

Section 1: 10-K (10-K)

**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

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

For the transition period from

to

Commission file number: 001-36355

Aerohive Networks, Inc.

(Exact name of registrant as specified in its charter)

Delaware

*(State or other jurisdiction of
incorporation or organization)*

20-4524700

*(I.R.S. Employer
Identification Number)*

**1011 McCarthy Boulevard
Milpitas, California 95035
(408) 510-6100**

*(Address, including zip code, and telephone number,
including area code, of registrant's principal executive offices)*

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

<u>Title of Each Class</u>	<u>Name of Exchange on Which Registered</u>
Common Stock, par value \$0.001 per share	New York Stock Exchange

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

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

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 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 and post such files). Yes No

Indicate by a check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§229.405 of this chapter) 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. Yes No

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

Large accelerated filer

Accelerated filer

Non-accelerated filer

Smaller reporting company

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 Act). Yes No

The aggregate market value of the registrant's common stock held by non-affiliates of the registrant as of the last business day of the registrant's most recently completed second fiscal quarter was approximately \$155.8 million based upon the closing sale price of such stock on the New York Stock Exchange. For purposes of this disclosure, shares of common stock held or controlled by executive officers and directors of the registrant and by persons who hold more than 10% of the outstanding shares of common stock have been treated as shares held by affiliates. However, such treatment should not be construed as an admission that any such person is an “affiliate” of the registrant. The registrant has no non-voting common equity.

The number of shares of the registrant's common stock, par value \$0.001, outstanding as of February 25, 2019 was 55,868,909.

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The Aerohive Networks design logo and the marks "Aerohive®", "HiveManager®", "HiveOS®", "Aerohive Networks™", "Aerohive Atom AP30™", "Aerohive Connect™", "Aerohive Select™", "HiveManager Connect™", "HiveManager Select™" and "HiveCare™", are the property of Aerohive Networks, Inc. All Rights Reserved. This Annual Report on Form 10-K contains additional trade names, trademarks and service marks of other companies.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K, including the sections entitled “Business,” “Risk Factors,” and “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. The words “believe,” “will,” “may,” “estimate,” “continue,” “anticipate,” “intend,” “should,” “plan,” “expect,” “predict,” “could,” “potentially” and similar expressions that convey uncertainty of future events or outcomes are intended to identify forward-looking statements.

These forward-looking statements include, but are not limited to, statements concerning the following:

- our ability to predict our revenue, operating results and gross margin accurately, including guidance we provide to our investors and investment analysts;
- our ability to timely develop, deliver and transition to new product offerings and transition existing and new end customers to such offerings, including in conjunction with our Connect product offering and data analytics, while maintaining existing product revenue and our existing service-level commitments to end customers;
- our ability to continue to identify opportunities and secure new customers for our products which are necessary to achieve future revenue growth;
- our ability to accurately estimate and predictably manage in a quarter shipments of products to our distributors, including in conjunction with our determination of guidance we provide to investors regarding our revenue, operating results and gross margin for the quarter;
- our ability to maximize the economic opportunity of the U.S. Federal Communications Commission’s E-Rate program and the timing and uncertainty of the availability of such funding, the level of available funding and the decisions by end customers to purchase our products using such funding;
- the length and seasonal unpredictability of our sales cycles;
- the effects of increased competition in and consolidation of our market and our ability to compete with larger competitors with greater financial, technical and other resources;
- our ability to attract new end customers within the verticals and geographies in which we currently operate;
- our ability to enhance and broaden our product and solutions offerings and timely bring new products, product functionality and solutions to market;
- changes in global consumer confidence and demand for our products internationally, due to disputes regarding trade and transfers of intellectual property, slowing global economic activity, changes to foreign currency exchange rates and other factors, including the decision of the United Kingdom to withdraw from the European Union;
- our ability to continue to build and enhance relationships with channel partners and to derive revenue from our investments in those partnerships, particularly with our strategic partners;
- our ability to protect our intellectual property and our exposure to third-party claims that we or our customers or channel partners infringe their intellectual property; and
- other risk factors included under the section titled “Risk Factors.”

These forward-looking statements are subject to a number of risks, uncertainties, and assumptions, including those described in “Risk Factors” included in Part I, Item 1A and elsewhere in this report. Moreover, we operate in a very competitive and rapidly changing environment, and new risks emerge from time to time. It is not possible for us to predict all risks, nor can we assess the impact of all factors on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements we may make. In light of these risks, uncertainties and assumptions, the forward-looking events and circumstances discussed in this report may not occur, and actual results could differ materially and adversely from those anticipated or implied in the forward-looking statements. We undertake no obligation to revise or publicly release the results of any revision to these forward-looking statements, except as required by law. Given these risks and uncertainties, we caution you not to place undue reliance on such forward-looking statements.

You should read the following information in conjunction with the Consolidated Financial Statements and the accompanying Notes to Consolidated Financial Statements we have included in this report.

PART I

ITEM 1. BUSINESS

Overview

Aerohive Networks, Inc. (together with its subsidiaries, “Aerohive Networks,” “Aerohive,” “Company,” “we,” “us,” and “our”), has designed and developed a leading cloud networking platform and product portfolio using cloud management, machine learning, and artificial intelligence to simplify and secure the access network. Our cloud-managed wireless, switching, routing, and security technologies provide flexibility and scalability in the deployment, management and licensing of networks globally. Our global cloud footprint provides network operations for 30,000+ customers and 10+ million daily users.

Technologies and Solutions

We are building a portfolio of products and solutions around four primary sets of technologies and capabilities:

- **Enterprise Cloud Networking.** Using cloud-based technologies, whether as a public or private cloud, to reduce the complexity of deploying and managing Wi-Fi access points, access switches, SD-WAN-capable routers and cloud-managed NAC solution;
- **Wi-Fi as the Primary Connectivity.** Putting more Wi-Fi intelligence and power closer to the end user using a distributed-control architecture that greatly simplifies network topologies and IT operations;
- **Cloud-Managed Network Access Control (NAC).** Securing, controlling and managing network-connected devices, including wireless and wired, IoT and BYOD, with our vendor-agnostic, cloud-managed NAC solution to reduce complexity and cost compared to traditional on-premises offerings; and
- **Machine Learning and Artificial Intelligence.** Applying machine learning to collected data sets to increase accuracy and actions to be driven by artificial intelligence to improve the operation of a customer's network.

We believe that each of these areas for innovation adds valuable customer capabilities, differentiates our offering, and showcases our continuing innovation.

Enterprise Cloud Networking. Our customers today are increasingly demanding ease and simplicity in how they deploy, manage, license, and operate their access networks with a particular emphasis on the Wi-Fi and security elements. Cloud networking positions us to deliver this to organizations of all sizes. Our cloud capabilities, including our HiveManager network management applications and A3 cloud-managed NAC, combined with machine learning and emerging developments in artificial intelligence technology, can provide the feature depth required for managing enterprise-class networks. We believe we are the only major vendor who can provide these enterprise-class capabilities in public cloud, private cloud and on-premise deployments.

We have chosen to focus on enterprise cloud management based on compelling benefits we believe we can offer our customers. Legacy approaches to network management have relied on complex enterprise applications that customers must install, integrate, maintain, and administer. New releases were infrequent, and updates installed by customers even less frequent. In contrast, our cloud-based network management provides a single, integrated management view across the entire network that a customer can access from virtually anywhere. We maintain and administer the network management application in the cloud, which users then access as a subscription service that can be regularly updated in response to new features or urgent changes.

With our innovations in cloud management, we believe we can deliver a number of important capabilities to our customers. While enterprise customers want simplified network management, they still need a full set of features and capabilities. Our “progressive disclosure” user interface means that advanced features are available but are hidden from view when not being used. Similarly, organizations that need to deploy the network often do not have technical staff at every location. Our cloud management supports automated provisioning, where a device that is connected to the network for the first time can automatically find and download its proper configuration. Our cloud management solution also includes troubleshooting capabilities, such as dashboards, to identify potential issues, and monitoring, to research and resolve them. Finally, cloud management makes it possible for a customer to evaluate the capabilities of our solution. A single wireless access point with a corresponding license for HiveManager gives customers access to such capabilities. In addition, those customers who want the capabilities of cloud management, but also need to manage their network in their own datacenter, behind their own firewall, can install and run HiveManager “on premises” at a customer location with similar functionality and software as we offer in the public cloud. Overall, by taking advantage of our innovative capabilities, our customers are able to manage even large networks with a small staff and limited resources.

While we were an early leader in controllerless Wi-Fi and cloud management, we continue to innovate and to invest in HiveManager as our strategic cloud management application. We are focusing our current efforts on HiveManager (an updated version of our legacy HiveManager application, we now call HiveManager Classic). HiveManager features an updated user interface, improved troubleshooting, expanded access to data and analytics, and an upgraded cloud-deployment platform. HiveManager also offers a more dynamic platform for innovation. Throughout 2016, we delivered new releases of HiveManager that continued to expand our enterprise feature set and improve the user experience. In January 2017, we announced HiveManager Connect, a simplified version of HiveManager included as a part of our new Aerohive Connect product line designed for customers with less complex, connectivity-oriented requirements. Aerohive's Connect customers can purchase a subscription to upgrade to our current full-featured Aerohive Select offering to access additional capabilities, such as advanced security and troubleshooting tools, support for BYOD programs, increased network visibility, enterprise support options, and the ability to deploy HiveManager on-premises or in a private cloud environment. In 2018, we added machine-learning and artificial intelligence capabilities to our HiveManager application, such as: Client 360, to improve the client experience; Network 360, to improve the health and performance of the network; and an Amazon Alexa Skill called HiveManager Shortcuts, to provide network administrators with a voice-driven, AI-powered interface to provide hands-free network monitoring and performance analytics on-the-go using simple voice commands.

Throughout 2018, we have seen significant increase in the rate of migration from HiveManager Classic to HiveManager by existing customers, and HiveManager has become the primary choice for new customers. However, we will continue to offer and support both versions of the application, while working with current HiveManager Classic customers as appropriate to migrate to HiveManager.

Wi-Fi as the Primary Connectivity for the Enterprise. We have built our Wi-Fi around a distributed-control and data-plane architecture that simplifies deployment, management, and operation while providing resiliency. We believe our distributed-control and data-plane technology remains one of our key innovations and differentiators. Over the last decade, Wi-Fi architectures have gone through a series of evolutions in response to changing technologies and user requirements. When the original autonomous Wi-Fi access points proved difficult to manage vendors introduced wireless LAN controllers to the network. Wireless LAN controllers brought management and control, but they also brought the cost and complexity of dedicated hardware, a new single point of failure, and rigid deployments less able to meet dynamic requirements of wireless networks. To overcome these limitations other vendors have integrated their controller with switches or Wi-Fi access points, or moved their controllers into the cloud, with greater cost and limited capabilities. In contrast, our architecture distributes the control plane across the Wi-Fi access points, eliminating the need for any wireless LAN controller and reducing costs of operation. We deliver distributed control through HiveOS, our device-operating system that runs on every Aerohive Wi-Fi access point. HiveOS delivers radio management, client roaming, load balancing, policy enforcement, packet inspection and other functions locally on the Wi-Fi access point.

Our distributed-control and data-plane architecture provides several benefits to our customers. Most important is the scalability of a single architecture. Most of our competitors have different technologies and products for different sizes of deployments. Instead, our customers can start small and grow as they need to without change in architecture or Wi-Fi technology. Our customers can also mix different generations of Wi-Fi access points in the same network; thus, preserving existing infrastructure investments. Overall, by intelligently distributing control over the Wi-Fi access points our architecture can support faster deployments and greater resiliency.

Integral to our scalable Wi-Fi is the ability to enforce security at the Wi-Fi access point based on the end customer's access policies, which can be based on the application being used, or other factors such as the device user identity and role, device type and ownership, and network access location and time of day. Our Private Pre-Shared Key ("PPSK") technology extends these capabilities to assign each device a unique key for accessing the network that can be authorized or revoked without impacting other network devices. PPSK can also be used in Internet of Things ("IoT") deployments to authorize devices that do not have a keyboard or some other mechanism for providing credentials.

While we emphasize our Wi-Fi capabilities our portfolio also includes cloud-managed access switches and SD-WAN-capable routers. Our Wi-Fi access points do not require either our access switches or SD-WAN-capable routers: they can be used with products from other major network hardware manufacturers. However, customers who purchase our access switches or SD-WAN-capable routers gain the ability to manage them with their wireless access points through a single HiveManager interface.

Cloud-Managed NAC. Access networks present multiple IT security challenges due to an ever-growing number of corporate and guest devices, as well as IoT and Bring-Your-Own-Device ("BYOD"), needing to be securely on-boarded and provisioned with the access rights appropriate for their roles. Once authenticated, the devices accessing the network can continue to pose security risks due to malware and compromised third-party applications the devices may accumulate over time.

A3, our cloud-managed NAC solution we introduced in 2018, provides security for all devices on the network. It delivers enterprise-grade functionality for device onboarding, visibility, profiling and policy enforcement, while its cloud-management option offers deployment simplicity, flexibility and scalability. Streamlined user-interface ("UI")-based workflows can further reduce the operational complexity and cost typically associated with competing offerings. A3 can orchestrate complementary security solutions, leveraging them to extend and unify policy enforcement to further bolster overall network security. A3 is vendor agnostic, with functionality supported on all major vendor networks. When deployed on an Aerohive network it delivers benefits like single-pane-of-glass management from Aerohive's HiveManager and PPSK.

Machine Learning and Artificial Intelligence. Increasingly, our customers are looking for value from the data their networks generate. Aerohive's access networks can be instrumented to collect and process enormous amounts of data using machine learning and emerging developments in artificial intelligence technology, focusing on characterizing client experience, application usage, and infrastructure device effectiveness. We believe such machine-learning-derived results, coupled with the ability to utilize artificial-intelligence-driven actions, can address a variety of use cases, including:

- **Component Benchmarking and Health.** Tracking and comparing utilization of a customer's network components to other access networks of a similar size and domain;
- **Client Benchmarking and Health.** Tracking and comparing client experience in a customer's access network to other access networks of a similar size and domain; and
- **Presence and Location.** Tracking, correlating and reporting the proximity (Bluetooth-derived), presence (Wi-Fi-derived) and/or location (Wi-Fi-derived) of user and devices in near-real-time or over time.

Application developers are also able to take advantage of the Aerohive Cloud Services ("ACS") platform. The ACS platform collects data for our customers from Aerohive network devices and, we expect in the future, from other vendor devices or third-party sources. We are also developing the ability to collect and aggregate data for our customers into a secure and scalable cloud-based store, which then can be processed and made available to our customers externally via APIs. Application developers can incorporate these APIs into their applications in order to receive data and analytics from us without needing to collect and process this data themselves. This approach means that the ACS platform has the extensibility to support additional use cases in the future. We expect to continue to expand the APIs and analytics that we make available from the ACS platform in order to encourage and enable an open-application-development environment to make possible compelling applications for our partners and customers.

Products

We offer our solution to end customers as a portfolio of products that includes our hardware products, cloud-based network management and applications, and support services.

Our hardware products include Wi-Fi access points, access switches and SD-WAN-capable routers. Our hardware design team develops our hardware products by working in conjunction with original design manufacturers ("ODMs"). Our Wi-Fi access points and SD-WAN branch routers run our proprietary HiveOS operating system. We generally sell our access switches and SD-WAN-capable routers in conjunction with a sale of Wi-Fi access points. We also sell our Wi-Fi access points for use with other manufactures' access switches and routers.

Our cloud-based product offering includes HiveManager, our next-generation network management application which features an updated user interface, improved troubleshooting, expanded access to data and analytics and an upgraded cloud-deployment platform.

We offer tiered maintenance and support services under renewable, fee-based maintenance and support contracts, which include technical support, bug fixes, access to priority hardware replacement services and unspecified upgrades on a when-and-if-available basis. Our Software as a Service ("SaaS") subscriptions include comparable maintenance and support services.

We continue to look for new ways to package and deliver our product to address customer demand and market opportunity. In January 2017, we introduced our Aerohive Connect product line targeting customers with simpler connectivity-oriented use cases. All Aerohive access points and switches can be purchased and deployed with Aerohive's subscription-free Connect offering, which is a simplified version of HiveManager, and community/email-based customer support. We offer Aerohive Connect as a complement to, not a replacement for, our full offering which we refer to as Aerohive Select. Aerohive Select remains our flagship solution capable of addressing the most-demanding enterprise network, deployment, and security requirements. Aerohive Connect customers can easily upgrade to Select at any time with the purchase of an entitlement key that provides access to additional feature sets and support. We expect many customers who might otherwise not initially consider Aerohive to be nonetheless attracted to the simplicity and low cost of Aerohive Connect and the ability to transition later to Aerohive Select as their network requirements evolve.

In April 2018, we introduced the Aerohive Atom AP30, the first enterprise-class pluggable access point designed to augment or replace ceiling-mounted access points and to simplify providing connectivity in both easy and hard-to-reach locations with the ability to quickly fill in Wi-Fi dead zones, improve meeting space capacity and network validation, and reduce the need for wiring.

In July 2018, we shipped the first family of enterprise-class access points, the AP630, AP650 and AP650X, based on the developing 802.11ax standard (also known as Wi-Fi 6). These newest-generation access points are designed for high density and performance environments, combining IEEE's 802.11ax technology with our HiveManager network management system, machine learning, and artificial intelligence capabilities. In addition, the integrated BLE radio and a USB interface in these access points open a multitude of deployment use-cases in IoT and proximity/location-oriented services.

In September 2018, we introduced the XR600P, our highest capacity SD-WAN branch router, capable of operating as both VPN client and server, which offers larger branches increased throughput, secure application-aware traffic shaping and monitoring, end-to-end QoS, and dynamic link prioritization. Managed by HiveManager, Aerohive's industry-leading cloud-management platform, Aerohive's XR routers can be deployed with ease and at scale alongside Aerohive's unified switches and access points for a full-stack distributed access network solution.

Segment and Geographic Information

We operate one reporting segment and operating segment structure. We present financial information about our operating segment and geographic areas in Note 10 to our Notes to Consolidated Financial Statements.

Customers

We sell our products to end customers through a network of authorized distributors, value-added resellers ("VARs") and managed-service providers ("MSPs"). We have sold our products to tens of thousands of end customers worldwide. We define end customers as organizations holding or having held licenses to our products and software subscription and services. Our end customers represent a broad range of industry verticals, including education, distributed enterprises, retail, hospitality and healthcare. In many cases, our target customers are installing a Wi-Fi network for the first time, or in parts of their organization that do not currently have Wi-Fi installed. In other cases, our customers already have a Wi-Fi network installed and our opportunity is to engage them in a future expansion or replacement of their current solution.

Sales

We use channel partners to sell and deliver our solutions to our end customers, which we support through our sales organization. Our sales teams are located in the United States, Asia Pacific and in Europe and focus on the development and enablement of our channels, the acquisition of end customer accounts in both the enterprise and State & Local Government/Education segments and overall market development. Our sales engineers have responsibility for pre-sales technical support, solutions engineering for our end customers, and technical training for our channel partners. We continue to evaluate and adjust our sales headcount in our principal and emerging markets based on a combination of our current sales results and future sales potential.

Our sales team works with our channel partners who have networking, Wi-Fi, security and/or vertical market expertise to win and support end customers through a direct-touch approach. Our distributors sell our products to and support our VARs, who then sell our products directly to end customers, often with the addition of their own installation or professional services. We are increasingly working with MSPs, who bundle our product and service offerings with their own infrastructure and services to provide ongoing network operations and management to end customers. This includes traditional VARs who are now expanding their services offering to include ongoing network management services.

We extend our sales capabilities through strategic alliances with companies such as Dell EMC and Juniper Networks. We hope to develop such alliances to be meaningful contributions to our business going forward.

Backlog

We typically accept and ship orders for product and related services within a short time-frame. However, our partners may reschedule orders without penalty, or we may delay shipment due to inventory constraints. As such, we do not believe that our backlog at any particular time is a reliable indicator of future revenue.

Research and Development

Continued investment in research and development is critical to our business. To this end, we have assembled a team of engineers with expertise in various fields, including networking platforms, cloud operations and applications, security systems, RF functions, user-interface design and open-source programming. We currently conduct our research and development efforts in California, with an additional facility in China.

We have invested significant time and financial resources in the development of our products, including our cloud services platform, HiveManager, and operating platform, HiveOS. We view continued investment in these capabilities as essential to our ability to differentiate ourselves in a competitive industry and to continue to be able to grow our business. For example, in 2015 we released HiveManager, our next-generation cloud services platform which provides a basis for data services and data analytic applications, and we released additional software modules to enhance the functionality and performance of our HiveOS operating system. In 2015, we announced our ACS platform, which provides a secure and scalable cloud-based big data store for data collected from Aerohive network devices, other devices, or third-party sources, which can then be available to application developers to incorporate their API applications without needing to collect and process this data themselves. In April 2016, we announced with our partner Dell EMC, a Dell-branded version of HiveManager capable of managing Dell N-series switches in the same network as Aerohive Wi-Fi access points, delivering multi-vendor integrated wired and wireless network management. Throughout 2016, we delivered new releases of HiveManager that continued to expand our enterprise feature set and improve the user experience. In January 2017, we announced HiveManager Connect, a simplified version of HiveManager included as a part of our new Aerohive Connect product line designed for customers with less complex, connectivity-oriented requirements. Aerohive's Connect customers can purchase a perpetual license or subscription to upgrade to our current full-featured Aerohive Select offering to access additional capabilities, such as advanced security and troubleshooting tools, support for BYOD programs, increased network visibility, enterprise support options, and the ability to deploy HiveManager on-premises or in a private cloud environment. The capabilities of our scalable cloud platform enabled all of these innovations.

Later in 2017 we also announced our SD-WAN solution for highly distributed commercial enterprises, retail chains, and long-term healthcare providers which, when combined with our existing SD-LAN offering, enables organizations to simplify branch deployments with a unified cloud-management Wi-Fi, switching, and SD-WAN VPN routing solution. In 2018, we announced our A3 cloud-managed NAC solution, Aerohive Atom AP30 pluggable access point, XR600P SD-WAN branch router, as well as our family of enterprise-class access points based on the developing 802.11ax standard.

We plan to continue to expand our product offerings and solutions capabilities in the future and to dedicate significant resources to these research and development efforts.

Manufacturing

We outsource the manufacturing of our hardware products to ODMs currently located in China and Taiwan. We believe that using original design manufacturers helps to optimize our operations by lowering costs, reducing time-to-market and enabling us to adjust to changing end customer demand.

Our ODM partners ship finished products to our warehousing and delivery logistics centers in the U.S., the Netherlands, Malaysia and China. We operate these logistic centers for all end customer shipments, whether destined to locations in the Americas, Europe, the Middle East and Africa ("EMEA"), or Asia Pacific and Japan ("APAC").

Our manufacturing partners procure components and assemble our products based on our demand forecasts. These forecasts represent our estimates at the time of future demand for our products, based upon historical trends and the assessment of our sales and product management functions of end customer demand and overall market conditions.

Our ODMs source the component parts within our products. We do not contract directly and do not have any long-term manufacturing contracts that guarantee us any fixed access to such component parts or specific pricing. This absence of direct and long-term component supply contracts may increase our exposure to shortages of component availability and to price increases which the ODM or supplier may charge in response to increased product demand or fluctuations related to the raw material inputs for such components. In addition, during periods of continued fluctuating or flat customer demand for our products our ODMs may be required to slow the production rate for those products, thus increasing costs, extending time-to-market and otherwise creating uncertainty for our ODM relationships.

Competition

We operate in a competitive market for enterprise mobility and network-edge infrastructure, which continues to experience constant change and consolidation. Our competitors include general networking and independent Wi-Fi vendors, such as Cisco/Meraki, Hewlett-Packard/Aruba, Arris/Ruckus, Ubiquiti, Extreme Networks, Huawei and Riverbed/Xirrus whose portfolios include enterprise mobility solutions and wireless access products.

Trends in enterprise network infrastructures and mobility are all significantly increasing the importance of access networks and Wi-Fi to our target customers. As organizations address the proliferation of mobile devices, increased BYOD utilization, enterprise adoption of cloud and the adoption of mobile-first applications they compare competing access network and wireless infrastructure products based on:

- ability to address specific customer-use cases;
- ease-of-use and simplicity of solutions;
- price and total cost of ownership;
- flexibility and feature-depth of solutions;
- ability to meet deployment requirements;
- ability to support business or customer-facing applications;
- performance and scalability of products;
- network survivability and reliability of solutions;
- security of the network; and
- for service providers, ability to support business/operating models.

We believe that we generally compete favorably on the combined basis of all of these factors. However, some of our competitors have better solutions for one or several of these factors. Many of our competitors have substantially greater financial, technical and other resources, greater name recognition, longer operating histories, larger sales and marketing budgets, broader distribution and established relationships with distribution partners and end customers, and larger and more mature intellectual property portfolios which provide a greater ability to assemble, market, aggressively price and more quickly bring to market different capabilities across integrated product platforms. Other competitors are also working to grow their cloud-networking capabilities, an area that has been one of our key differentiators.

Seasonality

See Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations" for information regarding seasonality of our business.

Intellectual Property

Our success depends in part upon our ability to protect our core technology and intellectual property. We rely on patents, trademarks, copyrights and trade secret laws, confidentiality procedures, and employee disclosure and invention assignment agreements to protect our intellectual property rights. As of December 31, 2018, we had 75 issued patents and 48 patent applications pending in the United States relating to our current and next-generation networking products, operating platform and cloud-based applications, and the ability to claim priority to most of the patent applications worldwide. Our patents issued in the U.S. will expire between 2028 and 2036. However, these patents or any patents that may issue to us in the future may be subject to re-examination, contest, circumvention, or found unenforceable or invalidated, and we may or may not be able to prevent third parties from infringing them. We also license software from third parties for integration into our products, including open-source software. We believe our licenses are on commercially reasonable terms.

We utilize internal and external controls to restrict access to and use of our proprietary software and other confidential information, including contractual protections with employees, contractors, end customers and channel partners. Our software is also protected by U.S. and international copyright laws. However, despite our efforts to protect our trade secrets and proprietary rights through intellectual property rights, licenses and confidentiality agreements, and reasonable security measures, third parties may still copy our products or otherwise gain access to or obtain and use our proprietary software and technology without our knowledge or authority or in ways we do not intend.

Our industry is characterized by the existence of a large number of patents, and competitors increasingly may utilize litigation regarding patent and other intellectual property rights to protect or expand their market position. In particular, leading and more mature companies in the wireless networking industry have extensive patent portfolios and are regularly involved in both offensive and defensive litigation. As end customers increasingly use our products and services, and to the extent that we gain greater visibility and market exposure as a public company, we face a higher risk of being the subject of intellectual property infringement claims from third parties, not only from our competitors but also increasingly from non-operating entities, who will be more likely to claim that our platform infringes their proprietary rights. From time-to-time, such third parties, including certain of these leading companies and, increasingly, non-operating entities, may assert patent, copyright, trademark, and other intellectual property rights against us, our channel partners or our end customers. In these instances, our standard license and other agreements may obligate us to indemnify our channel partners and end customers against such claims. Successful claims of infringement by a third party could prevent us from distributing certain products or performing

certain services, require us to expend significant management attention and money to develop non-infringing solutions or force us to pay substantial damages, royalties or other fees. This could include treble damages, if we are found to have willfully infringed patents or copyrights. We currently do not maintain insurance coverage against any such claims.

In addition, our products utilize software modules under third-party open-source licenses, including as incorporated into software we receive from third-party commercial software vendors. Some open-source licenses contain requirements that we make available source code for modifications or derivative works we create based upon the type of open-source software that we use. If we combine our proprietary software with open-source software in a certain manner, we could, under certain open-source licenses, be required to release portions of the source code of our proprietary software to the public. This could allow our competitors to create similar products with lower development effort and time, and ultimately could result in a loss of product sales for us.

We cannot assure that we do not currently infringe, or that we will not in the future infringe, or that we can resolve through litigation or on reasonable settlement terms, any such claims against us relating to, any third-party patents or other proprietary rights, including relating to use of third-party open source software. See “Part I, Item 3 - Legal Proceedings” and “Part I, Item 1A - Risk Related to Our Intellectual Property” for additional information.

Employees

As of December 31, 2018, we had approximately 460 employees in offices in the Americas, EMEA and APAC. None of our employees is represented by labor unions, whether in the United States or abroad. We consider all current employee relations to be good. However, we continue to see employee turn-over, particularly amongst our employees in Silicon Valley where competition is typically high for sales and engineering personnel.

Corporate Information

In March 2006, we incorporated our business in the State of Delaware. Our principal executive offices are located at 1011 McCarthy Boulevard, Milpitas, CA 95035. Our telephone number at that location is (408) 510-6100. Our website address is www.aerohive.com. Information on our website is not part of this prospectus and should not be relied upon in determining whether to invest in our common stock.

We are an emerging growth company as defined in the Jumpstart Our Business Startups Act of 2012 (“JOBS Act”). We will remain an emerging growth company until the earlier of (1) the last day of the fiscal year (a) following the fifth anniversary of our initial public offering, (b) in which we have total annual gross revenue of at least \$1.07 billion, or (c) in which we are deemed to be a large accelerated filer, which means the market value of our common stock that is held by non-affiliates exceeds \$700 million as of the prior June 30th, or (2) the date on which we have issued more than \$1.0 billion in non-convertible debt securities during the prior three-year period.

Website Posting of SEC Filings

We make available on our website, free of charge, our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and amendments to such reports, as soon as reasonably practical after we electronically file or furnish them with the SEC. You can access these reports and amendments by clicking on the “Company” and the “Investor” tab, which will take you to our Investor Relations Home page. The SEC maintains an internet site that contains reports, proxy and information statements and other information regarding our filings at www.sec.gov. The contents of our website are not incorporated into, or otherwise to be regarded as a part of, this report or any other report we file with or furnish to the SEC.

Investors and others should note that we announce material financial information to our investors using our website (<https://www.aerohive.com>) and, specifically, its Investor Relations Home page (<https://ir.aerohive.com>). This includes news and commentary about our business and financial performance, SEC filings, notices of investor events, press and earnings releases, and public conference calls and webcasts. We use these channels as well as social media to communicate with our investors and the public about our company, our services and other issues. We also provide corporate governance information, including our corporate governance guidelines, board / committee charters, and code of conduct, on the Investor Relations Home page of our website under the heading “Corporate Governance.” It is possible that this information, as well as information we post on social media, could be deemed to be material information. Therefore, we encourage investors, the media, and others interested in our company to review the information we post on our website and social media channels. However, the contents of our website and information we may post on social media channels are not incorporated by reference into this Annual Report on Form 10-K or in any other report or document we file with the SEC, and any references to our website or social media channels are intended to be inactive textual references only.

ITEM 1A. RISK FACTORS

In evaluating Aerohive and our business, you should carefully consider the risks and uncertainties described below, together with all of the other information in this report, including our condensed consolidated financial statements and related notes. The risks and uncertainties described below are not the only ones we face. If any of the following or other risks occur, our business, financial condition, operating results, and prospects could be materially harmed. In that event, the price of our common stock could decline, and you could lose part or all of your investment.

Risks Related to Our Business

We have a history of losses and we may not achieve profitability in the future.

We manage our ongoing operating expenses in an effort to position us to achieve non-GAAP operating profitability at certain target levels of quarterly revenue, which we may announce publicly from time-to-time. We may subsequently take actions which could raise or lower the level of quarterly revenue we would need to achieve non-GAAP profitability in any period. Nonetheless, we have a history of losses. We have never achieved GAAP profitability on a quarterly or annual basis, and we cannot predict with certainty whether or when we might be profitable in the foreseeable future, even on a non-GAAP basis and even at these revenue levels. Our net losses on a GAAP basis were \$38.2 million, \$22.1 million and \$18.3 million for fiscal years 2016, 2017 and 2018, respectively. As of December 31, 2018, our accumulated deficit was \$265.8 million. We expect to continue to incur expenses associated with the continued development and expansion of our business, including expenditures to hire additional personnel: specifically, personnel costs relating to sales, marketing and engineering, and investments in channel and product development and support. As such, we may not control our expenses sufficiently to achieve operating profitability on a non-GAAP basis even if we achieve quarterly revenue in the indicated target range. If we fail to increase our revenue and manage our cost structure, we may not achieve profitability in the future. Once achieved, we may not be able to sustain or increase our profitability, at all or at levels our investors or industry analysts expect, or we may choose to continue to make investments in our operations which we feel will promote long-term growth, but which will reduce near-term profitability. This could also require us to continue to use available cash to support our investments and ongoing operations. As a result, our business and prospects, and how investors view and value our common stock, would be harmed.

Our operating results may fluctuate significantly from period to period, which makes our future operating results difficult to predict and could cause our operating results in any particular period or over an extended period to fall below expectations of investors or analysts.

Our operating results have fluctuated significantly in the past and we expect will continue to fluctuate significantly in the future. In particular, the timing and size of sales of our products and services, including results across regions, are highly variable and difficult for us to predict and can result in significant fluctuations in our revenue from period to period. Other participants in our industry have also experienced these fluctuations. As a result, our future results in any particular period or over any extended period may be difficult for us, our investors and analysts to predict.

In addition, our planned expense levels depend in part on our expectations of future revenue. We may choose to maintain or increase levels of investment in areas such as R&D and sales and marketing, despite near-term fluctuations in revenue, in order to position us for continued growth. We also may reduce product prices in order to increase revenue growth and/or penetration of our products into targeted verticals. For example, in January 2017, we announced HiveManager Connect, a simplified version of HiveManager included as part of our new Aerohive Connect product line designed for customers with less complex connectivity-oriented requirements. Under the Aerohive Connect program, customers may purchase access points at lower list prices. Aerohive Connect customers can expand their Connect deployment, as needed, and can add subscriptions or licenses to upgrade to our full-featured Select offering and premium support services. We believe that separating our product line into these two offerings delivers attractively priced cloud-managed hardware for connectivity-oriented deployments and positions us to capture more subscription and software license revenue from those customers who require a more advanced feature set and support. However, this program may reduce our revenue, or the rate of our revenue growth, as purchasers take advantage of the lower entry pricing for our products. In addition, it may be difficult and take time for us to adjust expenses sufficiently to compensate for a shortfall in revenue, even when we may anticipate the shortfall. In such instances, even a small shortfall or seasonal fluctuation in revenue could disproportionately and adversely affect our overall operating margin, operating results and use of cash for a given quarter.

Our operating results may also fluctuate due to a variety of other factors, both within and outside of our control and which we may not foresee, or which we may foresee but not effectively manage, including changing and volatile domestic and international economic environments, and demand for our products in general and from any particular vertical which may be a target market for our products. Such factors may cause our operating results and stock price to fluctuate. In addition to other risks listed in this “Risk Factors” section, factors that may affect our operating results include:

- fluctuations in demand for our products and services, including seasonal variations, especially in the education vertical where purchasing in the United States has typically been stronger in the second and third quarters and weakest in the first and fourth quarters, and where purchasing at any time may depend on the availability of funding, including fluctuations based on the timing and availability of funding for schools under the Federal Communications Commission's ("FCC") E-Rate program and the decisions of schools to defer purchases in anticipation of the availability of such funding or due to a decision to delay product deployments;
- our ability to forecast and provide guidance to our investors and industry analysts regarding our revenue and operating results in any particular period, or to achieve results consistent with the guidance we provide;
- our ability to control operating expenses in order to achieve non-GAAP operating profitability in any particular quarterly period;
- our ability to hire, train, develop, integrate and retain a sufficient number of skilled sales and engineering employees to support our continued operations, including, specifically, in Silicon Valley, and to replace turn-over of our employees in these functions and location;
- the complexity, length and associated unpredictability of our sales cycles for our products and services;
- changes in end customers' budgets for technology purchases and delays in their purchasing decisions and cycles;
- technical challenges in end-customer networks, which may be unrelated to our products, and which could delay adoption and installation and impact the operation of our products and purchases of our services;
- delay in development and availability of component parts, and volatility in the pricing for such parts, needed for development and timely introduction of our next-generation products and product features and continued availability of legacy products at volumes we need to meet demand;
- our ability to develop, increase and sustain sales capacity and efficiency and consistent sales productivity across all our sales territories;
- changes in the competitive dynamics of our target markets, including new entrants, further consolidation and pricing trends which suggest commoditization of certain product segments;
- variation in sales channels, product costs, prices or the mix of products we sell;
- the timing of our shipments of products to our distributors, the level of inventory we deliver and the associated revenue we recognize for such products under ASC 606;
- our contract manufacturers' and component suppliers' ability to meet our product demand forecasts on time, at acceptable prices and requested volumes, or at all, particularly with respect to our newer products;
- our ability to develop and make more productive relationships with our channel and strategic partners, including specifically Dell EMC and Juniper Networks, and such partners' ability to effectively develop sales opportunities for us and distribute our products;
- the timing of product releases or upgrades by us or by our competitors, such as next-generation products or product features;
- our ability to successfully expand the suite of products we sell and services we offer to existing end customers and channel partners, to timely introduce and effectively manage new product introductions and transition both of existing products and operating platforms and our end customers to these new products and services, including timely transition of our end customers to HiveManager and our Connect offering, and to limit disruption to our end customers' ordering practices and the pricing environment for our legacy products and services while maintaining levels of revenue, gross margin and operating performance which we or our investors and analysts expect;
- our continuing transition to a channel-focused "Go-to-Market" selling model and our ability to maintain levels of revenue growth our investors and analysts may expect through this transition;
- our ability to identify and attract new customers for our products, while maintaining relationships with our existing customers, which is necessary to continued future revenue growth;
- our ability to predict and manage availability of our product effectively, in order to be able to take advantage of sales opportunities in a particular period;
- the potential need to record additional inventory reserves for products that may become obsolete or slow-moving due to our new product introductions, changes in end customer requirements, new competitive product or service offerings or our over-estimation of demand for such products as of any particular period;
- our decision to continue investing in sales, marketing, engineering and other activities in response to changes in the marketplace or perceived marketplace opportunities or in anticipation of or to position us for future growth;

- our ability to control costs, including our operating expenses and the costs of the components we purchase while continuing to derive benefits from our investments in sales, marketing, engineering and other activities;
- periods of continuing strength of the U.S. dollar relative to the currencies of the countries of our distributors or end customers who purchase our products, or of our contract manufacturers or the component suppliers to our contract manufacturers, which may require us to reduce pricing for our products outside the United States in order to maintain sales and revenue performance, or raise the cost we must pay to our manufacturers for our products, resulting in either case in lower revenue and/or gross margins for those products;
- volatility in our stock price, which may harm our ability to attract, incentivize and retain our employees using stock-based compensation;
- the ability of our competitors, including those with greater financial resources, to introduce new products, product features and services more quickly and in response to end customer demand and to drive down pricing on our products and services, which could materially reduce our revenue and gross margins;
- our ability to achieve as of any particular period or over time a level of financial performance consistent with the expectations of our investors and industry analysts; and
- general economic or political conditions in our domestic and international markets, including, specifically, in Europe, where the determination of the United Kingdom to exit the European Union has dampened economic activity and growth in the market for our product, or globally, where trade conditions and/or the introduction of tariffs or other barriers to trade, could increase the cost to us of component parts or of our products to our end customers.

The effects of these factors, individually or in combination, create unpredictability in our operating results, our ability to forecast those results and our ability to achieve those forecasts. As a result, you should not rely on our past results as an indication of our future performance and comparing our operating results on a period-to-period basis, or anticipating our future results based on our public forecasts, may not be meaningful. This variability and unpredictability could also result in our failing to meet the expectations of our investors or financial analysts for any period. We may release guidance in our quarterly earnings conference calls, quarterly earnings releases, or otherwise, based on management predictions, which are necessarily speculative in nature. Our guidance may vary, and has varied, materially from actual results. For example, on January 16, 2018, we announced preliminary revenue results for our fourth quarter of fiscal year 2017, which was below the revenue outlook we had provided for the period in November 2017 and the price of our common stock dropped significantly following our announcement in January 2018 of preliminary revenue results for the fourth quarter. We believe that different factors contributed to our disappointing revenue result in the period. For example, we believe poor sales execution issues were primarily responsible for our revenue short-fall in the fourth quarter of our fiscal year 2017. If our revenue or operating results, or the rate of growth of our revenue or operating results, fall below the expectations of our investors or financial analysts, or below any forecasts or guidance we may provide to the market, or if the forecasts we provide to the market are below the expectations of analysts or investors, the price of our common stock could decline substantially. Such a stock price decline could occur even when we have met our own or other publicly stated revenue or earnings forecasts. Our failure to meet our own or other publicly stated revenue or earnings forecasts, or even when we meet our own forecasts but fall short of analyst or investor expectations, could cause our stock price to decline and expose us to costly lawsuits, including securities class action suits. For example, purported class action law suits were filed in January 2018 asserting that statements we made in conjunction with our financial outlook for the fourth quarter of 2017 were false or misleading, or failed to include material information. See Note 5 - Commitments and Contingencies in this Annual Report on Form 10-K for additional information regarding these class action law suits. These suits and other potential such litigation against us could impose substantial costs and divert management's attention and resources.

Our results are subject to seasonal variances, which make it difficult to compare or forecast our financial results on a quarter-by-quarter basis.

Our revenue fluctuates on a seasonal basis, which affects the comparability of our results between periods. For example, our total revenue has historically decreased from our fourth quarter to the first quarter of our next fiscal year due to seasonal buying patterns and budget cycles from both our education and general enterprise end customers. Demand in the education vertical tends to be weakest in the first and fourth quarters. However, we also historically have seen a sequential increase in end-of-year purchases by enterprise customers in our fourth quarter, which we believe is mainly due to an expectation by such customers to complete purchases within their calendar-year budget cycles. These seasonal variations are difficult for us to predict accurately and at times may be entirely unpredictable or subject to our operating performance in any particular period. Our ability to sustain revenue growth from one quarter to subsequent quarters, particularly in our less-developed sales territories, or where we have experienced recent turn-over, introduces additional risk into our business and our ability to accurately provide our own publicly stated revenue and earnings forecasts. In addition, we rely upon forecasts of end customer demand to build inventory in advance of anticipated sales. We believe our seasonal business pattern has become more difficult to predict, making it more difficult for us to forecast product demand, inventory requirements and our financial results,

including on a quarter-to-quarter basis. Moreover, part of our strategy is to increase our sales in non-education verticals, and if the mix of products we sell in any particular period changes the seasonal nature of our revenue may change in an unpredictable way, which could increase the volatility of both our financial results and stock price.

The market and demand for our products and services may not develop as we expect.

Historically, our revenue has grown. However, this rate of growth has been slowing over the past few years. For example, our revenue decreased 9% from 2016 to 2017 but was relatively flat, increasing by 1% from 2017 to 2018. We expect this slow-to-flat rate of our revenue growth could continue and may even turn negative. As the general demand for wireless networking in the industry verticals that we target, or demand for our products in particular, slows, our revenue may continue to grow at a slower rate than we anticipate, or not at all.

Part of our strategy depends upon expanding sales of our cloud-managed wireless networking, switching and routing products to medium and large enterprise headquarters, branch offices and teleworkers. We intend to continue to direct resources to improve HiveManager as the basis for data services and data analytics applications. Sales of such products, services and applications to enterprise end customers typically require long sales cycles and are subject to price sensitivity. Moreover, many potential end customers in the enterprise market have substantial network expertise and experience, which may require a more-costly and sophisticated marketing and sales strategy. It is unclear whether our end customers will pay for data analytics or other SaaS services we expect to provide or, instead, require us to provide them as enhancements to our support offerings (at no cost to them or incremental revenue to us).

In January 2017, we announced HiveManager Connect, a simplified version of HiveManager included as part of our new Aerohive Connect product line designed for customers with less complex connectivity-oriented requirements. Under the Aerohive Connect program, customers may purchase access points with a simplified version of HiveManager, and community/email-based customer support, at lower list prices. Aerohive Connect customers can expand their Connect deployment, as needed, and can add subscriptions or licenses to upgrade to our full-featured Select offering and premium support services. Our Aerohive Connect and Select offerings are available across our entire portfolio of access points and switches. We believe that separating our product line into these two offerings delivers attractively priced cloud-managed hardware for connectivity-oriented deployments and will enable us to capture more subscription and software license revenue from those customers who require a more advanced feature set and support. This program may reduce our revenue, or the rate of our revenue growth, as purchasers take advantage of the lower entry pricing for our products. In addition, it is unclear whether our customers will choose the simplified Connect product offering, even at the lower list prices offered, or whether we will be able to manage the transition amongst our customers to our Connect offering.

In addition, the rate at which shipments of our Connect business convert to revenue differs significantly from shipments of our Select business. It is difficult for us to predict for any period the mix of Connect and Select shipments. As such, even if we accurately forecast the total shipments for our products and services, the ultimate mix between Connect and Select shipments can lead to significantly different revenue we will recognize in the period, which could bring volatility and uncertainty to our operating results. The third quarter of our fiscal year 2017 was the first full quarter that our customers could choose between these two offerings. We believe that this difficulty to predict the specific mix of Connect and Select shipments during the quarter added uncertainty to our operating results for this quarter and continues to do so.

Furthermore, if our competitors offer services or provide technologies or application platforms superior to our current cloud-managed platform, or the new products and services we introduce, alone or as part of a more-integrated offering or at reduced pricing, it would have a material adverse effect on our business, operating results and financial condition. As a result, demand for our products, services and applications may not continue to develop as we anticipate, or at all. In addition, if new customers do not purchase our Connect products, or having purchased our Connect products they do not also purchase subscriptions to our Select offering, or if our existing customers migrate toward Connect products without also continuing to purchase our Select services and support offerings, in each case at all or at levels greater than we assume, our overall revenue, operating performance and margins could decline, perhaps significantly, making more difficult our ability to demonstrate growth and achieve profitability at expected revenue levels, and the value of our stock could decline.

A significant portion of our sales is concentrated in the education vertical, which may cause us to have longer sales cycles, and be subject to program funding uncertainties and constraints.

A significant portion of our revenue is concentrated in the education vertical. The majority of our sales in education is concentrated in both public and private K-12 institutions. This vertical is characterized by long sales cycles and often requires additional sales efforts. In addition, this vertical typically operates on limited budgets, and depends on annual budget approvals, which add additional uncertainty to the sales cycle. For example, the U.S. federal government is providing supplemental funding to local school districts in conjunction with its E-Rate initiative to assist districts to upgrade their technical infrastructure, including Wi-Fi infrastructure. The announced incremental federal funding is significant and available over a five-year period, which began in the second half of 2015. However, this program has been subject to uncertainty regarding its

eligibility criteria, the timing and specific amount of federal funding actually available during each annual funding cycle, and federal program guidelines and funding appropriations, each of which can change from year-to-year. Corresponding funding appropriation by respective states and local districts is also uncertain and, even upon such appropriation, local districts must still then submit and have approved applications consistent with the final timing and eligibility requirements of the federal program for that annual funding cycle.

The United Service Administrative Company ("USAC") experienced significant administrative challenges during 2016 and 2017 E-Rate cycles, causing the pace of release of approved funds and resulting availability of those funds to schools to continue to be significantly reduced. For example, the Federal Communications Commission publicly acknowledged USAC's continuing management of the E-Rate program by letter dated April 18, 2017, noting serious and persistent flaws in critical E-Rate processes which have caused persistent delays in funding commitments to schools and libraries. We believe that the significantly slower pace of E-Rate funding and other program execution issues were significant drivers of our weaker-than-expected order volume and lower revenue performance from our educational vertical in recent quarters. We believe that lower levels of E-Rate-funded transactions continued through 2018, and could also continue into 2019. These are specific examples of the many factors which add additional uncertainty to our future revenue from our educational end customers.

Our sales cycles often require significant time, effort and investment and are subject to risks relating to our operating performance.

Our sales efforts can take several quarters and involve educating our potential customers about the applications and benefits of our products, including the technical capabilities of our products and associated applications and services, and recruiting and developing our channel partners. We may experience slower-than-expected sales productivity or poor sales execution in certain territories, including in the United States and certain other regions where we continue to experience turn-over and poor sales efficiency in our Sales organization. For example, we changed our sales leadership in November 2017 and again in October 2018, and have made additional personnel and other changes in our sales organization as we continued to identify underlying sales execution issues. We continue to review our sales organization and make changes we believe will further develop and sustain efficiency and effectiveness within the organization and our channel operations. As we respond to turn-over or transition personnel in response to poor execution, newly hired personnel may also require several quarters to gain experience and develop their territories before achieving capacities we have assumed in our sales forecasts. This may slow in those regions our ability to maintain our rate of new customer acquisitions. We believe poor sales execution and lack of improvements to our sales productivity may continue to reduce our revenue performance in 2019. In addition, sales to our enterprise customers may also involve an extended sales cycle, and often initial purchases are small. Purchases of our products are also frequently subject to our end customers' budget constraints, multiple approvals, unplanned administrative processing and other risks and delays. Such end customers, in particular larger enterprise customers, also may hesitate to place orders with us, instead preferring our larger and longer-established competitors.

We need to develop new products and continue to make enhancements to our existing products to remain competitive in a rapidly changing market.

The technology and end customer demand in the wireless networking market change rapidly, which requires us to continuously develop and release new products and product features and associated applications and services. We must continuously anticipate and adapt to our end customers' needs and market trends, and continue to make investments to develop or acquire new products, applications and services that meet market demands, technology trends and regulatory requirements. If our competitors introduce new products, applications and services that compete with ours, we may be required to reposition our product offerings or introduce new products in response to such competitive pressure. We may also offer products and services, and/or combinations thereof at lower price points in order to broaden our penetration in the enterprise market.

Developing our products is challenging and involves substantial commitment of resources and significant development risk. Each phase in our product development presents serious risks of failure, rework or delay, any one of which could impact the timing and cost-effective development of products, and each of which could affect our ability to take advantage of a business opportunity or could jeopardize end customer acceptance of the product. Compared to our larger and longer-established competitors, our ability to develop and timely deliver new products and product functionality is limited. We also have experienced in the past and may in the future experience design, manufacturing, marketing and other difficulties that could delay or prevent the development, introduction or marketing of new products and enhancements. For example, we are currently bringing to market our family of next-generation Wi-Fi products, including our .11ax, SD-WAN and SD-LAN portfolio of products, and our HiveManager cloud-services platform providing cloud-delivered network management applications and on-premises network management, as well as supporting data structures, analytics and APIs. We also have announced programs to develop new data analytics services and API and security platforms. In 2018 we announced our A3 cloud-managed NAC solution, Aerohive Atom AP30 pluggable access point, XR600P SD-WAN branch router and our family of enterprise-class access points based on the developing 802.11ax standard. These are complex technical undertakings and subject to many variables and risks of delay.

If we fail to develop new products, product enhancements applications or services, or fail effectively to manage the introduction or transition of our end customers to these new products, product enhancements, applications or services, or our end customers or potential end customers do not perceive our products, product enhancements, applications or services to have compelling technical or cost-based advantages, our business and prospects could be adversely affected, particularly if our competitors are able to introduce solutions at lower prices and/or with increased functionality. In addition, our introduction of new or enhanced products requires that we carefully manage the transition from older products to minimize disruption in customer ordering practices and ensure that new products can be timely delivered to meet our end customers' demand and to limit inventory obsolescence. For example, in January 2017, we announced HiveManager Connect, a simplified version of HiveManager included as part of our new Aerohive Connect product line designed for customers with less complex connectivity-oriented requirements. Under the Aerohive Connect program, customers may purchase access points with a simplified version of HiveManager, and community/email-based customer support, at lower list prices. Aerohive Connect customers can expand their Connect deployment, as needed, and can add subscriptions or licenses to our full-featured Select offering and premium support services. We believe that separating our product line into these two offerings delivers attractively priced cloud-managed hardware for connectivity-oriented deployments and positions us to capture more subscription and software license revenue from those customers who require a more advanced feature set and support. This program may reduce our revenue, or the rate of our revenue growth, as purchasers take advantage of the lower entry pricing for our products. If our customers, both new and existing, choose the simplified and lower-priced Connect product offering, as an alternative to our Select offering, we could see a shift in the mix of these product offerings, thus reducing overall revenue, gross margins and ability to achieve profitability.

Further, after delivering new products we may identify and must then timely address performance issues as the products are used in the field in a particular environment or at a scale which we could not replicate or did not anticipate during development. Our end customers may also defer decisions to purchase our existing products in anticipation of our expected release of a next-generation product. We also may not correctly anticipate customer interest in or demand for new products and offerings, such as our A3 cloud-managed NAC solution, Aerohive Atom AP30 pluggable access point and family of enterprise-class access points based on the developing 802.11ax standard, as well as our data analytics services or API and security platforms, or our customers may expect that we provide these additional services as part of our existing product support (and at no cost to them or incremental revenue to us). If we do not carefully manage the timing of our new products or product feature releases, and effectively support the new products and product feature releases, we could interfere with our end customers' purchases and disrupt the pricing environment for our new and legacy products, which could drive down our revenues and operating margins.

As a result of these and other risks, we may not be successful in modifying our current products or introducing new products in a timely or appropriately responsive manner, or at all. If we fail to address these changes successfully, our business and operating results and prospects would be materially harmed.

Our gross margin will vary over time and may decline in the future.

Our gross margin was 65.8%, 67.4% and 67.3% for fiscal years 2018, 2017 and 2016, respectively. Our gross margin will vary over time, may be difficult to predict and may continue to decline in future periods. Our gross margin also varies across our product lines and, therefore, a change in the mix of products our end customers purchase in any period would likely have a significant impact on our overall gross margin in the period. During periods where our subscription and support services and deferred revenue we recognize in the quarter may disproportionately contribute to our overall revenue mix our overall gross margins for the period may similarly exceed our public guidance or internal forecasts. This may be true even where our gross margins from product revenue may be declining, whether due to our planned transition of sales from perpetual software licenses to subscriptions, declining product sales in general, competitive product or pricing pressures or our end customers choosing lower-priced products, including our own, such as our Connect offering.

When the exchange rate of the U.S. dollar relative to foreign currencies is strong, we may reduce pricing for our products outside the United States in order to maintain sales and revenue performance, or incur higher manufacturing costs, each of which would lower gross margins for those products.

The market for wireless networking products is also characterized by rapid innovation and declining average sales prices as products mature in the market place. Even if we are successful in launching new products, competition may continue to increase in the market segments in which we compete, which would likely result in increased pricing competition. To retain our average gross margin, we are required to continuously update our products and introduce new products and reduce our manufacturing costs and expenses, and we could fail to accomplish this. In addition, the sales prices for our products and services may decline for a variety of reasons, including sales strategy, competitive pricing pressures, customer demand, discounts, a change in the mix of products and services we sell, including seasonal changes in our end customers' ordering practices, anticipation of the introduction of new products or services and decisions by end customers to defer purchases, or promotional programs. Larger competitors, such as Cisco/Meraki, Hewlett-Packard/Aruba, Arris/Ruckus, Ubiquiti, Extreme

Networks, Riverbed/Xirrus and Huawei, each with significantly greater financial, sales, and engineering resources and/or more diverse product and service offerings, may reduce the price of their products or services that compete with ours or may bundle them with other products and services. If we do not similarly reduce our product manufacturing costs, or if we reduce our prices for such products or services in order to remain competitive, our gross margin and revenue will decline. Any such declines in our gross margins or revenue could have an adverse impact on the value of our common stock.

As a result of being a public company, we need to further develop and maintain our internal control over financial reporting. If our internal control over financial reporting is not effective, it may adversely affect investor confidence in our company.

We are required, pursuant to Section 404 of the Sarbanes-Oxley Act ("SOX"), to furnish a report by management on, among other things, the effectiveness of our internal control over financial reporting, which would include a disclosure of any material weaknesses our management identifies in our internal control over financial reporting.

We continue to develop our systems and documentation necessary to perform the evaluation needed to comply with Section 404. We may not be able to complete on an annual and ongoing basis our evaluation, testing and any required remediation in a timely fashion. During the evaluation and testing process, if we identify one or more material weaknesses in our internal control over financial reporting, we will be unable to assert that our internal controls are effective. Further, our independent registered public accounting firm is not required to report on the effectiveness of our internal control over financial reporting until the later of the year following our first annual report required to be filed with the SEC, or the date we are no longer an "emerging growth company," as defined by the Jumpstart Our Business Startups Act of 2012 (the "JOBS Act") which will be commencing with our Annual Report on Form 10-K for the fiscal year ending December 31, 2019. At such time, our independent registered public accounting firm may issue a report that is adverse in the event it is not satisfied with the level at which our controls are documented, designed or operating. To comply with the requirements of SOX, we are undertaking various actions, such as implementing new controls and procedures and utilizing internal and external resources. We have consumed and will continue to consume management resources and incur significant incremental expenses for SOX compliance on an ongoing basis.

We cannot be certain that we will not discover, or that we will timely discover, material weaknesses or control deficiencies in the future. If our remediation efforts are not successful or other material weaknesses or control deficiencies occur in the future, we may be unable to report our financial results accurately or on a timely basis, which could cause our reported financial results to be materially misstated and result in the loss of investor confidence or delisting of trading of our common stock on the New York Stock Exchange, or cause the trading price of our common stock to decline. If we are unable to conclude that our internal control over financial reporting is effective, or if our independent registered public accounting firm is unable to express an opinion on the effectiveness of our internal controls when it is required to do so by the applicable rules, we could lose investor confidence in the accuracy and completeness of our financial reports, which could cause the price of our common stock to decline, and we may be subject to investigation or sanctions by the SEC. We would also be in violation of certain covenants under our debt facilities, which could accelerate payment obligations and/or increase our borrowing costs significantly.

In order to generate revenue growth, we must service our existing customers while also continuing to identify and secure revenue from new customers.

An increasing portion of our revenue is from existing end customers. However, our long-term revenue growth depends on our ability to identify and secure new customers who will provide additional revenue going forward. As such, our future revenue may also be negatively impacted by lower new-customer-acquisition levels in prior periods. We believe our rate of new customer acquisition slowed in fiscal years 2016, 2017 and 2018, including as we began to transition our customers to new products and platforms. For example, we introduced our new HiveManager product to some of our larger and more complex customers before its feature set was able to fully address their requirements. We believe changes in our sales organization and turn-over or transition of personnel slowed our ability to maintain our rate of new customer acquisitions, in particular in the United States, and that this will continue into 2019. Lower customer-acquisition rates in prior periods has contributed to lower current rates of revenue growth. We believe that this continued slowing in our rate of new customer acquisition will continue to affect for several quarters our ability to generate revenue growth. We primarily look to our channel partners to identify and secure new customer opportunities. Unless we are able, through these partnerships, to increase our rate of customer acquisition, our rate of revenue growth over the long term and future actual revenue performance may fall short of investor expectations and analyst forecasts, which would cause the price of our stock to decline.

Our products utilize cloud-managed solutions, and our future growth relies in significant part in continued demand for cloud-managed solutions and our ability to develop and deliver such services.

Most of our end customers utilize our cloud-managed networking platform to access our applications through the Internet, rather than access our application through a physical device or virtual machine that our end customers host on their

premises. As our business grows, we must increase the capacity of our cloud-managed solutions and continue to develop new and innovative solutions that meet the needs of our end customers. Demand for our cloud-managed solutions could decline if we are not able to offer sufficient capacity at commercially reasonable prices or if confidence in the security of cloud-managed solutions in general, or our platform in particular, were to decline. In addition, a significant feature of our platform will increasingly be the ability to collect and analyze user data through applications specific to particular industry vertical and use cases. Regulatory changes in the U.S. and internationally relating to the use of end customer data, including requirements under the GDPR, California Consumer Privacy Act and other data privacy and security regulations, or shifting societal norms regarding data privacy and security, could affect market demand for, and our ability to deploy, our platform. Moreover, although our end customers do not immediately lose network functionality if cloud connectivity fails, if our ability to deliver services through the cloud were interrupted, repeatedly or for an extended period, our reputation could be damaged and confidence in our platform would likely decline, causing our revenue to decline.

We plan to target new industry verticals and geographies to diversify our end customer base and expand our channel relationships, which could result in higher research and development and sales and marketing expenses, and which may not be successful and could reduce our operating margin.

We currently focus a significant portion of our business on education, retail and distributed enterprise end customers, and to a lesser extent on hospitality and healthcare verticals, which may depend on developing new products targeted to such sectors. However, part of our strategy is to target new industry verticals and geographies. Specifically, we intend to invest in the development of data applications and analytics capabilities which we feel may be attractive to our end customers, particularly in the retail vertical. In addition, we also plan to continue to expand to additional countries beyond those in which we currently operate. We also intend to invest in existing and new channel relationships to reach additional end customers to further diversify our revenue base. Targeting new industry verticals and geographies and developing customized products, data applications and partnerships, including channel partners targeting these industry verticals and geographies, may be expensive, require us to attract, train, develop, integrate and retain qualified employees and key sales personnel, and increase our research and development costs, as well as our sales and marketing expenditures. We may need to develop new product features or target new market segments, which could divert resources and attention from our existing products and target markets. We must also further develop and make more productive relationships with our channel partners and our channel partners' ability to effectively market, distribute and support our products, which require specific investments and additional dedicated resources. Because we have limited experience in developing and managing such channels and markets, we may not be successful in further penetrating certain geographic regions or reaching a broader customer base. Failure to develop or manage additional sales channels effectively would limit our ability to succeed in these markets and could adversely affect our ability to grow our business.

We announced in April 2015 a new relationship with Dell EMC, whereby Dell became a reseller of Aerohive's Wi-Fi and cloud services and in November 2017 that we had entered an OEM agreement which significantly expanded the scope of our resale relationship with Dell. We announced in June 2018, a global partnership with Juniper Networks, whereby Juniper can sell our cloud-managed Wi-Fi solution, including our family of .11ax access points and HiveManager cloud platform. In February 2016, we announced a partnership with SYNEX Corporation, as a distributor of our products in the United States and Canada. To support these and other relationships, we will need to continue to identify and invest in additional and dedicated resources and, potentially, new product, service and support offerings, which could distract management's attention and divert existing resources from our current business. We do not know if we will be successful in any of these efforts, or whether the level of success we achieve will justify the additional spending and specific investments and dedicated resources required. In addition, increasing the significance to us of Dell or Juniper as channel partners, including through broader partner relationships, could undermine the success of our other channel partners. For example, through our OEM relationship with Dell or reseller relationship with Juniper, some of our partners may have access to favorable pricing or integrated product offerings which may give them an advantage in identifying and securing customer opportunities. This could cause our product margins and associated revenue to decrease. Our other channel partners may also be less willing to continue to invest in and dedicate resources toward the marketing, distribution and support for our products, which could reduce the associated revenue we receive from them and our revenue overall.

It will also take time for us to fully realize the benefits from our continued channel relationships, including with Dell, in particular, as we continue to negotiate the transition from a reseller to an OEM relationship. In addition, we cannot be certain that these partners, such as Dell and Juniper, will continue to invest in the success of our partnership or, instead, choose to direct their resources to other partnerships, including potentially with our competitors. For example, in February 2018 Ruckus announced that it had signed an OEM agreement with Dell whereby Dell will also become a reseller of Ruckus' portfolio of wireless solutions. We also understand that Juniper has agreed to market competing products and solutions alongside our products and solutions. If our channel partners fail to effectively market, distribute and support our products, or if our channel strategy, or particular channel partner initiatives or investments, such as with Dell, Juniper or others we may identify, are otherwise unsuccessful, our revenue performance and operating margin would be harmed, which could adversely affect the value of our common stock.

We base our inventory purchasing decisions on our forecasts of customers' demand, and if these forecasts are inaccurate our revenue, gross margin and liquidity could be harmed.

We place orders with our manufacturers based on our forecasts of our end customer demand. We base our forecasts on multiple assumptions, including internal and channel partner sales forecasts, each of which may cause our estimates to be inaccurate, affecting our ability to fulfill demand for our products. When demand for our products increases significantly, we may not be able to meet demand on a timely basis, or we may incur additional expediting costs to assure we meet demand. If we underestimate demand, we may forgo revenue opportunities, lose market share and damage our reputation and our relationship with our channel partners and our end customer relationships. Conversely, if we overestimate demand, we may purchase more inventory than we are able to sell at any given time, or at all, which would increase our reserves and risk of potential write-offs.

Demand for our products is unpredictable and a change in any quarter in inventory levels at our channel partners could have a material effect on our operating results and the revenue we recognize in any quarter.

Under Accounting Standard Codification 606 ("ASC 606"), which we adopted effective January 1, 2018, we generally recognize revenue for product sales at the time we ship such products to our distributors, provided that all other revenue recognition criteria have been met. We will recognize such revenue in a quarter even though our channel partners may then "sell through" such products to our end customers during a later period. We estimate for any period the volume of product we anticipate shipping to such distributors based on our estimate of end customer purchases in the period, and we then consider that estimate when we determine and provide guidance to investors regarding our revenue, operating results and gross margin for the quarter. Currently, we endeavor to maintain with our channel partners at any time inventory which represents between two and three weeks of global quarterly product demand. However, we may adjust this global band depending on changes in our business. In addition, within this global band, we may target a higher or lower level of inventory on hand with our channel partners in any particular region.

We may deliver product to our distributors, such as SYNEX, our largest distributor, in anticipation of end customer demand we estimate in the quarter. However, where actual end customer purchases fall short of our estimates, in particular, where such shortfall occurs at the end of a quarter, or if we determine that higher levels of inventory are required to run the business effectively, the level of inventory we deliver and the associated revenue we recognize and report for the quarter pursuant to ASC 606 could be greater than actual end customer purchases of our products for the period. For example, as we exited 2017, our stocking distributors held little product inventory. In 2018, we increased the use of distribution and over the course of 2018 we built inventory with our stocking distributors to manage to our expected levels of business. As of our fourth quarter of 2018, inventory held by our stocking distributors represented approximately three weeks of global quarterly product demand. Under ASC 606, our revenue from the first, third and fourth quarters and full year of 2018 benefited from this build in inventory. Conversely, in instances where such inventory as of the end of a quarter is less compared to the prior period, the revenue we recognize for the quarter under ASC 606 would fall relative to actual end customer purchases of our products for the period.

In instances where the sales to our distributors exceeds the end customer purchases during the period and there is a buildup of incremental inventory, our distributors may then determine to draw down and sell through to end customers such incremental inventory on hand as of the end of a quarter before purchasing additional inventory. This may reduce the level of business we would otherwise expect and negatively impact our actual revenue when compared to our revenue guidance. In addition, our distribution partners may decide, in any period, not to purchase product from us, at all or at the level or mix of product which we estimated at the beginning of the period when we determined and provided guidance to our investors. Such changes in distributor demand for our product may also occur at the end of a quarter, with little or no advance notice to us. In any instances where actual end customer purchases fall short of the inventory we deliver to our distributors in the quarter, or where our distributors decide to not to purchase in the quarter product inventory we have estimated to meet product sales during the quarter, our revenue or other operating results we report for the quarter could fall short of our previously provided guidance and investors' expectations, and could impact guidance we provide and the revenue we may recognize in future periods. This difficulty and unpredictability in accurately adjusting inventory levels with our distributors, including, specifically, with SYNEX, could result in uneven or unpredictable revenue we may recognize in any quarter, which could adversely affect the value of our common stock.

Some of our distributors stock inventory of our products, and are entitled in certain circumstances to stock rotation rights, which could cause us to accept the return of products and expose us to the risks of higher costs.

We grant certain of our distributors stock rotation rights, which could require us to accept stock back from a distributor's inventory under certain circumstances. Under certain agreements, a distributor may have or retain a right to return a portion of products which the distributor purchased, typically within the prior six months. We typically recognize revenue upon shipment to the distributor; however, if we are required to accept returns and reimburse distributors for such obsolete or

slower-moving inventory, our costs would increase, and our operating results could be harmed to the extent we then have to hold or write-off the value of such obsolete or slower moving inventory.

We outsource the manufacturing of our products to third parties, and we therefore do not have the ability to completely control quality over the manufacturing process. In addition, if our contract manufacturers refuse or are unable to manufacture our products, we may be unable to qualify new manufacturers in a timely manner, which would result in our being unable to sell our products.

We outsource the manufacturing of our products to third-party original design manufacturers ("ODMs") currently located in China and Taiwan, where they perform quality inspections and conduct reliability tests before they ship finished products to our warehouse centers for managing inventory and delivery logistics located in the U.S., the Netherlands, Malaysia and China. We operate these logistics centers currently for all end customer shipments, whether destined to locations in North, South and Central America (the "Americas"), Europe, the Middle East and Africa ("EMEA"), or Asia Pacific and Japan ("APAC").

Our reliance on these third-party manufacturers reduces our control over the manufacturing process and exposes us to risks, including reduced control over product quality, costs, supply and timing of availability. Any manufacturing or shipping disruption by these third parties could severely impair our ability to fulfill orders. If we are unable to manage effectively our relationships with these third parties, or if these third parties suffer delays, manufacturing disruptions or volatility in component pricing or availability, experience increased manufacturing lead-times, capacity constraints or quality control problems in their manufacturing operations, or fail to meet our future requirements for timely delivery and quality purposes, for any reason, our ability to ship products to our end customers would be severely impaired and our reputation and our relationship with our channel partners and end customers would be seriously harmed. Additionally, labor unrest or disruption to trade or the expected movement of our product could delay delivery of our products by third parties, or by us to our channel partners and end customers, which could significantly delay revenue or increase our costs and in ways we cannot currently anticipate. Any natural disaster, political instability, or disruption in labor or foreign relationships could also disrupt our relationships with our manufacturers or delay their ability to timely deliver our products.

Our original design manufacturers typically fulfill our supply requirements on the basis of individual orders. We also do not have long-term contracts with our third-party manufacturers that guarantee capacity, the continuation of particular pricing terms or the extension of credit limits. Accordingly, our third-party manufacturers are not obligated to continue to fulfill our supply requirements, which could result on short notice to us of supply shortages and increases in the prices we are charged for manufacturing services. In addition, as a result of global financial market conditions, natural disasters, labor disruption, uncertain trade or political environment, or other causes, it is possible that any of our manufacturers could experience interruptions in production, cease operations, impose on us additional costs or otherwise alter our current arrangements. In addition, we may reduce orders with our design manufacturers in response to volatile market conditions or fluctuating demand for our products. Lower order levels for our products, in particular which continue over several quarters, may cause our manufacturing partners to increase their manufacturing costs to us, shift their resources to other partners or discontinue their partnership with us. If our manufacturers are unable or unwilling to continue manufacturing our products in required volumes, or on current or acceptable terms and prices, we will be required to identify and transition our manufacturing program to one or more acceptable alternative manufacturers.

It would be time-consuming and costly, and could be impractical, for us to begin to use new manufacturers, and changes in our third-party manufacturers may cause significant interruptions in supply and quality of our products if the new manufacturers have difficulty manufacturing products to our specification. As a result, our ability to meet our scheduled product deliveries to our end customers could be adversely affected, which could cause the loss of sales to existing or potential end customers, delayed revenue or an increase in our costs. We also do not currently require our manufacturers to maintain and demonstrate robust disaster recovery capabilities. Any production interruptions for any reason, such as due to a contractual disagreement, natural disaster, epidemic, capacity shortages or quality problems, at one of our manufacturers would negatively affect sales of our product lines manufactured by that manufacturer and adversely affect our business and operating results. In addition, we rely on our manufacturing partners to assure the integrity and security of their manufacturing processes. We do not have the resources independently to assess their processes and controls, or fully to inspect or test the products for materials or components which a third-party may illegally or inappropriately introduce into our operations during the manufacturing or distribution process. Our discovery of any such unauthorized components could require us to incur significant expense to remanufacture such products or correct issues in the field. Our failure to discover such components could expose us to significant liability under product warranties or in the event of data security concerns or breaches relating to such components.

Our manufacturing partners purchase component parts for our products based on estimates we provide, which may not be accurate. In addition, our manufacturing partners purchase some of the components and technologies used in our products from a single source or a limited number of sources. If our estimates were to be inaccurate, or if our manufacturing

partners were to lose any of these sources as suppliers, we might incur additional transition costs, resulting in delays in the manufacturing and delivery of our products, excess or obsolete inventory, or the need to redesign our products.

We rely on our manufacturing partners to select and source the component parts within our products. We do not choose or contract directly with the component parts providers and do not have manufacturing contracts that guarantee us any fixed access to such component parts, or at specific pricing. This absence of any relationship between us and the component suppliers, or direct and long-term component supply contracts may increase the risk of issues relating to the quality, performance, operability or cost of such component parts and our exposure to shortages of component availability and to price fluctuations related to the raw material inputs for such components, foreign exchange adjustments and other factors.

Moreover, we currently depend on a single source or limited number of sources for several components for our products. For example, each of our products typically incorporates third-party components that have no more than two suppliers. In some instances, we may have a sole source for critical components, such as semiconductor chip sets or other components critical to product functionality. We have also recently seen consolidation amongst component manufacturers, in particular of semiconductor chip set suppliers, and rises in component prices and more restrictive component availability as a result. If our manufacturing partners were unable to obtain such components for any reason, or on a limited basis or at increased prices, they would be unable to manufacture such product at all, or in the quantities we need or at pricing we expect. In order to secure such components, at all or as needed to meet our customer requirements, we may have to pay higher prices (thus, reducing our gross margins). For example, industry demand for basic components, such as multi-layer ceramic components essential for manufacturer of much of our hardware, has recently risen significantly relative to supply, and associated costs have risen, and availability become more restrictive and uncertain. We expect this condition to continue for some period and increase such component costs and delay availability to us, perhaps significantly. We have also entered into license agreements with some of our suppliers for technologies used in our products, and the termination of these agreements, which can generally be done on relatively short notice, could have a material adverse effect on our access to these technologies and, thus, on our business. Termination of these agreements could also make technology used in or developed for our products available to our competitors. If any of those manufacturing agreements was terminated, we could experience significant supply disruptions and be required to redesign some of our products in order to incorporate technology from alternative sources. Any such termination of the agreement, disruption in supply and redesign of certain of our products could materially and adversely affect our business and operating results. Volatility and unpredictability in the level of business we provide to our manufacturing partners could also cause them to divert resources and attention to other business partners, including our competitors, who can provide a greater or more dependable level of business to support their operations.

We have not currently identified and qualified other sources for certain of our components. If we lose any of our existing suppliers or licensors we could be required to transition to a new supplier or licensor, which could increase our costs, result in delays in the manufacturing and delivery and increase in the cost of our products or cause us to carry excess or obsolete inventory. Poor quality and delays in availability of any of the components in our products, including especially those with limited or sole sourcing, could also result in lost sales or lost sales opportunities. If the quality of the components does not meet our or our end customers' requirements, if we are unable to obtain components from our existing suppliers on commercially reasonable terms, or if any of our limited or solely sourced component suppliers ceases to remain in business or to continue to manufacture such components, we could be required to redesign our products in order to incorporate components or technologies from alternative sources. The resulting stoppage or delay in selling our products and the expense of securing and qualifying alternative sources or redesigning our products could result in significant manufacturing and development costs, delayed or lost sales opportunities and damage to customer relationships, which would adversely affect our reputation, business and operating results. For example, in August 2015, we announced that our AP250 and AP245X access points, which were our initial Wave 2 access point products, would not be commercially available until early 2016. This delayed release was due to delays in the products' development and the availability to us of a component part essential to our development and release of the products. Such as with the AP250 and AP245X access points, limited availability in component parts may affect the ability of our manufacturing partner and component suppliers to timely deliver sufficient quantities of a product to meet our demand and sales forecasts. There is a risk that existing or potential customers (including customers in our important education vertical) may elect not to purchase our products or defer purchases they otherwise would make of our products.

We rely upon third parties for the warehousing and delivery of our products, and we therefore have less control over these functions than we otherwise would.

We outsource the warehousing and delivery of all of our products to third-party logistics providers for worldwide fulfillment. As a result of relying on third parties, we have reduced control over shipping and logistics. Any shipping delays, disruptions or mismanagement by these third parties could severely impair our ability to fulfill and take revenue in a quarter on all the orders that we have received and processed for the quarter. If we are unable to have our products shipped in a timely manner, we may suffer reputational harm, and lose revenue.

We rely significantly on channel partners to sell and support our products, and the failure of this channel to be effective could materially reduce our revenue.

Our channel partners consist primarily of distributors, VARs and an OEM. We believe that establishing and maintaining successful relationships with these channel partners are, and will continue to be, important to our financial success. Recruiting and retaining qualified channel partners and training them in our technology and product offerings require significant time, resources and investment. Additionally, we need to recruit and develop different qualified channel partners for different geographic regions and markets. To develop and expand our channel, we must continue to scale and improve our processes and procedures that support our channel partners, including investment in systems and training. Additionally, we will increasingly focus our resources and attention on those channel partners best able to help us meet our growth expectations. As a result, the total number of our channel partners over time may decline. Existing and future channel partners will only work with us if we are able to provide them with competitive products at prices and on terms that are attractive to them. If we fail to maintain the quality of our products or to update and enhance them, and at reasonable pricing, existing and future channel partners may elect to work instead with one or more of our competitors.

We sell to our channel partners typically under a contract with an initial term of one or three years, with one-year renewal terms, based on compliance with our program requirements. Our contracts generally require payment by the channel partner to us within 30 to 45 calendar days of the date we issue an invoice for such sales. We typically do not have minimum purchase commitments from our channel partners, and our contracts with channel partners do not prohibit them from offering products or services that compete with ours, including products they currently offer or may develop in the future and incorporate into their own systems. Some of our competitors may have stronger relationships with our channel partners than we do and we have limited control, if any, as to whether those partners use our products, rather than our competitors' products, or whether they devote resources to market and support our competitors' products, rather than our offerings.

We announced in April 2015 a new relationship with Dell EMC, whereby Dell became a reseller of Aerohive's Wi-Fi and cloud services and, in November 2017, that we had an OEM agreement which expanded the scope of our resale relationship with Dell. We announced in June 2018, a global partnership with Juniper Networks, whereby Juniper can sell our cloud-managed Wi-Fi solution, including our family of .11x access points and HiveManager cloud platform. In February 2016, we announced a partnership with SYNEX Corporation as a distributor of our products in the United States and Canada. To support these and other relationships, we are continuing to identify and invest in additional and dedicated resources and, potentially, new product, service and support offerings. In addition, we cannot be certain that these partners, such as specifically Dell or Juniper, will continue to invest in the success of our partnership or, instead, choose to direct its resources to other partnerships, including potentially with our competitors. In addition, increasing the significance to us of Dell or Juniper as channel partners, including through broader partner relationships, could undermine the success of our other channel partners. For example, through our OEM relationship with Dell or reseller relationship with Juniper, our channel partners may have access to favorable pricing or integrated product offerings which may give them an advantage in identifying and securing customer opportunities. This could cause our product margins and associated revenue to decrease. Our other channel partners may also be less willing to continue to invest in and dedicate resources toward the marketing, distribution and support for our products, which could reduce the associated revenue we receive from them and our revenue overall.

It will take time for us to fully realize the benefits from our continued channel relationships, including with Dell and Juniper, in particular as we continue to negotiate the transition from a reseller to an OEM relationship. In addition, we cannot be certain that these partners, such as Dell and Juniper, will continue to invest in the success of our partnership or, instead, choose to direct their resources to other partnerships, including potentially with our competitors. For example, in February 2018 Ruckus (now Arris/Ruckus) announced that it had signed an OEM agreement with Dell whereby Dell will also sell Ruckus' portfolio of wireless solutions. We also understand that Juniper has agreed to market competing products and solutions alongside our products and solutions. If our channel partners fail to effectively market, distribute and support our products, or if our channel strategy, or particular channel partner initiatives or investments, such as with Dell or others we may identify, are otherwise unsuccessful, our revenue performance and operating margin would be harmed, which could adversely affect the value of our common stock.

Our products are subject to U.S. export controls; where we fail to comply with these laws, we could suffer monetary or other penalties.

Our products are subject to U.S. export controls, specifically the Export Administration Regulations, and economic sanctions enforced by the Office of Foreign Assets Control. We incorporate standard encryption algorithms into our products, which, along with the underlying technology, we may export outside of the United States only with the required export authorizations, including by license, license exception or other appropriate government authorizations. Each of these authorizations may require us to file an encryption registration and classification request. Furthermore, U.S. export control laws and economic sanctions prohibit the shipment of certain products and services to countries, governments and persons targeted by U.S. sanctions. We also are restricted from exporting products to certain government and state-owned enterprises. We take

precautions to prevent our products and services from being exported in violation of these laws and, in many instances, we rely on our channel partners, in particular our distributor, VAR and MSP partners, to assure compliance when selling, distributing and/or using our products outside the United States. In certain instances, we have shipped encryption products prior to obtaining the required export authorizations and/or submitting the required requests, including a classification request and request for an encryption registration number. As a result, we previously filed a Voluntary Self Disclosure with the U.S. Department of Commerce's Bureau of Industry and Security concerning these violations. In January 2018, we provided a voluntary disclosure to the U.S. Customs and Border Protection service relating to the value of merchandise we imported to the United States relating to the manufacture of certain of our products. A repeat of these past instances could result in monetary or other penalties assessed against us. Additionally, even though we take precautions to ensure that our channel partners comply with all relevant regulations, any failure by our channel partners to comply with such regulations could have negative consequences for us, including reputational harm, government investigations and penalties and interruptions in our ability to distribute and sell our products.

Various countries also regulate the import of certain encryption technology and operation of our products, including through import permitting, certification and licensing requirements, and have enacted laws that could limit our ability to distribute our products or our end customers' ability to operate our products in those countries, or could impose additional expense on us to meet these requirements as a condition to distribute our products. Encryption products and the underlying technology may also be subject to export-control restrictions. Governmental regulation of encryption technology and regulation of imports or exports of encryption products, or our failure to obtain required import or export approval for our products, when applicable, could harm our international sales and adversely affect our revenue. Compliance with applicable regulatory laws and regulations regarding the export or import of our products, including with respect to new releases of our products, may create delays in our introduction of products in international markets, prevent our end customers with international operations from deploying our products throughout their globally distributed systems or, in some cases, prevent the export or import of our products to some countries altogether.

In addition, because our sales are made through channel partners, if these channel partners fail to obtain appropriate import, export or re-export licenses or authorizations, we may also be adversely affected, including potentially being liable for penalties under government restrictions and regulations, even where the channel partner failed to obtain the appropriate licenses or authorizations. Obtaining the necessary authorizations, including any required license, for a particular sale may be time-consuming, is not guaranteed and may result in the delay or loss of sales opportunities. Changes in our products or changes in applicable export or import laws and regulations may also create delays in the introduction and sale of our products in international markets, prevent our end customers with international operations from deploying our products or, in some cases, prevent the export or import of our products to certain countries, governments or persons altogether. Any change in export or import laws and regulations, shift in the enforcement or scope of existing laws and regulations, or change in the countries, governments, persons or technologies targeted by such laws and regulations, could also result in decreased use of our products, or in our decreased ability to export or sell our products to existing or potential end customers with international operations. Any decreased use of our products or limitation on our ability to export or sell our products could adversely affect our business, financial condition and results of our operations.

U.S. export control laws and economic sanctions programs also prohibit the shipment of certain products and services to targeted countries, governments and persons that are subject to U.S. economic embargoes and trade sanctions. If we or our channel partners ship products to those targets, or third parties provide our products to these targets, we could be subject to government investigations, penalties and reputational harm. Furthermore, any new embargo or sanctions program, or any change in the countries, governments, persons or activities targeted by such existing programs, could result in decreased use of our products, or in our decreased ability to export or sell our products to existing or potential end customers, which could adversely affect our business and our financial condition.

Regulations related to conflict minerals may cause us to incur additional expenses and could limit the supply and increase the costs of certain metals used in the manufacturing of our products.

As a public company, we are subject to the requirements under the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (the "Dodd-Frank Act") to diligence, disclose and annually report whether our products contain conflict minerals. The implementation of these requirements could adversely affect the sourcing, availability and pricing of the materials used in the manufacture of components used in our products. We have incurred and will continue to incur additional costs to comply with the disclosure requirements, including costs related to conducting diligence procedures to determine the sources of conflict minerals that may be used in or necessary to the production of our products and, if applicable, potential changes to products, processes or sources of supply as a consequence of such verification activities, and we expect to incur additional costs in the future to comply with these disclosure requirements. We do not choose or contract directly with the component parts providers and do not have contracts with these component parts suppliers. We rely, instead, on our manufacturing partners to select, source, diligence and report to us the component parts within our products. This absence of any relationship between us and the component suppliers makes significantly more difficult our ability to determine and report

whether our products contain conflict minerals. Consequently, we may face reputational harm if our channel partners incorrectly determine or report whether certain of our products contain minerals not determined to be conflict-free or if we are unable to alter our products, processes or sources of supply to avoid use of such materials.

Our products incorporate complex technology and may contain defects or errors. We may become subject to warranty claims, product returns, product liability and product recalls as a result, any of which could cause harm to our reputation, impose costs and increase expenses, expose us to liability and adversely affect our business.

Our products incorporate complex technology and must support a wide variety of devices and new and complex applications in a variety of environments that use different wireless networking communication industry standards. Our products have contained, and may contain in the future, undetected defects or errors or may not perform as we expect in certain environments. We may discover some errors in our products only after a product has been installed and used by end customers. These issues are most prevalent when we introduce new products into the market or, once introduced, when the products experience significant loads in actual use environments or at scale which we could not create or did not anticipate during development. We have delayed and may in the future delay the introduction of our new products due to such defects and errors. Since our products contain components that we purchase from third parties, we also expect our products to contain latent defects and errors from time to time related to those third-party components.

Defects and errors may also cause our products to be vulnerable to security attacks. The techniques used by computer hackers to access or sabotage networks are becoming increasingly sophisticated, change frequently and generally are not recognized until after they have been launched against a target. As we increasingly collect, store, analyze, use and transmit data, and provide data analytics solutions to our end customers, these risks become more significant to us. We may be unable to anticipate these techniques or provide a solution in time to protect our and our end customers' networks. In addition, we might not be able to timely develop and provide updated products and software to our end customers, thereby leaving our end customers vulnerable to attacks. Finally, if our employees, or others who have access to end customer data, misuse this information, our reputation would be harmed, and we could be subject to claims for damages.

Real or perceived defects or errors in our products could result in claims to return product or that we reimburse losses that our end customers or channel partners sustain and we may be required, or may choose for customer or partner relations or other reasons, to expend additional resources in order to help correct the problem, including incurring additional warranty and repair costs, process management costs and costs associated with remanufacturing our inventory. We typically offer a limited warranty on our Wi-Fi access points and other products. We also provide certain service commitment guarantees for our cloud-managed platform, pursuant to which our end customers may receive service credits in connection with service outages. Liability limitations in our standard terms and conditions of sale may not be enforceable under some circumstances or may not fully or effectively protect us from claims and related liabilities and costs. In addition, regardless of the party at fault, errors of these kinds could divert the attention of our engineering personnel from our product development efforts, damage our reputation and the reputation of our products, cause significant customer relations problems, and result in product liability claims. We do not maintain insurance which would protect against many of these types of claims associated with the use of our products. Even where claims ultimately are unsuccessful, we may have to expend funds in connection with litigation, including on behalf of our end customers and channel partners, and divert management's time and other resources. We also may incur costs and expenses relating to a recall of one or more of our products. The process of identifying and recalling products that have been widely distributed may be lengthy and require significant resources, and we may incur significant replacement costs, contract damage claims from our end customers and channel partners and significant harm to our reputation. The occurrence of any of these problems could result in substantial costs to us and the delay or loss of market acceptance of our products and could adversely impact our business, operating results, reputation and financial condition.

The loss of key personnel or an inability to attract, retain and motivate qualified personnel may impair our ability to expand our business.

Our success substantially depends on the continued service and performance of our senior management team and other key personnel, including, in particular, David K. Flynn, who is our Chief Executive Officer. Our employees, including our senior management team, are at-will employees and, therefore, may terminate employment with us at any time with no advance notice. The loss of members of our senior management team or other key personnel, whether through resignation, illness, disability or death, our failure to attract replacement personnel, as needed, or the transition of newly hired senior management may significantly delay or prevent us from achieving our business objectives. In addition, if any of our executives or other key employees were to join a competitor or form a competing company, we could lose customers, suppliers, know-how and key personnel, and our business and product strategies and capabilities could be at risk and subject to disclosure, including to our competitors.

Our future success also depends on our ability to continue to attract, integrate and retain highly skilled personnel, especially skilled executives and sales and engineering employees. We have experienced in the past higher-than-normal turn-

over, especially amongst our sales personnel, in particular in the United States, and continue to replace personnel where we think needed to improve our operations and product development capabilities and processes. We also continue to replace personnel as part of our ongoing performance and expense management initiatives. Turn-over is highly disruptive to our operations and has had and could continue to have an adverse effect on our revenue. In addition, competition for highly skilled personnel is frequently intense, especially in Silicon Valley, where we maintain our headquarters and a substantial operating and sales presence. Compensation for new and existing employees has been increasing significantly of late, in particular for employees in Silicon Valley, increasing our operating expenses (and thus reducing our operating margins). Volatility or lack of performance in our stock price may affect our ability to attract new employees or retain existing employees by decreasing the perceived value of any stock-based compensation we may offer, or they may hold. Prolonged periods of low performance or volatility in our stock price could also negatively impact our appeal as an employer, harm employee morale or increase employee turnover, including amongst our Silicon Valley employees. Any failure to successfully attract, integrate or retain qualified personnel to fulfill our current or future needs may negatively impact our growth. Also, to the extent we hire personnel from our competitors, we may be subject to allegations that we have improperly solicited these employees, that they have divulged to us proprietary or other confidential information of their former employers, or that their former employers own their inventions or other work product. This may expose us to significant liability and litigation risk.

Our ability to sell our products is highly dependent on the quality of our support offerings, and our failure to offer high quality support would have a material adverse effect on our sales and results of operations.

Once our products are deployed, our end customers depend on our support organization and support our channel partners provide to resolve any issues relating to our products. Our support delivery organization comprises employees in various geographic locations and an outside service provider, which provides general technical support to our end customers. A high level of support is important for the successful marketing and sale of our products. If we do not effectively help our end customers quickly resolve issues or provide effective ongoing support, it would adversely affect our ability to sell our products to existing end customers as well as demand for continued support and renewal contracts and could harm our reputation with existing and potential end customers.

We are subject to complex and evolving U.S. and foreign laws and regulations regarding privacy, data protection and other matters and violations of these complex and dynamic laws, rules and regulations may result in claims, changes to our business practices, monetary penalties, increased costs of operations, and/or other harms to our business.

Numerous provincial, state, national and international laws and regulations apply to our collection, use, retention, protection, disclosure, transfer and other processing of data, including personal data. These laws and regulations are evolving rapidly and imposing increasingly varied requirements across the jurisdictions in which we do business. Further, the application and interpretation of these laws and regulations may be uncertain, particularly in the new and rapidly evolving industry in which we operate. At the same time that these data protection requirements are increasing in number, variation, and complexity, the consequences of noncompliance are also increasing. As a result, we anticipate (i) heightened privacy and data protection compliance costs; (ii) an increased risk of legal, financial, or reputational harm in case of actual or perceived noncompliance, whether by us, our business partners, customers or end users; and (iii) an increased risk of a reduced return on investments in some strategic partnerships and product and service development efforts. These risks include:

- ***Heightened Privacy and Data Protection Compliance Costs.*** Privacy and data protection laws and regulations affecting our business are evolving rapidly and may result in heightened long-term compliance costs for our business. In some cases, this may result in longer customer contract cycles and delayed onboarding. Additionally, as part of our own compliance efforts, we anticipate increasing our scrutiny of the vendors that support data-related aspects of our services. Further, as data subject access rights become more widespread and frequently exercised under these evolving requirements, we anticipate heightened compliance costs in implementing policies, procedures and technologies to respond to our business partners and others regarding requests to exercise consumer rights related to “personal data” or “personal information,” as defined under the laws of various jurisdictions.
- ***Increased Risk of Legal, Financial, or Reputational Harm in Cases of Actual or Perceived Noncompliance (whether by us, our business partners, customers or end users).*** In cases of our potential noncompliance with any of these privacy and data protection requirements, regulatory trends suggest the risk of heightened enforcement and more significant sanctions, including monetary penalties, for example, under the European Union’s General Data Protection Regulation (“GDPR”), which entered into effect May 25, 2018 and, among other things, authorizes fines up to 4% of global annual revenue or €20 million, whichever is greater, for some types of violations. In other cases, new laws may authorize a private right of action and/or a statutory framework for damages that are likely to increase the risk of litigation, in particular, in the case of a data breach, such as under the recently enacted California Consumer Privacy Act, which becomes operative January 1, 2020. Additional litigation risks may arise due to contractual obligations with our customers and business partners.

In most cases, our processing of personal data is a service we provide at the direction of a partner or end customer, including in conjunction with a service the customer provides for its end-users. Our role in delivering services for customers to end-users may increase the risk of a perceived violation, even when the fault is not attributable to our action or inaction (e.g., in the case of a data breach resulting from a customer's or end-user's failure to secure systems or passwords within their control). We might be included in others' perceptions of inadequate data protection measures, regardless of whether such perceptions are invalid, and this could harm our reputation and inhibit adoption of our products, applications and services by current and future customers. Even where it is clear that Aerohive is not responsible, privacy or data protection violations by one of our business partners could negatively affect us by association. We may incur costs to investigate and disprove perceptions. We may also experience challenges recovering trust from customers whose information may have been affected (e.g., disclosed more broadly than intended due to a data breach, regulatory inquiry, or litigation). Such reputational harms could result in potentially decreased demand for our products and cloud-managed solutions.

- *Reduced Return on Investments in Some Strategic Partnerships and Product and Service Development Efforts.* As legal requirements and interpretations change, are called into question, or increase in variability across jurisdictions, some of our assumptions leading to investments in strategic partnerships and product and service development may be challenged. This may reduce the return on some of our investments in products, services, and partnerships in key markets. Our ability to operate or expand our business may be inhibited if we must implement higher-cost security measures, establish alternate business processes or infrastructure, or are prohibited from capitalizing on cost-saving efficiencies related to the automated processing of data previously not anticipated to be subject to such requirements. For example, evolving and increasingly varied legal definitions of personal information and personal data in the United States, European Union, and elsewhere may affect our legal treatment of IP addresses, MAC addresses, machine identification, location and tracking data, data analytics and other information as well as the extent to which we can lawfully apply machine learning and artificial intelligence to those data sets for certain purposes and in certain jurisdictions. Some countries' data localization laws may require us to establish additional infrastructure or engage service providers in those jurisdictions, increasing the cost and complexity of our business operations and potentially limiting sales of our products in those jurisdictions. While we do not anticipate the same rapid evolution and proliferation of data localization laws as with privacy and data protection laws and regulations, we continue to monitor overall legal developments in this area for impact on our current products and services, as well as those in development. We also note that our introduction of new data platforms, applications and solutions or expansion of our activities in certain jurisdictions may subject us to additional laws and regulations. For instance, participation in the federal E-Rate funding program may subject us to additional privacy and data use restrictions under U.S. federal, state, and local laws and regulations relating to the processing of data relating to students or children. Risks remain that new or expanded products and services may be commercially infeasible in some markets in light of actual or potential compliance costs under current or developing legal requirements in this area.

Our international operations expose us to additional business risks and failure to manage these risks may adversely affect our international revenue.

We derive a significant portion of our revenue from end customers and channel partners outside the United States. For the fiscal years ended December 31, 2018 and 2017, we attributed 46% and 41% respectively, of our revenue to our international end customers and channel partners. As of December 31, 2018, approximately 44% of our full-time employees were located outside of North America, with 25% located in China. We expect that our international activities will be dynamic over the foreseeable future as we continue to pursue opportunities in international markets, which will continue to require significant management attention and our financial investment. In addition, the United States and other countries have recently engaged in counter-vailing trade sanctions and tariffs, both on goods imported to United States and goods we may export from the United States to other countries. In retaliation, various countries are considering export regulations and other regulatory or contractual limitations, such as import, technical and other certification requirements and restrictions on our ability to sell or develop our products in certain foreign markets.

Given the extent of our international operations, we are subject to other inherent risks and our future results could be adversely affected by a number of other factors, including:

- regulatory requirements or preferences for domestic products, which could reduce demand for our products;
- differing technical standards, existing or future regulatory and certification requirements and required product features and functionality;
- management communication and integration problems related to entering new markets with different languages, cultures, commercial practices and political systems;
- difficulties in enforcing contracts and collecting accounts receivable, and longer payment cycles, especially in emerging markets;

- heightened risks of unfair competition or corrupt business practices in certain geographies and of improper or fraudulent sales arrangements that may impact financial results and result in restatements of, and irregularities in, our financial statements;
- difficulties and costs of staffing and managing foreign operations, and retaining key personnel;
- differing labor standards;
- the uncertainty of protection for our intellectual property rights and the enforceability of our rights and third-party rights in some countries;
- potentially adverse tax consequences, including regulatory requirements regarding our ability to repatriate profits to the United States;
- uncertainties and instability in economic and market conditions following the decision of the United Kingdom to withdraw from the European Union;
- added legal compliance obligations, costs and complexity, including complying with varying local labor, compensation and tax and securities laws as well as specific and evolving local requirements regarding data privacy protection;
- foreign currency exchange risk;
- the increased cost of terminating employees in some countries; and
- political and economic instability and terrorism.

To the extent we continue to expand our business globally, our success will depend, in large part, on our ability to effectively anticipate and manage these and other risks and expenses associated with our international operations. Political instability and uncertainty in the European Union and, in particular, Britain's decision to exit the European Union have slowed economic growth and created significant economic disruption and uncertainty in the region, which could continue to discourage near-term economic activity, including delay decisions to purchase our products. We believe this has had a significant and continuing impact of our revenue from our European operations, and our ability to predict such revenue, as the terms and circumstances of Britain's exit and its impact on other countries of the European Union are unresolved. Our failure to manage any of these risks timely and successfully could harm our international operations and reduce our international sales, and business generally, adversely affecting our business, operating results and financial condition.

Our operations in certain emerging markets expose us to political, economic and regulatory risks.

Our growth strategy depends in part on our ability to expand our operations in emerging markets, including Asia Pacific, the Middle East and Africa, and Latin America. However, some emerging markets have greater political, economic and currency volatility, and greater vulnerability to infrastructure and labor disruptions than more-established markets. In many countries outside of the United States, particularly those with emerging economies, it may be common for others to engage in business practices prohibited by laws and regulations with extraterritorial reach, such as the U.S. Foreign Corrupt Practices Act ("FCPA"), the U.K. Bribery Act, or other local anti-bribery laws. These laws generally prohibit companies and their employees, contractors or agents from making improper payments to government officials, including in connection with obtaining permits or engaging in other actions necessary to do business. Failure to comply with these laws could subject us to civil and criminal penalties that could materially and adversely affect our reputation, financial condition and results of operations.

For example, under the FCPA, U.S. companies may be held liable for the corrupt actions taken outside the United States by employees, strategic or local partners, or other representatives. Under the FCPA, we and our channel partners are required to maintain accurate books and records and a system of internal accounting controls. As such, if we or our intermediaries fail to comply with the requirements of the FCPA or similar legislation outside the United States, governmental authorities in the United States and elsewhere could seek to impose civil or criminal fines and penalties, which could have a material adverse effect on our business, operating results and financial conditions. While our employee handbook and other policies prohibit our employees from engaging in corrupt conduct, we do not yet have in place compliance measures and training to require both our employees and our third-party intermediaries to comply with the FCPA and similar anticorruption laws.

Establishing operations and distribution partners in these emerging markets may also require complex legal arrangements and operations to deliver services on global contracts for our end customers. Because of our limited experience with international operations and developing and managing sales and distribution channels in international markets, our international expansion efforts may not be successful. Additionally, we have established operations in locations remote from our more developed business centers. As a result, we are subject to heightened risks inherent in conducting business internationally, including the following:

- failure to comply with local regulations or restrictions;

- enactment of legislation, regulation or restriction, whether by the United States or in the foreign countries, including unfavorable labor regulations, tax policies or economic sanctions (such as potential economic sanctions arising from political disputes), and currency controls or restrictions on the transfer of funds;
- enforcement of legal rights or recognition of commercial procedures by regulatory or judicial authorities in a manner in which we are not accustomed, would not reasonably expect or with which we could not reasonably comply;
- differing technical and environmental standards, data protection and telecommunications regulations and certification requirements, which could prevent the import, sale or use of our products or SaaS offerings in such countries;
- difficulties and costs associated with staffing and managing foreign operations;
- potentially longer payment cycles and greater difficulty collecting accounts receivable;
- the need to adapt and localize our services for specific countries, including conducting business and providing services in local languages;
- reliance on third parties over which we have limited control, such as our VARs, distributors, OEM partner or their resellers or agents, for marketing and reselling our products and solutions;
- availability of reliable broadband connectivity and wide-area networks in areas we target for expansion;
- difficulties in understanding and complying with local laws, regulations, and customs in foreign jurisdictions or unanticipated changes in such laws;
- application of or changes in anti-bribery laws, such as the FCPA and UK Bribery Act, which may disrupt our staffing or ability to manage our foreign operations;
- changes in political and economic conditions leading to changes in the business environment in which we operate, as well as changes in foreign currency exchange rates;
- sanctions restricting local commercial activity, including retaliatory actions by local governments; and
- natural disasters, pandemics or international conflict, including terrorist acts or labor or political disputes, which could interrupt our operations or endanger our personnel.

In addition, our competitors may also expand their operations in these markets or others we may also target, and low-cost local manufacturers may also expand and improve products and their production capacities, thus increasing competition in these emerging markets. Our success in emerging markets is important to our growth strategy. If we cannot successfully increase our business in emerging markets and manage associated political, economic, regulatory and currency volatility, our product sales, financial condition and results of operations could be materially and adversely affected.

International trade disputes and other protectionist measures that could adversely affect our business.

We manufacture all our products and sell a substantial portion outside the United States. Trade disputes and tariffs imposed by regulatory agencies or application of tariff requirements to currently untariffed products, whether by the United States or a foreign government or agency, could increase the cost of our products and the components and raw materials that go into making them. For example, all of our switching and routing products and certain of our access points are currently subjected to 10% tariffs under current regulations. These increased costs could adversely impact the gross margin that we earn on our product sales. Increased costs could also make our products more expensive for customers, which could make them less competitive and reduce customer demand and our sales. Countries may also adopt other protectionist measures that could limit our ability to offer our products and services at all to certain customers and/or in certain regions. This could further lower the sales of our products in general or in certain regions, or lower the margins we recognize on the sale, perhaps significantly. In addition, such tariffs and associated requirements, and how they may apply to our products, are often complex and subject to interpretation. We may not foresee or correctly apply such tariffs or requirements to our products in all instances. As such, we may be exposed to fines or penalties, including underpayment of applicable tariffs or restrictions on our ability to distribute our products to certain customers or certain regions.

We conduct substantial R&D operations in China; risks associated with a business presence in China could negatively affect our business and results of operations.

We currently operate a research and development center in Hangzhou, China, which subjects us to a number of risks relating to China's political and legal systems, including:

- uncertainty regarding the validity, enforceability, scope and ability to protect and secure our intellectual property rights and the practical difficulties or enforcing such rights;
- ability to secure our business' proprietary information when residing in or is accessible from China from illegal or unauthorized access or use;

- extensive government regulation; and
- an uncertain legal system.

Any actions and policies taken or adopted by the government of the People's Republic of China, particularly with regard to our intellectual property, products and legal rights, could have an adverse effect on our business, results of operations and financial condition. For example, development in China or by entities supported by the China government of competing products or technologies using our intellectual property could significantly erode the market or pricing for our products. In addition, actions or policies to incorporate technical capabilities into our products, without our knowledge or permission or the appearance or threat of the same, could undermine product or data security features of our products. Whether any such actions or policies actually exist, or have been effected, the fact of a significant research and development presence in China could expose our products and data and security offerings to government or market scrutiny regarding the integrity of our product or data security features. Any of the foregoing could similarly discourage the purchase or use of our products and cause significant harm to our reputation in the market.

We could be subject to additional income tax liabilities.

We are subject to income taxes in the United States and numerous foreign jurisdictions. We use significant judgment in evaluating our worldwide provision for income taxes, which could be adversely affected by several factors, many of which are outside our control. During the ordinary course of business, there are many transactions for which the ultimate tax determination is uncertain. For example, our effective tax rates could be adversely affected by earnings being lower than we anticipate in countries that have lower statutory rates and higher than we anticipate in countries that have higher statutory rates, by changes in foreign currency exchange rates, by changes in the valuation of our deferred tax assets and liabilities, or by changes in the relevant tax, accounting and other laws, regulations, principles and interpretations, including possible changes to the U.S. taxation of earnings of our foreign subsidiaries or to the deductibility of expenses attributable to foreign income or the foreign tax credit rules. We are subject to audit in various jurisdictions, and such jurisdictions may assess additional income tax against us as well as penalties and fines. As we operate in multiple taxing jurisdictions, the application of tax laws can be subject to diverging and sometimes conflicting interpretations by tax authorities of these jurisdictions. The time and expense necessary to defend and resolve a tax audit may be significant. Although we believe our tax estimates are reasonable, the final outcome of tax audits and any related litigation could be materially different from our historical income tax provisions and accruals and may have a material effect on our operating results or cash flows in the period or periods for which we make such determination.

Our international operations and corporate structure subject us to potential adverse tax consequences.

We generally conduct our international operations through wholly owned subsidiaries and report our taxable income in various jurisdictions worldwide based upon our business operations in those jurisdictions. Our intercompany relationships are subject to complex transfer pricing regulations administered by taxing authorities in various jurisdictions. The relevant taxing authorities may disagree with our determinations as to the income and expenses attributable to specific jurisdictions. If such a disagreement were to occur, and our position not sustained, we could be required to pay additional taxes, interest and penalties, which could result in one-time tax charges, higher effective tax rates, reduced cash flows and lower overall profitability of our operations. We may not have adequate reserves to cover such a contingency.

In the future, we may reorganize our corporate structure or intercompany relationships, which would likely require us to incur expenses in the near term for which we may not realize related benefits, at all or within a reasonable period, to justify the expense. Changes in domestic and international tax laws, including enacted legislation to reform U.S. taxation of international business activities, may negatively impact our ability to effectively restructure, or reduce the benefits we expected from such corporate restructuring. Any such restructuring would likely involve sophisticated analysis, including analysis of U.S. and international tax regimes. Compliance with such laws and regulations may be difficult and expensive and subject our business to additional risks, costs and uncertainties.

Our ability to use our net operating losses to offset future taxable income may be subject to certain limitations.

As of December 31, 2018, we had federal and state net operating loss carryforwards (NOLs) of \$132.2 million and \$85.7 million, respectively, due to current and prior period losses. In general, under Section 382 of the Internal Revenue Code of 1986, as amended (the "Code"), a corporation that undergoes an "ownership change" (generally defined as a greater than 50-percentage-point cumulative change (by value) is subject to limitations on its ability to utilize its pre-change NOLs to offset post-change taxable income. Our existing NOLs may be subject to limitations arising from previous ownership changes, and if we undergo an ownership change in the future, our ability to utilize NOLs could be further limited by Section 382 of the Code. Future changes in our stock ownership, some of which may be outside of our control, could result in an ownership change under Section 382 of the Code.

On December 22, 2017, the U.S. government enacted new tax legislation commonly referred to as The Tax Cuts and Jobs Act (TCJA). The TCJA makes broad and complex changes to the U.S. tax code including changes to the uses and limitations of net operating losses. Specifically, the TCJA imposes an 80% limitation on the use of net operating losses that were generated in tax years beginning after December 31, 2017. As such, we may not be able to utilize a material portion of the NOLs.

Taxing authorities may successfully assert that we should have collected or in the future should collect sales and use, value-added or similar taxes, and we could be subject to liability with respect to past or future sales, which could adversely affect our results of operations.

We do not collect sales and use, value-added or similar taxes in all jurisdictions in which we have sales, based on our belief that such taxes are not applicable. Sales and use, value-added and similar tax laws and rates vary greatly by jurisdiction. Certain jurisdictions in which we do not collect such taxes may assert that such taxes are applicable, which could result in tax assessments, penalties and interest, and we may be required to collect such taxes in the future. Such tax assessments, penalties and interest or future requirements could be significant and may adversely affect the results of our operations.

We must improve our infrastructure to manage our growth, which could involve significant costs and could, if not properly managed, harm our operating results.

To manage any future growth effectively we must continue to improve and expand our information technology and financial and administrative infrastructure, our operating systems and administrative controls and our ability to manage headcount, capital and processes in an efficient manner. For example, we continue to evaluate upgrades to our existing business processes and systems to better manage licensing, renewals and order processing, and to transition to a global distribution platform. Such new processes and systems may significantly improve our transaction efficiency and ability to scale our revenue and operating performance, including through an ability to track, timely identify and manage increasing volumes of product, license and renewal opportunities and transactions. We may not be able to successfully implement improvements to these systems and processes in a timely or efficient manner, which could result in additional operating inefficiencies and lost business opportunities and associated revenue, and which could cause our costs to increase more than planned. If we do increase our operating expenses in anticipation of the growth of our business and this growth does not meet our expectations, at all or sufficiently to justify the expense, our operating results may be negatively impacted. If we are unable to manage future expansion, our ability to develop and deliver high-quality products and services and securely process increased transaction volumes could be harmed, which could damage our reputation and brand and impede expected growth, and any of which may have a material adverse effect on our business, operating results and financial condition.

Our business and operating results could be adversely affected by unfavorable economic and market conditions.

Our business depends on the overall demand for wireless network technology and on the economic health and general willingness of our current and prospective end customers to purchase our products. The conditions in the United States and global economies are volatile and if they deteriorate our business, operating results and financial condition may be harmed. In particular, we do not know whether spending on wireless network technology will increase or decrease in the future, or at what rate.

Investments in technology by educational institutions in particular could be related to budgetary constraints unrelated to overall economic conditions or may be magnified by unfavorable economic conditions. The purchase of our products or willingness to replace existing infrastructure are discretionary and highly dependent on a perception of continued rapid growth in consumer usage of mobile devices and, in many cases, involve a significant commitment of capital and other resources. In addition, our small and medium enterprise end customers may also be more sensitive to adverse economic conditions than other potential customers, which could amplify the adverse impact of a deterioration of economic conditions. Therefore, weak economic conditions, uncertain availability of government funding, or a reduction in capital spending would likely adversely impact our business, operating results and financial condition. A reduction in spending on wireless network technology could occur or persist even if economic conditions improve.

In addition, if interest rates rise or U.S. dollar foreign exchange rates weaken for our international end customers and channel partners, overall demand for our products and services could decline and related capital spending may be reduced. For example, when the exchange rate of the U.S. dollar to foreign currencies is strong, the price of our products outside the United States may become less competitive, reducing our sales or requiring us to lower pricing for our products outside the United States in order to maintain sales and revenue performance (thus also reducing our gross margins). Furthermore, any increase in the U.S. dollar-value of worldwide commodity prices may result in higher component prices for us and increased manufacturing and shipping costs, each of which may negatively impact our financial results.

U.S. and global political, credit and financial market conditions may negatively impact or impair the value of our current portfolio of cash, cash equivalents and short-term investments, including U.S. treasury securities and U.S.-backed investment vehicles.

Our cash, cash equivalents and short-term investments were \$92.1 million as of December 31, 2018, which we held as money market funds, U.S. treasury securities, commercial paper and investment-grade corporate debt securities with Moody's and S&P ratings of A-/A3 or better. As a result of the uncertain domestic and global political, credit and financial market conditions, investments in these types of financial instruments pose risks arising from liquidity and credit concerns. Any deterioration in the U. S. and global credit and financial markets could cause losses or significant deterioration in the value of our cash, cash equivalents or possible investments. If any such losses or significant deteriorations occur, it may negatively impact or impair our current portfolio of cash, cash equivalents and possible investments, which may affect our ability to fund future obligations. Further, it may be difficult for us to liquidate our investments prior to their maturity without incurring a loss, which would have a material adverse effect on our business, operating results and financial condition.

System security risks, data security incidents and cyber-attacks could compromise our or our end customers' information including proprietary information and end customer information and disrupt our internal operations, which could cause our business and reputation to suffer and adversely affect our stock price.

In the ordinary course of business, we store sensitive data, as well as our proprietary business information and that of our end customers, suppliers and business partners. The secure maintenance of this information, and our ability to protect our network from interruption or damage from unauthorized entry, computer viruses or other events beyond our control, is critical to our operations, and business strategy, reputation and, ultimately, our success as a business and value to our investors. While we believe we use certain proven applications designed for data security and integrity, we are in the process of developing an information security program. Despite the implementation of security measures, our infrastructure or systems may be vulnerable to hackers, computer viruses, worms, malware, ransomware or other malicious software programs or similar disruptive problems caused by our customers, employees, consultants or other Internet users who attempt to invade public and private data networks. For example, we and many other companies were notified in October 2017 of a vulnerability in the protocol that secures all-protected Wi-Fi networks, which would enable an attacker to exploit weaknesses using key reinstatement attacks (the "KRACK Attack"). In addition, in January 2018, we assessed the impact of the widely reported "Meltdown" and "Spectre" vulnerabilities, to assess whether HiveOS and related products and services were affected.

Aerohive uses layered defenses to help protect our systems and data; however, we may not be able to fully mitigate the risk of exploitation from vulnerabilities in core protocols that we, and much of the secure Internet, rely upon for protection. In addition to technological measures we have put in place, we actively monitor commercial and publicly available cyber threat intelligence for reports of new vulnerabilities and emerging cyber threats. However, we may not identify all vulnerabilities or threats as they emerge. As a complement to secure coding lifecycle development practices, routine vulnerability scanning, and penetration testing of our systems, we have implemented additional security and disclosure programs to help identify potential issues in Aerohive products and platforms. These security measures, although designed to reduce the risk of a coding, integration, or configuration issue, are unlikely to identify all potential issues and require continuous effort to monitor, evaluate, and appropriately remediate such issues. Our data or customer data potentially may be exposed due to exploitation of an unidentified or not fully remediated vulnerability; similarly, our systems and services to customers may be disrupted if such vulnerabilities are exploited.

Increasingly, companies are subject to a wide variety of attacks on their networks on an ongoing basis. Our information technology and infrastructure may be vulnerable to persistent threats, penetration or attacks by computer programmers and hackers, software bugs or other technical malfunctions, or other disruptions. Due to our business model and the location of some of our development centers, we have faced and are likely to face threats that target both our internal systems and our products and data analytics solutions, which, in turn, may threaten our end customers' networks, devices, applications and data. In addition, our employees could breach our data security measures and misuse such data or other information, whether through error or misconduct. We also share security responsibilities with our cloud vendors Amazon Web Services ("AWS"), which is also subject to and must respond to similar threats. Any such data security incident, whether external or internal in origin, could compromise our networks, including our cloud-managed platform, creating system disruptions or slowdowns and exploiting security vulnerabilities of our products, and the information stored on our networks could be improperly accessed, publicly disclosed, lost or stolen, which could subject us to liability to our end customers, suppliers, channel and business partners and others, and cause us reputational and financial harm. Additionally, an effective attack on our systems, products, data analytics solutions or key vendor services could disrupt their proper functioning, allow unauthorized access to sensitive, proprietary or confidential information of ours or of our end customers, disrupt or temporarily interrupt customers' networking traffic, or cause other destructive outcomes, including the theft of information sufficient to engage in fraudulent financial transactions or compromise other sensitive information. Because the techniques used by computer programmers and hackers, many of whom are highly sophisticated and well-funded, to access or sabotage networks change frequently and generally are not recognized until after they are used, we may be unable to anticipate or immediately detect these techniques. This could delay our response

or the effectiveness of our response and impede our sales, manufacturing, distribution or other critical functions and ability to limit our exposure to third-party claims and potential liability. If any of these types of data security incidents were to occur or to be believed to have occurred, or if we were unable to timely respond to protect sensitive data or other proprietary or non-public data, our relationships with our business partners and end customers could be materially damaged, our reputation and brand could be materially harmed, use of our solutions could decrease, and affected partners, end customers or government authorities could initiate legal or regulatory action against us in connection with such incidents, which could cause us to incur significant expenses and liability or could result in orders, judgments, or consent decrees forcing us to modify our business practices. The risk that these types of events could seriously harm our business is likely to increase as we expand the number of web-based products and data analytics solutions we offer, and as we operate in more countries.

In addition, if an actual or perceived data security incident occurs in our network or in the network of a partner or an end customer of one of our products and data analytics solutions (particularly our cloud-based offerings), regardless of whether the incident is attributable to our products and data analytics solutions, the market perception of the effectiveness of our products and data analytics solutions could be harmed. We may also be required to expend significant financial and operational resources in an effort to secure our systems and our and our partners' or customers' data from security threats and hazards. Further, real or perceived defects or errors in our products and data analytics solutions (particularly in our cloud-based offerings, due to cloud-based offerings sometimes being perceived as being inherently less secure) could result in claims by channel partners and end customers for losses that they sustain, including potentially losses resulting from data security incidents affecting our systems, our end customers' networks and/or downtime of those networks. If channel partners or end customers make these types of claims, we may be required, or may choose for customer relations or other reasons, to expend additional resources in order to help correct the problem, including warranty and repair costs, process management costs, and costs associated with re-manufacturing our inventory, and to respond to and resolve litigation and regulatory claims. The economic costs to us to eliminate or alleviate cyber or other security problems, bugs, viruses, worms, malware, ransomware or malicious software systems and security vulnerabilities and claims could be significant and may be difficult to anticipate or measure because the damage may differ based on the identity and motive of the programmer or hacker, which may be difficult for us to identify.

Undetected software errors or flaws in our cloud platform could harm our reputation or decrease market acceptance of our solution, which would harm our operating results.

Our platform may contain undetected errors or defects when introduced or as we release new versions. We have experienced these errors or defects in the past in connection with new releases and solution upgrades. Although we were implementing additional procedures to help detect such errors or defects, we expect that we or others will find errors or defects from time to time in future releases, even after we release them commercially. Since our end customers may use our platform for security and compliance reasons, any errors, defects, disruptions in service or other performance problems may damage our end customers' business and could hurt our reputation. If that occurs, we may incur significant costs, the attention of our key personnel could be diverted, our end customers may delay or withhold payment to us or elect not to continue to use our products or renew our services, or defer further purchases, or other significant customer relations problems may arise. We may also be subject to government penalties and liability claims for damages related to errors or defects in our platform.

Our business is subject to the risks of earthquakes, fire, floods and other natural catastrophic events, and interruptions by man-made problems, such as network data-security incidents, computer viruses or terrorism.

Our corporate headquarters are located in Silicon Valley, and substantially all of our contract manufacturers are located in Asia, both regions known for seismic activity. A significant natural disaster, such as an earthquake, a fire or a flood, occurring near our headquarters, or near the facilities of our contract manufacturers, could have a material adverse impact on our business, operating results and financial condition. Despite the implementation of network security measures, our networks also may be vulnerable to computer viruses, break-ins, denial of service attacks, malware, ransomware and other disruptions and data security incidents arising from unauthorized tampering with our systems or our products or our data analytic solutions or from internal or external threats. In addition, natural disasters, acts of terrorism or war could cause disruptions in our or our end customers' or channel partners' businesses, our suppliers' and manufacturers' operations or the economy as a whole. We also rely on information technology systems to communicate among our workforce and with third parties. Any disruption to our communications, whether caused by a natural disaster or by manmade problems, such as power disruptions, could adversely affect our business. We do not have a fully developed or resourced disaster recovery plan, incident response or comprehensive information or data security plans in place which would cover all our installations and business operations, and do not currently require that all our manufacturing partners have such plans in place. To the extent that such incidents or our failure to promptly or effectively respond result in delays or cancellations of orders or impede our suppliers' and/or our manufacturers' ability to timely deliver our products and product components, or the deployment of our products, our business, operating results and financial condition could be adversely affected. We do maintain what we believe are commercially reasonable levels of business interruption insurance. However, we cannot assure that such insurance would be available to us or adequately cover our losses in the event of a significant disruption in our business.

We may acquire other businesses or form partnerships or joint ventures that could require significant management attention, disrupt our business and dilute stockholder value.

We may make investments in complementary companies, products or technologies, or form partnerships or joint ventures with third parties. For example, in January 2016, we lent \$1.5 million in cash in the form of a promissory note issued by a privately held company which provides Wi-Fi application and analytics, which converted into preferred shares of the privately held company in June 2017.

We have limited experience identifying, making investments in, purchasing and integrating third-party companies, technologies or other assets that could be complementary to our business or help advance our strategy, in particular, internationally. As a result, our ability as an organization to identify, invest in, acquire and integrate other companies, technologies or other assets in a successful manner is unproven. We may not be able to find suitable investment or acquisition candidates, and we may not be able to complete such investments or acquisitions on favorable terms, if at all. If we do complete investments or acquisitions, we may not ultimately strengthen our competitive position or achieve our goals, and any investments or acquisitions we complete could be viewed negatively by our end customers, investors and financial analysts. In addition, if we are unsuccessful at integrating such acquisitions, or the technologies associated with such investments or acquisitions, the business prospects, operating results and financials of the combined company could be adversely affected. Any integration process may require significant time and resources, and we may not be able to manage the process successfully. We may also be required to write-down the value of such investments, where the performance of the company or our ability to account for such investment falls below the original investment value. Such write-downs could be material in any reporting period. Cross-border transactions may involve complex regulatory, labor or government compliance requirements which we may not fully anticipate, or which could impose ongoing cost and require significant management attention and resources. We may not successfully evaluate or utilize the acquired technology or personnel, or accurately forecast the financial impact of an acquisition, including accounting charges. We may have to pay cash, assume liabilities, incur debt or issue equity securities to pay for any such investment or acquisition, each of which could adversely affect our financial condition or the value of our common stock. The sale of equity or issuance of debt to finance any such investment or acquisition could result in dilution to our stockholders. The incurrence of indebtedness would result in increased fixed obligations and could also include covenants or other restrictions that would impede our ability to manage our operations.

We periodically assess the value of our assets, and may determine to reduce the value of such assets we report on our balance sheet.

We periodically review the value of assets material to our business and report this value on our financial statements. These assets include property and equipment, as well as intangible assets such as investments we may make in complementary companies, products or technologies, or partnerships or joint ventures we may form with third parties. Changes in events or circumstances, including those we do not anticipate, may cause us to reconsider and reduce the value at which we have previously estimated and reported this asset. For example, in January 2016, we lent \$1.5 million in cash in the form of a promissory note issued by a privately held company which provides Wi-Fi application and analytics, which converted into preferred shares of the privately held company in June 2017. Since that investment, we have written down approximately \$0.8 million of the asset's initial value. Such adjustments in value which we then report on our financial statements could be significant in any period.

Our future capital needs are uncertain, and we may need to raise additional funds in the future. If we require additional funds in the future, those funds may not be available on acceptable terms, or at all.

Our cash, cash equivalents and short-term investments were \$92.1 million as of December 31, 2018. We believe that our existing cash and cash equivalents will be sufficient to meet our anticipated working capital and capital expenditure needs for at least the next 12 months. We may, however, need to raise substantial additional capital in the future to:

- fund our operations;
- continue our research and development;
- develop and commercialize new products;
- invest in or acquire companies, in-licensed products or intellectual property; or
- expand sales and marketing activities.

Our future funding requirements will depend on many factors, including:

- market acceptance of our products and services;
- the cost of our research and development activities;
- refinancing, extending or replacing existing obligations, including our existing credit facilities and lease obligations as they mature or where earlier repayment may be required;

- the cost of responding to potential security vulnerability or breach, including responses to customer or regulatory inquiries, or costs of defending or resolving in litigation or otherwise claims related to such vulnerability or breach (including actual or alleged violations of data privacy rights or regulations);
- the cost of defending and resolving, in litigation or otherwise, claims that we infringe third-party patents or violate other intellectual property rights;
- the cost and timing of establishing additional sales, marketing and distribution capabilities;
- the cost and timing of establishing additional technical support capabilities;
- the effect of competing technological and market developments;
- the market for different types of funding and overall economic conditions; and
- continued investments we may make to fund anticipated future growth.

We may require additional funds in the future, and we may not be able to obtain those funds on acceptable terms, or at all. If we raise additional funds by issuing equity securities, our stockholders may experience dilution. Debt financing, if available, may involve covenants restricting our operations or our ability to incur additional debt. Upon any liquidation, our debt lenders and other creditors would be repaid all interest and principal then-outstanding prior to the holders of our common stock receiving any distribution. Any debt or additional equity financing that we raise may contain terms that are not favorable to us or our stockholders.

If we do not have, or are not able to obtain, sufficient funds, we may have to reduce our cash burn rate, delay development or commercialization of our products or license to third parties the rights to commercialize products or technologies that we would otherwise seek to commercialize. If we raise additional funds through collaboration and licensing arrangements with third parties, it may be necessary to relinquish some rights to our technologies or our products, or to grant licenses on terms that are not favorable to us. If we are unable to generate sufficient cash flows or to raise adequate funds to finance our forecasted expenditures, we may have to liquidate some or all of our assets, or delay, reduce the scope of or eliminate some or all of our development programs. We also may have to reduce sales, marketing, engineering, customer support or other resources devoted to our products, or cease operations. Any of these actions could impede our ability to achieve our business objectives and harm our operating results.

The requirements of being a public company may strain our resources, divert management's attention and affect our ability to attract and retain qualified members of our board of directors.

As a public company, we are subject to the reporting requirements of the Securities Exchange Act of 1934, as amended, or the Exchange Act, the Dodd-Frank Act, the listing requirements of the New York Stock Exchange, the Financial Industry Regulatory Authority ("FINRA") and other applicable securities rules and regulations. Compliance with these rules and regulations increases our legal and financial compliance costs, make some activities more difficult, time-consuming or costly, and increases demand on our systems and resources. For example, the Exchange Act requires, among other things, that we file annual, quarterly and current reports with respect to our business and operating results.

Being a public company has increased our ongoing expenses in general and, specifically, the cost for us to obtain director and officer liability insurance at levels we deem commercially reasonable, and we have incurred higher costs and accepted higher retentions to obtain such coverage. Being a public company also makes it more difficult for us to attract and retain qualified members of our board of directors, particularly to serve on its audit committee and compensation committee, and qualified executive officers. California recently enacted a law requiring public companies with headquarters in California to maintain minimum female representation on their boards of directors. Failure to achieve designated minimum levels by identified dates expose such companies to financial penalties and reputational harm. Institutional investors are increasingly also requiring companies in which they hold shares to expand the diversity of board representation, including the number of women represented. We cannot assure that we will meet the requirements of this new law or the expectations of our investors, on time or at all, which would expose us to financial penalties or cause certain investors to divest their holdings in our stock.

As a result of disclosure of information in filings required by us as a public company, our business and financial condition is more visible, which might result in threatened or actual litigation, including by competitors and other third parties. For example, as described in Note 5 - Commitments and Contingencies in this Annual Report on Form 10-K, we were previously sued in separate federal and state actions relating to our revenue forecast for the fourth quarter of 2017. We will incur significant expenses to defend these actions and expend time and resources, including management resources necessary to resolve them. This and similar future litigation could harm our business and operating results.

An increasing volume of our business is being delivered through our channel partners and distributors, thus increasing our credit exposure to those partners.

We will continue to increase our investment in our channel partners and distributors and expect the level of our revenue to be delivered through those partners and distributors to increase as well. While utilizing our channel partners and distributors to a greater degree as a source of our revenue may reduce the credit risk, we would otherwise have through direct sales to individual end customer transactions, it increases our overall credit risk specific to these individual partners and distributors. We attempt to monitor periodically the business conditions of our partners and distributors. However, we may not fully understand or be able to anticipate at any time difficult financial or market conditions that could affect or undermine their credit worthiness and ability to meet their obligations to us. This is particularly true for our partners located outside the United States and those who do not provide a level of financial reporting or disclosure consistent with U.S.-reporting companies. In the event one or more of these channel partners and distributors were to experience financial difficulties, slow their payments or default entirely on their obligations to us this could have a material effect on our revenue and overall business.

Our debt obligations contain restrictions that impact our business and expose us to risks that could adversely affect our liquidity and financial conditions.

On June 21, 2012, we entered into a revolving credit facility with Silicon Valley Bank, which we refer to, as amended, as our Revolving Credit Facility. As of December 31, 2018, we have \$20.0 million drawn under the Revolving Credit Facility.

Our obligations under the Revolving Credit Facility are secured by substantially all of our property, other than our intellectual property. The Revolving Credit Facility contains customary negative covenants that limit our ability to, among other things, incur additional indebtedness, grant liens, make investments, repurchase stock, pay dividends, transfer assets or engage in merger and acquisition activity, including merge or consolidate with a third party. The Revolving Credit Facility also requires us to maintain a liquidity ratio of not less than 1.25 to 1.00 and a minimum net cash, cash equivalent and investment balance with the bank of \$35 million and to demonstrate the absence of defined events of default in order to assure full access to the available borrowing. Our Revolving Credit Facility also contains customary affirmative covenants, including requirements to, among other things, deliver audited financial statements, and it contains customary events of default, subject to customary cure periods for certain defaults, which include, among other things, non-payment defaults, covenant defaults, material judgment defaults, bankruptcy and insolvency defaults, cross-defaults to certain other material indebtedness, and defaults arising from inaccuracy of representations and warranties. The Revolving Credit Facility also includes a default upon the occurrence of a material adverse change to our business.

If our cash balances or cash flows decline due to any of the factors described in this “Risk Factors” section or otherwise, if we breach covenants under our Revolving Credit Facility or if there occurs a material adverse change in our business, we could be prohibited from further borrowing under the Revolving Credit Facility, our interest rates on the outstanding borrowings could increase and our obligation to repay principal amounts could be accelerated. Our failure to pay interest and principal amounts when due or comply with covenants could cause a default under the Revolving Credit Facility. Any such default could have a material adverse effect on our liquidity and financial condition. In the event of our liquidation, the lender would be repaid all outstanding principal and interest prior to distribution of assets to other creditors. Our holders of common stock would receive a portion of any liquidation proceeds only if all of our creditors were first repaid in full, which portion could be substantially less than the value of their original investment in us.

Risks Related to Our Industry

We compete in highly competitive markets, and competitive pressures from existing and new companies may harm our business, revenue, growth rates and prospects. In addition, many of our current or potential competitors have longer operating histories, greater brand recognition, larger customer bases and significantly greater resources than we do, and we may lack sufficient financial or other resources to maintain or improve our competitive position.

The markets in which we compete are highly competitive, and we expect competition to increase in the future, whether from established competitors or new market entrants. The markets are influenced by, among others, the following competitive factors:

- brand awareness and reputation;
- price and total cost of ownership;
- discounts and other incentives offered to resellers and channel partners;
- strength and scale of sales and marketing efforts, professional services and customer support;
- product features, reliability and performance;
- incumbency of the current provider, either for wireless or wired networking or other products;

- scalability of products;
- ability to integrate with other technology infrastructures; and
- breadth of product offerings.

Our main competitors are primarily general networking infrastructure vendors that include Wi-Fi products in their portfolio, such as Cisco/Meraki, Hewlett-Packard/Aruba Networks, Arris /Ruckus Wireless, Ubiquiti, Extreme Networks, Riverbed/Xirrus and Huawei. Their broad networking portfolios may include enterprise mobility solutions they have developed or acquired or may acquire in the future. Such vendors have significant sales and engineering resources and, along with the relationships they have formed, can offer customers and resellers a broader or more compelling portfolio of products and platform solutions than we can offer, which some customers may prefer, and can use their broader offerings to provide additional financial and technical incentives for customers to purchase their products. These companies may also expand their product offerings over time and, through such partnerships and acquisitions and with greater resources, are able more effectively and opportunistically to target emerging markets or market opportunities, becoming more difficult competitors for us. They are also able to develop broader suites of products and provide a complete and integrated wired and wireless solution which may be preferable to our end customers. We expect competition to intensify in the future as companies introduce new products into our markets, consolidate or broaden their product offerings or from partnerships or collaborations, including amongst our competitors and partners, which expand the breadth and compatibility of their product offerings. This competition could result in increased pricing pressure, reduced profit margins, increased sales and marketing expenses, and failure to increase, or the loss of, our market share, any of which would likely seriously harm our business, operating results or financial condition. If we do not keep pace with product and technology advances, or if we are unable to differentiate our products and services successfully from those of our competitors, including our total cost of ownership, there could be a material and adverse effect on our competitive position, revenue and prospects for growth.

A number of our current or potential competitors have longer operating histories, greater name recognition, larger customer bases, more resellers, and significantly greater financial, technical, sales, marketing and other resources. Our competitors may be better able to anticipate, influence or adapt more quickly to new or emerging technologies and changes in customer requirements, devote greater resources to the promotion and sale of their products and services, initiate or withstand substantial price competition, take advantage of acquisitions or other opportunities more readily and develop and expand their product and service offerings more quickly than we can. Such greater resource and operating histories of our larger and longer-established competitors may be particularly important to our larger enterprise customers when choosing our or a competing product solution. In addition, certain of our competitors may be able to leverage their relationships with customers based on other products or incorporate functionality into existing products to gain business in a manner that discourages customers from purchasing our products, including through selling at low or even negative margins, product bundling, or closed-technology platforms. Our competitors may also be able to offer a broader integrated product platform, or across platforms through partnerships, bringing together a unified product, security and applications offering. Potential end customers may prefer to purchase all of their equipment from a single provider, or may prefer to purchase wireless and wired networking products from an existing supplier rather than a new supplier, regardless of product performance or features.

We expect increased competition from our current competitors, as well as other established and emerging companies, to the extent our markets continue to develop and expand. Conditions in our markets could change rapidly and significantly as a result of technological advancements or other factors. These pressures could limit our growth and materially adversely affect our business, operating results and financial condition.

Industry consolidation and strategic partnerships lead to increased competition and may harm our operating results.

There has been a trend toward industry consolidation in our markets for several years as companies attempt to strengthen or hold their market positions in an evolving industry, and as companies are acquired or are unable to continue operations. Some of our competitors have made acquisitions or entered into partnerships or other strategic relationships to offer a more comprehensive solution than they individually had offered. For example, in November 2012, Cisco Systems acquired Meraki Networks. In April 2014, Zebra Technologies announced that it would buy the enterprise business of Motorola Solutions, which Zebra later sold to Extreme Networks in September 2016. In March 2015, Hewlett-Packard announced that it would acquire Aruba Networks. In July 2015, Fortinet, Inc. completed its acquisition of Meru Networks. In October 2015, Ruckus (now Arris/Ruckus) announced its acquisition of CloudPath Networks, a provider of Wi-Fi onboarding technology. In April 2016, Brocade announced its acquisition of Ruckus. Brocade subsequently sold its Ruckus business unit to the Arris Group. In April 2017, Riverbed Technology announced its acquisition of Xirrus Networks. Such or similar consolidation or strategic partnerships may continue in the future. The companies or alliances resulting from these possible consolidations may create more compelling or bundled or integrated product platforms, bringing together unified product, security and application offerings, as well as being able to offer greater pricing flexibility, making it more difficult for us to compete effectively, including on the basis of price, sales and marketing programs, channel coverage, technology or product functionality. Continued industry consolidation may adversely impact customers' perceptions of the viability of smaller and even medium-

sized technology companies such as ourselves and, consequently, customers' willingness to purchase from us. Such greater resource and operating histories of our larger and longer-established competitors may be particularly important to our larger enterprise customers when choosing our or a competing production solution. In addition, companies that are our strategic alliance or channel partners in some areas of our business may acquire or form alliances with our competitors, thereby reducing their business with us. For example, in February 2018 Ruckus Wireless announced that it had signed an OEM agreement with Dell EMC, whereby Dell would sell Ruckus' portfolio of wireless solutions. We also understand that Juniper has agreed to market competing products and solutions alongside our products and solutions. If our channel partners fail to effectively market, distribute and support our products, or if our channel strategy, or particular channel partner initiatives or investments, such as with Dell, Juniper or others we may identify, are otherwise unsuccessful, our revenue performance and operating margin would be harmed, which could adversely affect the value of our common stock. We also believe that industry consolidation may result in stronger competitors, with more efficient cost structures that are better able to compete as sole-source vendors for our end customers. This could lead to more variability in our operating results and could have a material adverse effect on our business, operating results and financial condition.

Demand for our products and services depends in part on the continued growth of the industries in which we participate, as well as our ability to diversify into other verticals, and the failure of these industries to expand or of our ability to diversify our revenue opportunities, could harm our operating results.

We currently target education, retail and distributed enterprise end customers, and to a lesser extent on hospitality and healthcare vertical. In the event any of the specific sectors we target fails to expand on wireless networking, or slows the rate of its spending, our operating results could be harmed. For example, the education sector is faced with limited resources to spend on technology purchases. In North America, the U.S. government's E-Rate program starting on July 1, 2015 was expected to continue to provide a significant portion over the next several years of the funding used by schools to purchase our solutions. However, we believe the use of this funding and overall level of education spending to purchase our solutions slowed in 2018 and slowed funding levels could continue into 2019. We believe that the significantly slower pace of E-Rate funding and other operation program execution issues were the primary drivers of our weaker-than-expected order volume and lower revenue performance from our educational vertical in recent quarters. If this sector does not continue to expand expenditures on technology in general, or the rate of funding continues to slow or is delayed, our business could be harmed. If the E-Rate program is discontinued or receives a lower level of funding than we expect, or the share of funding our end customers secure or direct toward purchasing our products is lower than we expect, our business could also be harmed.

If functionality similar to that offered by our products is incorporated into existing network infrastructure products, enterprises may decide against adding our products to their network, which would have an adverse effect on our business.

Large, well-established providers of networking equipment may continue to introduce features that compete with our products, either in stand-alone products or as additional features or applications in their network platforms. For example, several of our larger competitors may be better able to integrate into a single platform a broader product, security and applications offering. The inclusion of, or the announcement of an intent to include, functionality perceived to be better or more cost-effective than our platform offering may have an adverse effect on our ability to market and sell our products. Furthermore, even if the functionality these providers offer is more limited or less cost-effective than our platform, end customers may elect to accept such products in lieu of adding platforms from an additional vendor such as ourselves. Many enterprises have invested substantial personnel and financial resources to design and operate their networks and have established deep relationships with other providers of networking products, which may make them reluctant to add new components to their networks, particularly from other vendors such as ourselves. In addition, an enterprise's existing vendors or new vendors with a broad product offering may be able to offer concessions that we are not able to match. If enterprises are reluctant to add new vendors or otherwise decide to work with their existing vendors, our ability to maintain or improve our market share, our financial condition and operating results will be adversely affected.

We rely on revenue from subscription and support services that may decline. Because we recognize revenue from subscriptions and support over the term of the relevant service period, downturns or upturns in sales are not immediately reflected in full in our operating results.

Subscription and support revenue, consisting of sales of new or renewal subscription and support and maintenance contracts, accounts for a significant portion of our revenue, comprising 30% and 26% of our total revenue for the fiscal years ended December 31, 2018 and 2017, respectively. Our service revenue may decline and fluctuate as a result of a number of factors, including end customers' level of satisfaction with our offerings, the prices, pricing and changes in the scope of our offerings, the prices of products and services offered by our competitors, and reductions in our end customers' spending levels. In addition, slowing rates of new customer acquisition will limit the expansion of our installed base and, thus may reduce renewal opportunities and associated revenue in future periods. We are developing and implementing systems to enable us better to track and timely identify renewal opportunities. If our sales of new or renewal subscription and support and maintenance contracts decline, or we are not able to manage efficiently increased support transaction volumes, including

renewals, our revenue and long-term revenue growth may decline, and our business will suffer. In addition, we recognize service revenue ratably over the term of the relevant service period, which is typically one, three or five years. As a result, much of the service revenue we report each quarter is the recognition of deferred revenue from service contracts entered during previous quarters. Consequently, a decline in new or renewed subscription or support and maintenance contracts in any one quarter will not be fully reflected in revenue in that quarter but will continue to negatively affect our revenue in future quarters. Accordingly, the effect of significant downturns in new or renewed sales of our subscriptions or support and maintenance is not reflected in full in our operating results until future periods. Also, it is difficult for us to rapidly increase our service revenue through additional service sales in any period, as revenue from new and renewal service contracts must be recognized over the applicable service period. Furthermore, any increase in the average term of service contracts would result in revenue for service contracts being recognized over longer periods of time and the associated revenue we recognize could be lower in any particular quarter.

If we fail to comply with environmental requirements, our business, financial condition, operating results, and reputation could be adversely affected.

We are subject to various local, state, federal, and international environmental laws and regulations, including laws governing the hazardous material content of our products and laws relating to the collection of and recycling of electrical and electronic equipment. Examples of these laws and regulations include the European Union Restriction on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Directive ("RoHS"), and the European Union Waste Electrical and Electronic Equipment Directive ("WEEE Directive"), as well as the implementing legislation of the European Union member states. Similar laws and regulations have been passed or are pending in China, South Korea, Norway, and Japan and may be enacted in other regions in which we currently or expect to operate, including in the United States, and we are, or may in the future be, subject to these laws and regulations.

The RoHS and similar laws of other jurisdictions limit the content of certain hazardous materials, such as lead, mercury and cadmium, in the manufacture of electrical equipment, including our products. Currently, our products comply with the EU RoHS requirements. However, if there are changes to these or other laws (or their interpretation) or other jurisdictions pass new similar laws or requirements, we may be required to reengineer our products to use components compatible with these regulations. This reengineering and component substitution could result in additional costs to us or disrupt our operations or logistics or delay our ability to sell our products.

The WEEE Directive requires electronic goods producers to register as a WEEE producer and be responsible for the collection, recycling, and treatment of such products. Changes in interpretation of the directive may cause us to have additional regulatory requirements to meet in the future in order to comply with this directive, or with any similar laws adopted in other jurisdictions.

We are also subject to environmental laws and regulations governing the management of hazardous materials, which we use in small quantities in our engineering labs. Our failure to comply with these or past, present and future similar laws could result in reduced sales of our products, substantial product inventory write-offs, reputational damage, costs, penalties, third-party property damage, and other sanctions, any of which could harm our business and financial condition. We also expect that our products will be affected by new environmental laws and regulations on an ongoing basis, imposing greater compliance costs, and increasing risks and penalties associated with violations, which could harm our business. To date, our expenditures for environmental compliance have not had a material impact on our results of operations or cash flows, and although we cannot predict the future impact of such laws or regulations, they will likely result in additional costs and may increase penalties associated with violations or require us to change the content of our products or how they are manufactured, any of which could have a material adverse effect on our business, operating results, and financial condition.

New regulations or standards or changes in existing regulations or standards in the United States or internationally related to our products may result in unanticipated costs or liabilities, which could have a material adverse effect on our business, results of operations and future sales, and could place additional burdens on the operations of our business.

Our products are subject to governmental regulations in a variety of jurisdictions. In order to achieve and maintain market acceptance, our products must continue to comply with these regulations as well as a significant number of industry standards. In the United States, our products must comply with various regulations defined by the Federal Communications Commission ("FCC"), Underwriters Laboratories and others. We must also comply with similar international regulations in order for our products to be certified for use in such countries. For example, our wireless communication products operate through the transmission of radio signals and radio emissions are subject to regulation in the United States and in other countries in which we do business. In the United States, various federal agencies, including the Center for Devices and Radiological Health of the Food and Drug Administration, the FCC and various state agencies have promulgated regulations that concern the use of radio and electromagnetic emissions standards. Member countries of the European Union and individual countries in the Asia Pacific region have enacted similar standards concerning electrical safety and electromagnetic

compatibility and emissions. In addition, our data analytics solutions, and the manner in which we collect, store, analyze, use or transmit end customer data, increasingly may be subject to regulation under the Federal Trade Commission.

As these regulations and standards evolve, and if new regulations or standards are implemented, we will be required to modify our products or develop and support new versions of our products, or change the manner in which we collect, store, analyze, use or transmit end customer data, and our compliance with these regulations and standards may become more burdensome and require significant investments. The failure of our products to comply, or delays in compliance, with the various existing and evolving industry regulations and standards could prevent or delay introduction of our products, which could harm our business. End customer uncertainty regarding future policies may also affect demand for communications products, including our products. Moreover, channel partners or end customers may require us, or we may otherwise deem it necessary or advisable, to alter our products to address actual or anticipated changes in the regulatory environment. Our inability to alter our products to address these requirements and any regulatory changes may have a material adverse effect on our business, operating results and financial condition.

Risks Related to Our Intellectual Property

If we are unable to protect our intellectual property rights, our competitive position could be harmed or we could be required to incur significant expenses to enforce our rights.

We protect our proprietary information and technology through licensing agreements, third-party nondisclosure agreements and other contractual provisions, as well as through patent, trademark, copyright and trade secret laws in the United States and similar laws in other countries. As of December 31, 2018, we held 75 patents issued and 48 applications pending in the United States (as well as certain foreign equivalents issued and applications pending outside the United States). These patents issued in the U.S. will expire between 2028 and 2036.

We do not know whether these protections will be available in all cases or will be adequate to prevent our competitors from copying, reverse engineering or otherwise obtaining and using our technology, proprietary rights or products. The laws of some foreign countries, including countries in which our products are sold, used or manufactured, are in many cases not as protective of intellectual property rights as those in the United States, and mechanisms for enforcement of intellectual property rights may be inadequate. In addition, third parties may seek to challenge, invalidate or circumvent our patents, trademarks, copyrights and trade secrets, or applications for any of the foregoing. Our competitors may independently develop technologies that are substantially equivalent or superior to our technology or design around our proprietary rights. We have focused patent, trademark, copyright and trade secret protection primarily in the United States. As a result, we may not have sufficient protection of our intellectual property in all countries where infringement may occur. In each case, our ability to compete or offer our products for sale could be significantly impaired.

To prevent substantial unauthorized use of our intellectual property rights, it may be necessary to prosecute actions for infringement and/or misappropriation of our proprietary rights against third parties. We currently have a limited portfolio of issued patents compared to our larger competitors and, therefore, may not be able to effectively utilize our intellectual property portfolio to assert against third parties. Any such action could result in significant costs and diversion of our resources and management's attention and, in any case, we could fail to be successful in any such action. Furthermore, many of our current and potential competitors have the ability to dedicate substantially greater resources to enforce their intellectual property rights than we do. Accordingly, despite our efforts, we may not be able to prevent third parties from infringing upon or misappropriating our intellectual property.

Claims by others that we infringe their intellectual property rights could harm our business.

Companies that sell products in the wireless networking industry are often aggressive in protecting intellectual property rights and perceived rights, which has resulted in protracted and expensive litigation for some companies. In addition, non-operating entities have been increasingly aggressive in asserting intellectual property rights and perceived rights against operating companies in the Wi-Fi and networking industry, including ourselves. We currently are subject to claims and litigation by third parties that we infringe their intellectual property rights.

As our business expands, and the number of products and competitors in our market increases and overlaps occur, we expect that infringement claims against us or our partners or end customers may increase in number and significance. Any claims or proceedings against us, whether meritorious, will be time-consuming, result in costly litigation, require significant amounts of management time or result in the diversion of significant operational resources, any of which could materially and adversely affect our business and operating results.

Intellectual property lawsuits are subject to inherent uncertainties due to the complexity of the technical issues involved, and we cannot be certain that we will be successful in defending ourselves against intellectual property claims. Our limited portfolio of issued patents may not provide defenses or counterclaims in response to patent infringement claims or litigation

brought against us by third-party competitors. Further, where non-operating entities or other adverse patent owners who have no relevant products or revenue bring such claims or litigation against us, our patents provide no deterrence or competitive risk. In any case, many potential litigants have the capability to dedicate substantially greater resources to enforce their intellectual property rights and to defend claims than we could against them. Furthermore, a successful claimant could secure a judgment that requires us to pay substantial damages or prevents us from distributing certain products or performing certain services. We might also be required to seek a license and pay royalties for the use of such intellectual property, which may not be available on commercially acceptable terms, or at all. Alternatively, we may be required to develop non-infringing technology, which could require significant effort and expense to redesign our product, which could delay our product offering and may ultimately not be successful.

See Part II, Item 1 "Legal Proceedings." for a discussion of certain of the intellectual property litigation in which we are currently involved.

Our use of open-source software could impose limitations on our ability to commercialize our products.

Our products utilize software modules licensed to us by third-party authors under open-source licenses, including as incorporated into software we receive from third party commercial software vendors. Use and distribution of open-source software may entail greater risks than use of third-party commercial software, as open-source licensors generally do not provide support, updates, warranties, or other contractual protections regarding infringement claims or the quality of the code. Furthermore, the terms of many open-source licenses have not been interpreted by U.S. or foreign courts, and these licenses could be construed in a way that could impose unanticipated conditions or restrictions on our ability to commercialize our products. In addition, some open-source licenses require the licensee, under certain circumstances, to make available source code for modifications or derivative works the licensee creates based upon such open-source software, and to allow further modification and distribution of such works. As a result, if we combine our proprietary software with open-source software or modify such software in a certain manner, we could be required to release certain source code we authored under license terms that freely permit third parties, including our competitors, to further modify, use and distribute our software. In some instances, this could allow our competitors to create similar products with lower development effort and time, create security vulnerabilities in our products, and ultimately result in a loss of product sales for us. Further, if we are held to have breached or otherwise failed to comply with the terms of an open-source software license, we could be required to pay damages, seek licenses from third parties to continue offering our products, re-engineer our products, or discontinue the sale of our products if re-engineering could not be accomplished on a timely basis, any of which could harm our business, operating results and financial condition.

We continue to review our usage of open-source software in our products, and to analyze the impact of such usage on our products and business. We may not be able to identify all of the risks regarding our use of open-source software and what steps we will need to take to come into compliance with applicable license terms. Moreover, our implementation of tools and policies designed to monitor our ongoing use of open-source software in our products may not be adequate or entirely effective in all instances to identify past or future use. Depending on our determination of the impact on our business of compliance with applicable open-source license requirements, we may re-engineer certain aspects of our products and/or seek licenses from third parties in order to demonstrate compliance with applicable license terms. Our review to date has identified certain uses of third-party open-source software that, under the terms of applicable open-source licenses, will require us to provide certain additional notices, and to distribute and to offer to release certain of our source code under open-source software license terms, which we currently anticipate doing. We are also re-engineering certain portions of our products to limit the scope of and potential impact on our business of such disclosure and licensing requirements going forward. We do not know the full extent of such required disclosures or re-engineering efforts, or if and on what terms such alternative licenses could be available and whether our reengineering efforts will be sufficient to demonstrate substantial compliance with applicable licensing requirements. Even where we have reengineered new product or platform offerings, we will likely be required to support for some period into the future legacy products and platforms utilizing software which does not comply with applicable license requirements. In such instances, we may nonetheless have exposure to third-party claims regarding our ability to demonstrate compliance with applicable open-source license requirements.

We rely on the availability of third-party licenses. If these licenses are available to us only on less favorable terms or not at all in the future, our business and operating results would be harmed.

We have incorporated third-party licensed technology and intellectual property rights into our products. It may be necessary in the future to renew existing licenses relating to various aspects of these products or to seek additional licenses for existing or new products. These necessary licenses could be unavailable to us on acceptable terms, or at all. The inability to obtain certain licenses or other rights, or to obtain those licenses or rights on favorable terms, or the need to engage in litigation regarding these matters, could result in delays in product releases until such time, if ever, as we can identify, license or develop equivalent technology and integrate such technology into our products, which might have a material adverse effect on our business, operating results and financial condition. Moreover, the inclusion in our products of intellectual property licensed

from third parties on a nonexclusive basis could limit our ability to differentiate our product offering or protect our proprietary rights in our products.

Risks Related to Ownership of Our Common Stock

We have experienced significant volatility in the price of our common stock, and you could lose all or part of your investment.

The trading price of our common stock has fluctuated substantially. From the date of our initial public offering in March 2014 through December 31, 2018, the high and low trading price for our common stock as reported by the New York Stock Exchange ranged between a high of \$12.23 and a low of \$3.02. The trading price of our common stock depends on a number of factors, including those described in this “Risk Factors” section, many of which are beyond our control and may not be related to our operating performance. These fluctuations could cause you to lose all or part of your investment in our common stock, since you might not be able to sell your shares at or near the price you paid.

Factors that could cause fluctuations in the trading price of our common stock include the following:

- price and volume fluctuations in the overall stock market from time to time;
- volatility in the market prices and trading volumes of high-technology stocks;
- changes in operating performance and stock market valuations of other technology companies generally, or those in our industry in particular;
- sales of shares of our common stock by us or our stockholders, including through secondary offerings we may initiate to generate cash to fund our ongoing operations;
- failure of financial analysts to maintain coverage of us, changes in financial estimates by any analysts who follow our company, or our failure to meet these estimates or the expectations of our investors;
- the financial projections we may provide to the public, any changes in those projections or our failure to meet those projections;
- distribution by large holders of our stock, including by early-stage investors;
- announcements by us or our competitors of new products or new or terminated significant contracts, commercial relationships or capital commitments, or of delays in our product offerings;
- public analyst or investor reaction to our press releases, other public announcements and filings with the Securities and Exchange Commission, including specifically, concerning our operations, business initiatives or operating performance;
- rumors and market speculation involving us or other companies in our industry;
- vesting of shares under RSU awards to our employees and delivery of shares our employees purchase under our ESPP, and related selling of such shares into the market, whether by us or our employees, including to cover employee tax-withholding obligations;
- actual or anticipated changes in our results of operations or fluctuations in our operating results, including any actual or perceived slowing in our rate of growth or ability to achieve profitability at all or on a schedule expected by our investors or industry analysts;
- actual or anticipated developments in our business or our competitors’ businesses or the competitive landscape generally;
- litigation involving us, our industry or both, or investigations by regulators into our operations or those of our competitors;
- developments or disputes concerning our intellectual property or our products, or third-party proprietary rights;
- announced or completed investments in or acquisitions of businesses or technologies by us or our competitors, including the result of ongoing consolidation within our industry, and the performance of such investments or acquisitions;
- the partnerships we or our competitors may announce, and the performance of such partnerships;
- declines in our operating, margin or revenue growth or customer acquisition rates;
- announcement or perceived risk of a data breach or vulnerability involving our products;
- new laws or regulations or new interpretations of existing laws or regulations applicable to our business, particularly relating to the protection, use and other processing of end-customer data;

- changes in accounting standards, policies, guidelines, interpretations or principles;
- changes in our senior management or our board of directors;
- general economic conditions and slow or negative growth of our markets; and
- other events or factors, including those resulting from war, incidents of terrorism or responses to these events.

The stock market in general, and the market for technology companies in particular, have experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of those companies. Broad market and industry factors may seriously affect the market price of our common stock, regardless of our actual operating performance. In addition, in the past, following periods of volatility in the overall market and the market prices of particular companies' securities, securities class action litigations have often been instituted against these companies. Our industry has experienced significant consolidation recently, and the prices paid in such consolidations and the performance of such acquisitions could have a significant impact on how analysts and investors view our stock and the price such investors are willing to pay. For example, in April 2016, Brocade announced its acquisition of Ruckus Wireless, one of our competitors. Brocade subsequently sold its Ruckus business unit to the Arris Group. In April 2017, Riverbed Technology announced its acquisition of Xirrus Networks. What prices buyers paid in these or other similar transactions could have a significant and negative affect on our stock price or what a potential buyer would be willing to pay for our stock. In addition, if our revenue or operating results, or the rate of growth of our revenue or operating results, fall below the expectations of our investors or financial analysts, or below any forecasts or guidance we may provide to the market, or if the forecasts we provide to the market are below the expectations of analysts or investors, the price of our common stock could decline substantially. For example, the price of our common stock dropped significantly following our announcement on January 16, 2018 of preliminary revenue results for our fourth quarter of fiscal year 2017. Shortly thereafter, several federal stockholder class actions and a state derivative lawsuit were initiated alleging that Aerohive and certain of our officers made false and misleading statements, in particular regarding our financial outlook for our fourth quarter of fiscal year 2017. See Note 5 - Commitments and Contingencies in this Annual Report on Form 10-K for additional information regarding these actions and lawsuit. Such stock price declines could occur and result in litigation against us even when we have met our own or other publicly stated revenue or earnings forecasts, and results in substantial costs and a diversion from our management's attention and resources.

We utilize RSU awards as a significant component of the equity incentives we provide to our employees. Shares subject to these awards typically vest on March 1, June 1, September 1 and December 1 of each year. On each of these dates, we may direct the sale of such shares into the market to generate cash sufficient to satisfy our estimate of the minimum statutory employee tax withholding. Our employees are also able to purchase shares of our common stock twice per year under our ESPP, which purchase dates currently are June 1 and December 1 of each year. Employees may choose then to sell a portion or all of such shares, including to generate cash sufficient to satisfy statutory tax withholding requirements they may have under local law. The coincidence of such sales of our common stock, concentrating on specific dates, may increase the typical or average trading volume of our common stock, and increase the volatility and degree of fluctuation in the trading price of our common stock. We expect such increased trading volumes and related trading-price volatility to repeat, coinciding with future RSU vesting and ESPP purchase dates. For this reason, on each of March 1, June 1, September 1 and December 1, and for the several days thereafter, the average trading volume in our common stock, as reported by the NYSE, typically increases, sometimes significantly, as does the degree of fluctuation in the trading price for our stock. Such trading volume and price volatility could create uncertainty amongst our investors or contribute to further stock price declines which may not be related to the actual performance of our business.

A small number of stockholders hold a substantial share of our common stock and their sales could increase the volatility of our stock price.

A small number of stockholders currently each holds more than 5% of our common stock. These stockholders include our C.E.O., but also stockholders with no affiliation with our company. The average daily trading volume in our stock is limited and any sales of our common stock by any of these stockholders (or, in the case where such stockholders are investment funds, distribution of our stock to their investors and their subsequent sale), could significantly increase trading volatility in and significantly lower the market price of our common stock, regardless of our actual operating performance.

Certain provisions in our charter documents and under Delaware law could limit attempts by our stockholders to replace or remove members of our board of directors or current management and may adversely affect the market price of our common stock.

Provisions in our certificate of incorporation and bylaws may have the effect of delaying or preventing a change of control or changes in our board of directors or management. These provisions include the following:

- our Board has the right to elect directors to fill a vacancy created by the expansion of the Board or the resignation, death or removal of a director, which prevents stockholders from being able to fill vacancies on our Board;

- our stockholders may not act by written consent or call special stockholders' meetings; as a result, a holder or holders controlling a majority of our common stock would not be able to take certain actions other than at annual stockholders' meetings or special stockholders' meetings called by the Board, the chair of the Board, the chief executive officer or the president;
- our directors may only be removed for cause, which would delay the replacement of a majority of our Board;
- our Board is staggered in three tiers, with directors in each tier separately serving staggered three-year terms, which could impede an acquiror from rapidly replacing our existing directors with its own slate of directors;
- our certificate of incorporation prohibits cumulative voting in the election of directors, which limits the ability of minority stockholders to elect director candidates;
- our stockholders must provide advance notice and additional disclosures in order to nominate individuals for election to our Board or to propose matters that can be acted upon at a stockholders' meeting, which may discourage or deter a potential acquiror from conducting a solicitation of proxies to elect the acquiror's own slate of directors or otherwise attempting to obtain control of our company; and
- our Board may issue, without stockholder approval, shares of undesignated preferred stock; the ability to issue undesignated preferred stock makes it possible for our Board to issue preferred stock with voting or other rights or preferences that could impede the success of any attempt to acquire us.

As a Delaware corporation, we are also subject to certain Delaware anti-takeover provisions. For example, under Delaware law, a corporation may not engage in a business combination with any holder of 15% or more of its capital stock unless the holder has held the stock for three years or, among other things, the Board has approved the transaction. Our Board could rely on Delaware law to prevent or delay an acquisition of us.

Our directors are entitled upon a change of control of our company to accelerated vesting of their equity awards pursuant to the terms of their service arrangements, and our executive officers and certain employees in the event their employment is actually or constructively terminated in the context of a change of control. In addition to the arrangements currently in place with some of our executive officers, we may enter into similar arrangements in the future with other officers and employees. Such arrangements could delay or discourage a potential acquisition of our company.

If financial or industry analysts do not publish research or reports about our business, or if they issue an adverse or misleading opinion regarding our common stock, our stock price and trading volume could decline.

The trading market for our common stock is influenced by the research and reports that industry or financial analysts publish about us, our business, our competitors' business or our industry. We do not control these analysts, or the content and opinions included in their reports. We may not attract sufficient research coverage or maintain coverage of analysts that currently publish reports regarding our business. If any of the analysts who cover us issues an adverse or misleading opinion regarding our stock price, our stock price would likely decline. If one or more of these analysts ceases coverage of our company or fails to publish reports on us regularly, we could lose visibility in the financial markets, which in turn could cause our stock price or trading volume to decline.

We have a share repurchase program, but we cannot guarantee that in fact that our repurchase of shares will enhance long-term stockholder value. Our share repurchases could also increase the volatility of the price of our common stock and could diminish our cash reserves.

In February 2016, our board of directors authorized a stock repurchase program. Currently, under the program, we are authorized to repurchase shares of our common stock for an aggregate purchase price of up to \$20 million. The program currently extends through June 30, 2020. Under the program, we may purchase shares of our stock from time to time, in the open market or through private transactions, subject to market conditions and in compliance with applicable state and federal securities laws. However, the timing and number of our share repurchases, if any, will depend upon several factors, including market and business conditions, the trading price of our common stock and the nature of other investment opportunities available to us. We may also choose to defer or limit repurchases given other uses of our cash or our desire to preserve cash balances. As of December 31, 2018, we had repurchased under this program 2,469,978 shares of our common stock at a total price of \$10.6 million and average purchase price of \$4.29 per share of our common stock.

Although our board of directors authorized the program, we are not obligated to repurchase any minimum or specific number or dollar amount of shares. In addition, we may suspend or terminate the program at any time before its expiration as of June 30, 2020. Our repurchases of common stock could affect the market price of our common stock or increase its volatility. For example, the existence of a share repurchase program could cause our share price to be higher than it would be in the absence of such a program and could potentially reduce the market liquidity for our stock. Additionally, our repurchase program could diminish our cash reserves, which may impact our ability to finance future growth and to pursue possible future strategic opportunities and acquisitions. We also cannot assure that any share repurchases will enhance stockholder value because the

market price of our common stock may decline below the levels at which we repurchase our stock, and short-term stock price fluctuations could reduce the program's effectiveness.

We do not intend to pay dividends and under our loan agreements with our lenders we are not permitted to pay dividends. As a result, your ability to achieve a return on your investment will depend on appreciation in the price of our common stock.

Pursuant to our Revolving Credit Facility, we are restricted from paying dividends while this facility is in place. Moreover, we have never declared or paid any cash dividends on our common stock and do not intend to pay any cash dividends in the foreseeable future. We anticipate that we will retain all of our future earnings for use in the development of our business and for general corporate purposes our Board may determine, in its discretion. Any determination to pay dividends in the future will be at the discretion of our Board. Accordingly, investors must rely on sales of their common stock after price appreciation, which may never occur, as the only way to realize any future gains on their investments.

We are an "Emerging Growth Company," and any decision on our part to comply only with certain reduced disclosure requirements applicable to Emerging Growth Companies could make our common stock less attractive to investors.

We are an "emerging growth company," as defined in the Jumpstart Our Business Startups Act enacted in April 2012, and, for as long as we continue to be an "emerging growth company," we choose to take advantage of exemptions from various reporting or compliance requirements applicable to other public companies but not to "emerging growth companies," including, but not limited to, not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act, reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements, and exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved. We could be an "emerging growth company" for up to five years after the completion of the IPO in March 2014, although if the market value of our common stock that is held by non-affiliates exceeds \$700 million as of any June 30 before that time or if we have total annual gross revenue of \$1.07 billion or more during any fiscal year before that time, we would cease to be an "emerging growth company" as of the end of that fiscal year. If we issue more than \$1 billion in non-convertible debt in a three-year period, we would cease to be an "emerging growth company" immediately. We cannot predict if investors will find our common stock less attractive if we choose to rely on these exemptions. If some investors find our common stock less attractive as a result of any choices to reduce future disclosure, there may be a less active trading market for our common stock and our stock price may be more volatile.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

As of December 31, 2018, we leased approximately 150,000 square feet of space in our domestic and international locations. Approximately 65% of our leased properties are located in the United States and are primarily located in Milpitas, California, which is where our corporate headquarters are located. Our international locations, which comprise approximately 35% of all our properties, are mainly located in China, the Netherlands and the United Kingdom. We use our international properties primarily as customer service centers, sales offices and research and development facilities. Our current office leases for our headquarters facilities in Milpitas, California will expire in June 2023. See Note 5, Commitments and Contingencies, of the Notes to our Consolidated Financial Statements for information regarding our lease obligations. We believe that our current facilities are suitable and adequate to meet our current needs.

We intend to add new facilities or expand existing facilities as necessary. As we add employees and support new geographic markets, we also intend to add new facilities. We believe that suitable additional or alternative space will be available as needed to accommodate ongoing operations and any such growth. However, such additional or alternative facilities may impose additional expenses on our ongoing operations.

ITEM 3. LEGAL PROCEEDINGS

The information set forth under the "Contingencies" subheading in Note 5 - Commitments and Contingencies of Notes to Consolidated Financial Statements in Part II, Item 8 of this Annual Report on Form 10-K is incorporated herein by reference.

Export Compliance

Our products are subject to U.S. export controls, specifically the Export Administration Regulations, and economic sanctions enforced by the Office of Foreign Assets Control. We incorporate standard encryption algorithms into our products, which, along with the underlying technology, may be exported outside of the United States only with the required export

authorizations, including by license, license exception or other appropriate government authorizations. Each of these authorizations may require the filing of an encryption registration and classification request. Furthermore, U.S. export control and trade laws and economic sanctions prohibit the shipment of certain products and services to certain countries, as well as governments and persons targeted by U.S. sanctions. We take precautions to prevent our products and services from being exported in violation of these laws. However, in certain instances we or our channel partners may ship encryption products prior to obtaining the required export authorizations and/or submitting the required requests, including a classification request and request for an encryption registration number. For example, we filed in June 2013 a Voluntary Self Disclosure with the U.S. Department of Commerce's Bureau of Industry and Security ("BIS") concerning these violations. BIS closed out this disclosure with a warning letter in May 2014 and did not assess penalties. In January 2018, we provided a voluntary disclosure to the U.S. Customs and Border Protection service relating to the value of merchandise we imported to the United States relating to the manufacture of certain of our products. Similar future instances could result in monetary penalties or other penalties assessed against us. Additionally, even though we take precautions to ensure that our channel partners comply with all relevant regulations, any failure by our channel partners to comply with such regulations could have negative consequences for us, including reputational harm, government investigations, and assessments of penalties against us.

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

Market Information

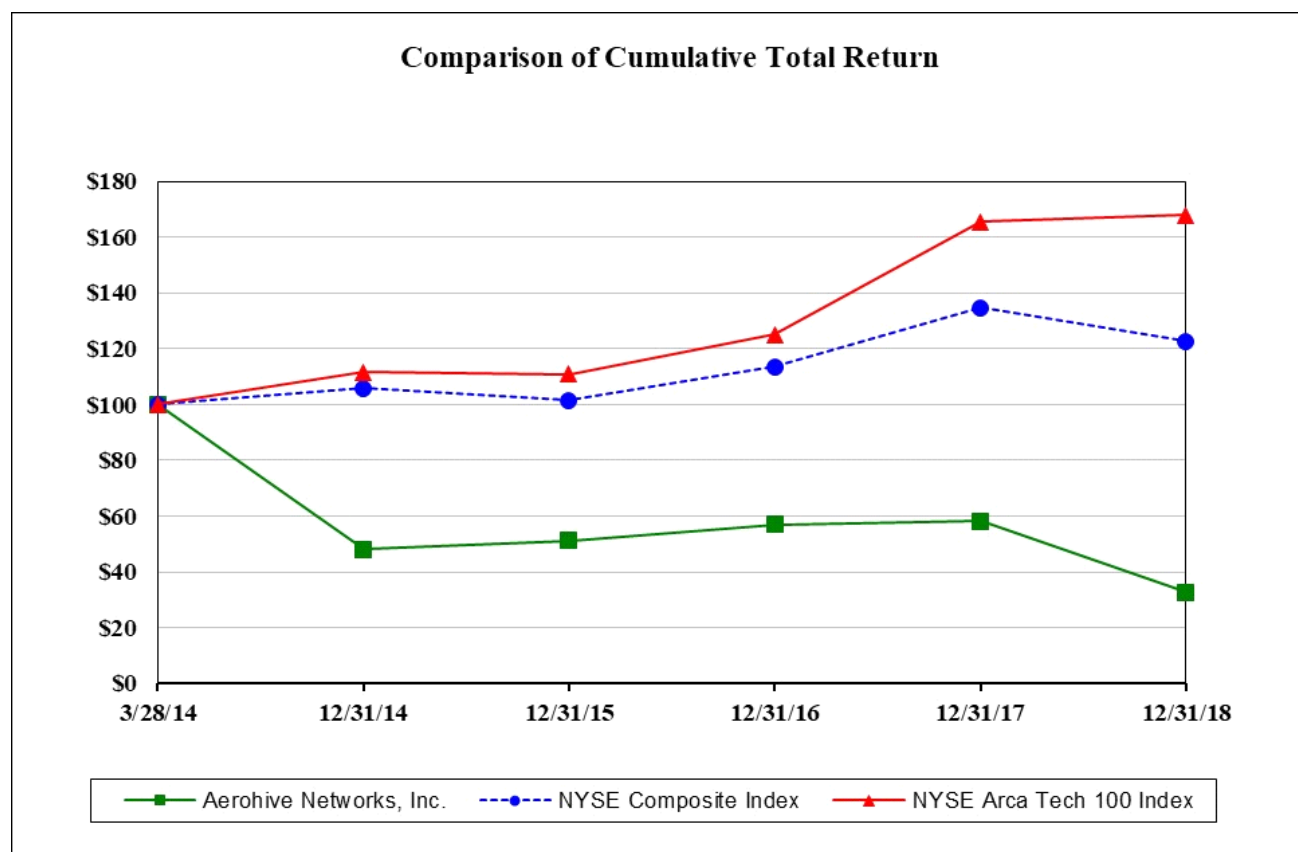
Our common stock, \$0.001 par value per share, has been trading on the New York Stock Exchange since March 28, 2014, under the symbol "HIVE."

Holders of Record

As of December 31, 2018, there were approximately 21 holders of record of our common stock. Because many of our shares of common stock are held by brokers and other institutions on behalf of stockholders, we are unable to estimate the total number of stockholders these record holders represent.

Stock Performance Graph

The following graph compares, for the period ending December 31, 2018, the cumulative total stockholder returns for our common stock, the NYSE Composite Index and the NYSE Arca Tech 100 Index. The graph assumes that \$100 was invested on March 28, 2014 in each of our common stock, the NYSE Composite Index and the NYSE Arca Tech 100 Index and assumes reinvestment of any dividends. The stock price performance on the following graph is not necessarily indicative of future price performance of our stock. This performance graph shall not be deemed "filed" for purposes of Section 18 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), or incorporated by reference into any of our filings under the Exchange Act or the Securities Act of 1933, as amended, except as shall be expressly set forth by specific reference in such filing.



Dividend Policy

We have never declared or paid cash dividends on our common stock. Our various credit facilities currently restrict our ability to pay dividends while these facilities remain outstanding. We currently intend to retain all available funds and any future earnings for use in the operation of our business and do not anticipate paying any dividends on our common stock in the

foreseeable future. Our Board of Directors would determine, in its discretion, whether to declare any future dividends, in accordance with applicable law, which may require the approval of certain of our lenders and will depend on our financial condition, operating results, capital requirements, general business conditions and other factors that our Board may deem relevant.

ITEM 6. SELECTED CONSOLIDATED FINANCIAL DATA

You should read the following selected historical financial data below in conjunction with Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” our financial statements, and the related notes appearing in Item 8, “Financial Statements and Supplementary Data,” of this Annual Report on Form 10-K to fully understand factors that may affect the comparability of the information presented below.

We derived the selected consolidated statement of operations data for the years ended December 31, 2018, 2017 and 2016, and the consolidated balance sheet data as of December 31, 2018 and 2017 from our audited consolidated financial statements included elsewhere in this report. We derived the selected consolidated statements of operations data for the years ended December 31, 2015 and 2014, and the consolidated balance sheet data as of December 31, 2016, 2015, and 2014 from audited financial statements not included in this report. Our historical results are not necessarily indicative of the results that may be expected in the future.

	Year Ended December 31,				
	2018	2017	2016	2015	2014
		(As Adjusted)	(As Adjusted)		
	(in thousands, except share and per share data)				
Consolidated Statements of Operations Data:					
Revenue:					
Product	\$ 108,738	\$ 113,133	\$ 134,558	\$ 126,281	\$ 120,507
Subscription and support	46,171	40,425	33,280	25,378	16,785
Total revenue	<u>154,909</u>	<u>153,558</u>	<u>167,838</u>	<u>151,659</u>	<u>137,292</u>
Cost of revenue ⁽¹⁾ :					
Product	39,293	37,116	42,735	40,496	38,365
Subscription and support	13,612	12,893	12,066	9,897	6,400
Total cost of revenue	<u>52,905</u>	<u>50,009</u>	<u>54,801</u>	<u>50,393</u>	<u>44,765</u>
Gross profit	102,004	103,549	113,037	101,266	92,527
Operating expenses:					
Research and development ⁽¹⁾	35,646	36,418	41,504	36,924	27,546
Sales and marketing ⁽¹⁾	61,687	65,385	80,812	81,089	70,846
General and administrative ⁽¹⁾	22,508	23,094	28,839	26,303	21,180
Total operating expenses	<u>119,841</u>	<u>124,897</u>	<u>151,155</u>	<u>144,316</u>	<u>119,572</u>
Operating loss	(17,837)	(21,348)	(38,118)	(43,050)	(27,045)
Interest income	1,568	720	468	108	37
Interest expense	(748)	(567)	(474)	(1,209)	(1,843)
Other income (expense), net	(1,160)	(308)	177	285	255
Loss before income taxes	(18,177)	(21,503)	(37,947)	(43,866)	(28,596)
Income tax provision	160	603	269	352	441
Net loss	<u>\$ (18,337)</u>	<u>\$ (22,106)</u>	<u>\$ (38,216)</u>	<u>\$ (44,218)</u>	<u>\$ (29,037)</u>
Net loss per share, basic and diluted	<u>\$ (0.33)</u>	<u>\$ (0.42)</u>	<u>\$ (0.76)</u>	<u>\$ (0.93)</u>	<u>\$ (0.80)</u>
Weighted-average shares used in computing net loss per share, basic and diluted	<u>55,050,119</u>	<u>53,227,342</u>	<u>50,332,872</u>	<u>47,323,253</u>	<u>36,097,405</u>

⁽¹⁾Stock-based compensation expense included in the consolidated statements of operations data above was as follows:

	Year Ended December 31,				
	2018	2017	2016	2015	2014
	(in thousands)				
Cost of revenue	\$ 913	\$ 1,132	\$ 1,305	\$ 902	\$ 411
Research and development	4,178	4,171	5,393	4,651	2,419
Sales and marketing	4,325	5,103	8,269	7,112	4,121
General and administrative	5,467	6,269	6,735	5,706	3,301
Total stock-based compensation expense	\$ 14,883	\$ 16,675	\$ 21,702	\$ 18,371	\$ 10,252

	As of December 31,				
	2018	2017	2016	2015	2014
	(As Adjusted)		(As Adjusted)		
	(in thousands)				
Consolidated Balance Sheet Data:					
Cash and cash equivalents	\$ 26,049	\$ 27,249	\$ 34,346	\$ 45,741	\$ 98,044
Short-term investments	66,052	57,675	42,408	46,593	—
Working capital	46,950	68,650	51,231	79,414	83,184
Total assets	141,517	134,271	135,981	147,652	149,014
Total deferred revenue	77,261	67,040	63,239	59,262	46,155
Total debt and capital lease obligations	20,761	20,950	21,120	20,000	19,752
Total stockholders' equity (deficit)	17,608	24,914	30,851	40,931	62,916

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

You should read the following discussion and analysis of our financial condition and results of operations together with the consolidated financial statements and related notes that are included elsewhere in this report. This discussion contains forward-looking statements based upon current expectations that involve risks and uncertainties. Our actual results may differ materially from those anticipated in these forward-looking statements as a result of various factors, including those set forth under Item 1A, "Risk Factors" and in other parts of this report.

Overview

Our goal is to be a leading independent cloud networking company using cloud management, machine learning and artificial intelligence to simplify and secure the access network. Our cloud-managed wireless, switching, routing and security technologies provide flexibility and scalability in the deployment, management and licensing of networks globally. Our global cloud footprint provides network operations for 30,000+ customers and 10+ million daily users.

For fiscal years 2018, 2017 and 2016, our revenue was \$154.9 million, \$153.6 million and \$167.8 million, respectively, representing year-over-year increase of 1% from fiscal year 2017 to fiscal year 2018 and year-over-year decline of 9% from fiscal year 2016 to fiscal year 2017. In fiscal years 2018, 2017 and 2016, our net losses were \$18.3 million, \$22.1 million and \$38.2 million, respectively.

We primarily conduct business in three geographic regions: (1) Americas, (2) Europe, the Middle East and Africa, or EMEA, and (3) Asia Pacific, or APAC. From a geographic perspective, year-over-year revenue decreased in fiscal year 2018 from 2017 by 5% in the Americas, however increased by 12% in EMEA and 9% in APAC. For the fiscal year ended December 31, 2018, we generated 59% of our total revenue from Americas, 32% from EMEA and 9% from APAC.

We believe that the growth of our business and our future success depends upon many factors, including our ability to continue to develop innovative technologies and timely provide new product offerings to the marketplace; increase our sales capabilities and develop our channel partner program; acquire new end customers, expand our end-customer base and increase penetration within our existing end-customer base (including through new product offerings); and demonstrate revenue growth to our investors and financial analysts while also demonstrating that we can achieve profitability on an acceptable timeline and predictably maintain profitability thereafter.

We operate in the highly competitive wired and wireless network access products market, which is characterized by rapid technological innovation. We will need to continue to innovate in order to achieve market adoption of our products and services. We have continued the expansion of our product portfolio with the release of new Wi-Fi access points, access switches, SD-WAN branch routers and management software to allow us to deliver a unified wired and wireless network edge.

In the wireless market, we have seen almost all customer demand shift to the 802.11ac standard, which uses new radio hardware to deliver substantially higher wireless performance. In 2016, we continued the push towards higher performance with the release of our 802.11ac "Wave 2" access points. We also continue to develop new functionality in our product offerings to take advantage of the changes to industry standards, including continued evolution of "Wave 2" and our release in 2018 of our family of products based on the developing 802.11ax standard.

We believe we have a market opportunity based on our ability to deliver unified Wi-Fi, switch and SD-WAN branch router solutions operating on a single, unified management platform, with subscription-based SaaS solutions and data analytics, at a low entry and operating cost, and the ability to expand based on each user's needs. We have developed a cloud-based services platform to provide network management and support additional value-added applications. HiveManager, the newest version of our network management application, provides a single management interface that customers use to configure network policies, monitor and troubleshoot performance, manage access and security, and run reports on network operations. We will continue to sell and support the legacy version of HiveManager, we call HiveManager Classic. However, our focus is to continue to transition our business to HiveManager and make our cloud-services platform and applications available to customers in either a subscription-based public cloud, on-premises private cloud deployment or virtual "private cloud" instance. Under the Aerohive Connect program, customers may purchase a less complex, connectivity-oriented HiveManager solution at lower entry-point pricing. Aerohive Connect customers can expand their Connect deployment, as needed, and can add subscriptions or licenses to upgrade to our full-featured Select offering and premium support services. Our Aerohive Connect and Select offerings are available across our entire portfolio of access points and switches. We believe that separating our product line into these two offerings delivers an attractively priced cloud-managed hardware for connectivity-oriented deployments and will position us to capture more subscription and software license revenue from those customers who require a more-advanced feature set and support. In November 2017, we announced that we had entered an OEM agreement with Dell EMC to deliver Aerohive's Wi-Fi access point hardware and HiveManager cloud services platform. The agreement includes joint sales, marketing, support services and logistic investments, and combines Aerohive's technology with Dell's go-to-market and support capabilities through Dell sales teams, Dell channel partners, and Dell services offerings. We also announced later in 2017 our SD-WAN solution for highly distributed commercial enterprises, retail chains and long-term healthcare providers which, when combined with our existing SD-LAN offering, enables organizations to simplify branch deployments with a unified cloud-managed Wi-Fi, switching, and SD-WAN VPN routing solution. In early 2018, we announced our A3 cloud-managed NAC solution, and later in 2018 our Aerohive Atom AP30 pluggable access point and our family of enterprise-class access points based on the developing 802.11ax standard. We also announced in June 2018, a global partnership with Juniper Networks, whereby Juniper can sell our cloud-managed Wi-Fi solution, including our family of 11ax access points and HiveManager cloud platform.

Our business is seasonally driven by annual budget cycles in the enterprise and spending seasonality in the education vertical. The buying cycle for K-12 schools in the United States historically has driven strong sequential growth for us in the second quarter. We expect this seasonality to continue into 2019 as well, though we expect the overall significance to our business in the future of the K-12 education vertical may decline as we are able to further expand our business in the enterprise and other verticals and as we expect the overall level of education spending to purchase our solutions is likely to be lower in future periods.

A substantial portion of our revenue has, historically, depended on the volatile education market, which has brought uncertainty to our results in particular quarters. For this reason, a priority for our business continues to be to expand and diversify our offerings and revenue opportunities into other verticals, with particular focus on enterprise customers. For the year ended December 31, 2018, our K-12 education vertical comprised approximately 30% of our overall business, compared with 37% for the same period in fiscal year 2017. We also intend to increase our focus and continue to invest significant resources in developing our innovative technologies and new product offerings, acquiring new end customers in new and existing geographies, increasing penetration within our existing end customer base and extending the reach of our channel partnerships.

Key Financial Metrics

We regularly review the following key financial metrics to evaluate growth trends in our business, measure our performance, identify trends affecting our business, formulate financial projections and make strategic decisions. Our key financial metrics include non-GAAP financial metrics. We discuss revenue under "Results of Operations." We discuss cash provided by (used in) operating activities, deferred revenue and non-GAAP financial measures immediately below the following table.

	Year Ended December 31,		
	2018	2017	2016
	(As Adjusted)		(As Adjusted)
	(in thousands)		
Total revenue	\$ 154,909	\$ 153,558	\$ 167,838
Total deferred revenue at period end	77,261	67,040	63,239
Cash provided by (used in) operating activities	12,875	9,319	(14,554)

Cash provided by (used in) operating activities. We monitor cash provided by (used in) operating activities as a measure of our overall business performance. Our largest uses of cash from operating activities are for employee-related expenditures and purchases of products from our contract manufactures. Our primary source of cash flows from operating activities is cash receipts from our channel partners. Monitoring net cash provided by (used in) operating activities enables us to analyze our financial performance without the non-cash effects of certain items such as depreciation, amortization, and stock-based compensation costs, thereby allowing us to better understand and manage the cash needs of our business.

Deferred Revenue. Our deferred revenue consists of amounts that have either been invoiced or prepaid but that we have not yet recognized as revenue as of the period end. We consider deferred revenue to be a key financial metric, because it represents a significant portion of the revenue that we expect to recognize in future periods. In addition, we monitor the change in our deferred revenue balance, which, taken together with revenue, is an indication of sales activity in a given period. The vast majority of our deferred revenue comprises future subscription and support revenue, primarily for PCS and SaaS, which we recognize ratably over the service term. The following table reconciles between the current and non-current deferred revenue:

	As of December 31,		
	2018	2017	2016
	(As Adjusted)		(As Adjusted)
	(in thousands)		
Current portion of deferred revenue	\$ 38,786	\$ 33,279	\$ 30,179
Non-current portion of deferred revenue	38,475	33,761	33,060
Total deferred revenue	\$ 77,261	\$ 67,040	\$ 63,239

Non-GAAP financial measures. We regularly review non-GAAP financial measures because they are key measures our management and our board of directors use to evaluate the business, measure performance, identify trends affecting the business, formulate financial projections and make strategic decisions.

We define non-GAAP financial measures to exclude share-based compensation, adjustment to internal-use software amortization, amortization of acquired intangibles, one-time charges related to certain securities litigation, one-time charges related to headquarter relocation expense, and certain charges related to restructuring. We believe that the exclusion of certain expenses in calculating these non-GAAP financial measures can provide a useful measure for period-to-period comparisons of our core business. Accordingly, we believe that non-GAAP financial measures provide useful information to investors and others in understanding and evaluating our operating results in the same manner as does our management and our board of directors.

The following table reconciles GAAP to non-GAAP measures:

	Year Ended December 31,		
	2018	2017	2016
		(As Adjusted)	(As Adjusted)
		(in thousands)	
GAAP net loss	\$ (18,337)	\$ (22,106)	\$ (38,216)
Amortization of stock-based compensation related to internal-use software - Cost of revenue	140	140	140
Stock-based compensation - Cost of revenue	913	1,132	1,305
Stock-based compensation - Research and development	4,178	4,171	5,393
Stock-based compensation - Sales and marketing	4,325	5,103	8,269
Stock-based compensation - General and administrative	5,467	6,269	6,735
One-time charges related to securities litigation - General and administrative	564	—	1,446
One-time charges related to headquarter relocation - General and administrative	—	—	890
Certain charges related to restructuring	1,183	1,327	—
Impairment of investment in a privately held company	750	—	—
Non-GAAP net loss	\$ (817)	\$ (3,964)	\$ (14,038)
Basic and diluted net loss per share on a Non-GAAP basis	\$ (0.01)	\$ (0.07)	\$ (0.28)
Weighted average shares used in computing non-GAAP basic and diluted net loss per share	55,050,119	53,227,342	50,332,872

Although investors frequently use non-GAAP financial measures in their evaluations of companies, these non-GAAP financial measures have limitations in that they do not reflect all of the amounts associated with our results of operations as determined in accordance with GAAP. Some of these limitations are:

- the non-GAAP measures do not consider the expense related to stock-based compensation, which is an ongoing expense for us;
- although amortization of internal-use software is a non-cash charge, the assets being amortized often will have to be replaced in the future, and the non-GAAP measures do not reflect any future cash requirement for such replacements;
- impairment of investment is a non-cash charge which does not directly impact the Company's current cash position, however, represents the declining value of our investment;
- excluding certain expenses associated with the litigation in the fiscal year does not reflect the impact on our ongoing operations over these periods of the cash requirement to defend such or other litigation;
- excluding headquarter relocation expense in the fiscal year does not reflect the cash requirement relating to the one-time charges related to the lease abandonment costs incurred upon vacating buildings of our prior headquarters and double rent and utilities expenses during the transition to our new headquarter facility;
- restructuring charges excluded in the fiscal year primarily relate to employee termination costs and benefits and do not reflect the cash requirement relating to the costs associated with such restructuring; and
- other companies, including companies in our industry, may not exclude these as non-GAAP measures or may include them but calculate them differently, which reduces their usefulness as a comparative measure.

Because of these limitations, you should consider non-GAAP financial measures only together with other financial performance measures, including various cash flow metrics, net loss and other GAAP results.

Results of Operations

The following table sets forth our results of operations for the periods presented in dollars (in thousands):

	Year Ended December 31,		
	2018	2017	2016
	(As Adjusted)		(As Adjusted)
	(in thousands)		
Revenue:			
Product	\$ 108,738	\$ 113,133	\$ 134,558
Subscription and support	46,171	40,425	33,280
Total revenue	154,909	153,558	167,838
Cost of revenue ⁽¹⁾ :			
Product	39,293	37,116	42,735
Subscription and support	13,612	12,893	12,066
Total cost of revenue	52,905	50,009	54,801
Gross profit	102,004	103,549	113,037
Operating expenses:			
Research and development ⁽¹⁾	35,646	36,418	41,504
Sales and marketing ⁽¹⁾	61,687	65,385	80,812
General and administrative ⁽¹⁾	22,508	23,094	28,839
Operating loss	(17,837)	(21,348)	(38,118)
Interest income	1,568	720	468
Interest expense	(748)	(567)	(474)
Other income (expense), net	(1,160)	(308)	177
Loss before income taxes	(18,177)	(21,503)	(37,947)
Provision for income taxes	160	603	269
Net loss	\$ (18,337)	\$ (22,106)	\$ (38,216)

⁽¹⁾Includes stock-based compensation, as follows:

	Year Ended December 31,		
	2018	2017	2016
	(in thousands)		
Cost of revenue	\$ 913	\$ 1,132	\$ 1,305
Research and development	4,178	4,171	5,393
Sales and marketing	4,325	5,103	8,269
General and administrative	5,467	6,269	6,735
Total stock-based compensation expense	\$ 14,883	\$ 16,675	\$ 21,702

The following table sets forth our results of operations for the periods presented, as a percentage of our total revenue:

	Year Ended December 31,		
	2018	2017	2016
		(As Adjusted)	(As Adjusted)
Revenue:			
Product	70 %	74 %	80 %
Subscription and support	30	26	20
Total revenue	100	100	100
Cost of revenue:			
Product	25	25	26
Subscription and support	9	8	7
Total cost of revenue	34	33	33
Gross profit	66	67	67
Operating expenses:			
Research and development	23	24	25
Sales and marketing	40	42	48
General and administrative	15	15	17
Operating loss	(12)	(14)	(23)
Interest income	1	—	—
Interest expense	—	—	—
Other income (expense), net	(1)	—	—
Loss before income taxes	(12)	(14)	(23)
Provision for income taxes	—	—	—
Net loss	(12)%	(14)%	(23)%

Revenue

We derive revenue from the sales of our products and services, and we recognize revenue when we have identified the contract with the customer, identified the performance obligations in the contract, determined the transaction price, allocated the price to the performance obligations, and the performance obligations have been satisfied.

Our total revenue comprises the following:

Product Revenue. We derive product revenue primarily from sales of our hardware products, which include wireless access points, SD-WAN branch routers, and switches, the majority of which are embedded with our proprietary operating system, HiveOS, and perpetual licenses for our unified network management system, HiveManager, A3, and other software applications, as well as related accessories. We recognize product revenue at the time of shipment, provided that all other revenue recognition criteria have been met.

Subscription and Support Revenue. We derive subscription and support revenue primarily from sales of our software subscription and support offerings that we deliver over a specified term. These offerings primarily include post-contract customer support ("PCS") related to our perpetual software licenses and subscriptions to HiveManager and other software applications delivered as SaaS, including related customer support, and from subsequent renewals of those contracts. To benefit fully from potential contract renewals, we plan to continue to invest in systems to better track existing customer support commitments and renewal opportunities and provide offerings which continue to be attractive to our customers. Our PCS includes tiered maintenance and support services under renewable, fee-based maintenance and support contracts, which include technical support, bug fixes, access to priority hardware replacement services and unspecified upgrades on a when-and-if available basis. Our SaaS subscriptions include comparable maintenance and support services. The higher the percentage of our end-customers that purchase SaaS subscriptions, as opposed to HiveManager and PCS, the higher our subscription and support revenue will be as a percentage of our total revenue. We recognize subscription and support revenue ratably over the term of the contract, which is typically one, three or five years. As a result, our recognition of subscription and support revenue lags our recognition of related product revenue.

	Year Ended December 31,			2018 to 2017		2017 to 2016	
	2018	2017	2016	\$ Change	% Change	\$ Change	% Change
	(As Adjusted)	(As Adjusted)	(As Adjusted)				
(dollars in thousands)							
Revenue:							
Product	\$ 108,738	\$ 113,133	\$ 134,558	\$ (4,395)	(4)%	\$ (21,425)	(16)%
Subscription and support	46,171	40,425	33,280	5,746	14 %	7,145	21 %
Total revenue	<u>\$ 154,909</u>	<u>\$ 153,558</u>	<u>\$ 167,838</u>	<u>\$ 1,351</u>	1 %	<u>\$ (14,280)</u>	(9)%
Percentage of revenue:							
Product	70%	74%	80%				
Subscription and support	30%	26%	20%				
Total	<u>100%</u>	<u>100%</u>	<u>100%</u>				

	Year Ended December 31,			2018 to 2017		2017 to 2016	
	2018	2017	2016	\$ Change	% Change	\$ Change	% Change
	(As Adjusted)	(As Adjusted)	(As Adjusted)				
(dollars in thousands)							
Revenue by geographic region:							
Americas	\$ 91,556	\$ 96,706	\$ 102,487	\$ (5,150)	(5)%	\$ (5,781)	(6)%
EMEA	50,021	44,676	49,792	5,345	12 %	(5,116)	(10)%
APAC	13,332	12,176	15,559	1,156	9 %	(3,383)	(22)%
Total revenue	\$ 154,909	\$ 153,558	\$ 167,838	\$ 1,351	1 %	\$ (14,280)	(9)%

Percentage of revenue by geographic region:

Americas	59%	63%	61%
EMEA	32%	29%	30%
APAC	9%	8%	9%
Total	100%	100%	100%

2018 Compared to 2017. Our total revenue increased \$1.4 million, or 1% in fiscal year 2018 as compared to fiscal year 2017, primarily due to an increase in subscription and support revenue, partially offset by a decrease in product revenue.

The decrease in our product revenue of \$4.4 million in fiscal year 2018 was primarily due to the decrease in K-12 education market and decrease related to our Connect and Select offering in the list prices of our hardware products and the decrease in our license revenue due to lower unit shipments as we transition our business to subscription-based cloud-management platform.

The increase in our subscription and support revenue of \$5.7 million in fiscal year 2018 as compared to fiscal year 2017, was primarily due to an increase in sales of our SaaS offerings, including our cloud-management platforms, PCS renewals, and our recognition of deferred revenue in the period.

The Americas and EMEA accounted for the majority of our total revenue in fiscal year 2018. The decrease in revenue in our Americas region was primarily due to the decrease in K-12 education market and decrease related to our Connect and Select offering in the list prices of our hardware products we sold in that region.

2017 Compared to 2016. Our total revenue decreased \$14.3 million, or 9%, in fiscal year 2017 as compared to fiscal year 2016, primarily due to a decrease in our product revenue, partially offset by an increase in subscription and support revenue.

The decrease in our product revenue of \$21.4 million in fiscal year 2018 was primarily due to lower unit shipments and a decrease related to our Connect and Select offering in the list prices of our hardware products.

The increase in our subscription and support revenue of \$7.1 million in fiscal year 2017 as compared to fiscal year 2016, was primarily driven by the increase in sales of PCS and SaaS, including our HiveManager cloud management platform, and our recognition of deferred revenue in the period.

Cost of Revenue

Our cost of revenue includes the following:

Cost of Product Revenue. Our cost of product revenue primarily includes manufacturing costs of our products payable to third-party manufacturers. Our cost of product revenue also includes personnel costs, including stock-based compensation, shipping costs, third-party logistics costs, provisions for excess and obsolete inventory, warranty and replacement costs, the depreciation and amortization of testing and imaging equipment, inbound license fees, certain allocated facilities and information technology infrastructure costs, and other expenses associated with logistics and quality control.

Cost of Subscription and Support Revenue. Our cost of subscription and support revenue primarily includes personnel costs, including stock-based compensation, certain allocated facilities information technology infrastructure costs, costs associated with our provision of PCS and SaaS activities and datacenter costs. Our cost of subscription and support

revenue also includes amortization of capitalized costs related to HiveManager, our internally developed, cloud services platform, which we completed and launched in April 2015.

	Year Ended December 31,			2018 to 2017		2017 to 2016	
	2018	2017	2016	\$ Change	% Change	\$ Change	% Change
	(As Adjusted)		(As Adjusted)				
(dollars in thousands)							
Cost of revenue:							
Product	\$ 39,293	\$ 37,116	\$ 42,735	\$ 2,177	6%	\$ (5,619)	(13)%
Subscription and support	13,612	12,893	12,066	719	6%	827	7%
Total cost of revenues	\$ 52,905	\$ 50,009	\$ 54,801	\$ 2,896	6%	\$ (4,792)	(9)%

2018 Compared to 2017. Cost of revenue increased \$2.9 million in fiscal year 2018 as compared to fiscal year 2017, primarily due to an increase in cost of product revenue and an increase in cost of subscription and support revenue. We primarily attribute the increase in our cost of product revenue to an increase in unit shipments and changes in the mix of the products we sold in the period. We primarily relate the increase in our cost of subscription and support revenue to an increase in the cost of our cloud operations as we scale to support more managed devices.

2017 Compared to 2016. Cost of revenue decreased \$4.8 million in fiscal year 2017 as compared to fiscal year 2016, primarily due to a decrease in cost of product revenue offset by an increase in cost of subscription and support revenue. We primarily attribute the decrease in our cost of product revenue to a decrease in unit shipments and changes in the mix of the products we sold in the period. We primarily relate the increase in our cost of subscription and support revenue to an increase in the costs of our cloud operations.

Gross Margin

Our gross margin or gross profit has been and will continue to be affected by a variety of factors, including product shipment volumes, average sales prices of our products, discounts we offer to our VAR, OEM and distributor partners, the mix of revenue between products and subscription and support services, and the mix of products we sold in the period, because our products have varying gross margins depending on the product offering and the lifecycle of the product. We expect our subscription and support gross margin to increase over the long term because we expect our subscription and support revenue to increase more quickly than our cost of subscription and support revenue. We expect our gross margin to be volatile and may decrease at any given time as we experience additional competitive pricing pressure. Further, we believe the pricing of our new Connect and Select offerings may dampen our product gross margin; however, we expect those offerings to generate improvements in our subscription and support gross margin as well as to increase in our deferred revenue over the period, both of which we expect will generate higher operating margins for our business.

	2018		2017		2016	
	Amount	Gross Margin	Amount	Gross Margin	Amount	Gross Margin
	(As Adjusted)		(As Adjusted)	(As Adjusted)	(As Adjusted)	(As Adjusted)
(dollars in thousands)						
Gross margin:						
Product	\$ 69,445	63.9%	\$ 76,017	67.2%	\$ 91,823	68.2%
Subscription and support	32,559	70.5%	27,532	68.1%	21,214	63.7%
Total gross margin	\$ 102,004	65.8%	\$ 103,549	67.4%	\$ 113,037	67.3%

2018 Compared to 2017. The total gross margin decreased from 67.4% in fiscal year end 2017 to 65.8% in fiscal year 2018 was primarily due to the shift in sales from our perpetual licenses to subscription and decrease related to our Connect-to-Select strategy in list prices of our hardware products, accompanied by the increase in software and subscription prices. Product gross margin decreased from 67.2% to 63.9% for the fiscal year ended December 31, 2018, compared to the year ended December 31, 2017. The decrease in our product gross margin was primarily due to the decrease related to our Connect-to-Select strategy in list prices of our hardware products and the mix of products sold during the period. A result of our planned pricing shift related to our Connect-to-Select strategy, revenue shifted from hardware products and increased our subscription and support revenue. Subscription and support gross margin increased from 68.1% to 70.5% for the year ended December 31, 2018, compared to the year ended December 31, 2017. The increase in our subscription and support gross margin was primarily

due to higher growth in our subscription and support revenue than our related cost of delivering these subscription and support services.

2017 Compared to 2016. The total gross margin remained relatively similar in fiscal year 2017 as compared to fiscal year 2016. The decrease in our product gross margin was primarily due to a decrease in list prices of our hardware products related to our Connect-to-Select strategy and the mix of products we sold in the period. Our planned pricing shift related to our Connect-to-Select strategy shifted revenue from hardware products and increased our subscription and support deferred revenue. The increase in our subscription and support gross margin was primarily due to higher growth in our subscription and support revenue than our related cost of delivering these subscription and support services and was partially also due to an increase in our software and subscription pricing.

Research and Development

Our research and development expenses consist primarily of personnel costs, including bonuses, stock-based compensation, recruiting fees and travel expenses for employees engaged in research, design and development activities. Research and development expenses also include costs for prototype-related expenses, product certification, consulting services, depreciation and certain allocated facilities and information technology infrastructure costs. We believe that continued investment in research and development is important to attaining our strategic objectives. Over time, we expect our research and development expenses to continue to increase in absolute dollars for the foreseeable future as we continue to invest in the development of our products and services, particularly due to increased headcount and cost of certification. Our research and development expenses may fluctuate as a percentage of our total revenue from period to period due to the seasonality of our total revenue and the timing and extent of our research and development expenses.

	Year Ended December 31,			2018 to 2017		2017 to 2016	
	2018	2017	2016	\$ Change	% Change	\$ Change	% Change
	(dollars in thousands)						
Research and development	\$ 35,646	\$ 36,418	\$ 41,504	\$ (772)	(2)%	\$ (5,086)	(12)%
% of revenue	23%	24%	25%				

2018 Compared to 2017. Research and development expense decreased \$0.8 million in fiscal year 2018 as compared to fiscal year 2017. The decrease primarily due to a decrease of \$1.0 million in personnel and related costs which was driven by lower headcount offset by an increase of \$0.2 million in professional services.

2017 Compared to 2016. Research and development expense decreased \$5.1 million in fiscal year 2017 as compared to fiscal year 2016. The decrease was primarily due to a decrease of \$1.8 million in personnel and related costs, a decrease of \$1.2 million in stock-based compensation expense, each of which were driven by lower headcount, a decrease of \$0.8 million in engineering expenses related to product certifications, a decrease of \$0.6 million in professional services expense and a decrease of \$0.7 million in other expenses primarily due to decreases in depreciation and facilities expenses.

Sales and Marketing

Our sales and marketing expenses consist primarily of personnel costs, including commission costs, stock-based compensation, recruiting fees and travel expenses for employees engaged in sales and marketing activities. Sales and marketing expenses also include the cost of trade shows, marketing and training programs, promotional materials, demonstration equipment, consulting services, depreciation and certain allocated facilities and information technology infrastructure costs. Over time, we expect our sales and marketing expenses to continue to increase in absolute dollars as we increase the size of our sales and marketing organization, expand into new markets and further develop our channel program. Our sales and marketing expenses may fluctuate as a percentage of our total revenue from period to period due to the seasonality of our total revenue, operating performance and the timing and extent of our sales and marketing expenses.

	Year Ended December 31,			2018 to 2017		2017 to 2016	
	2018	2017	2016	\$ Change	% Change	\$ Change	% Change
	(As Adjusted)			(As Adjusted)			
	(dollars in thousands)						
Sales and marketing	\$ 61,687	\$ 65,385	\$ 80,812	\$ (3,698)	(6)%	\$ (15,427)	(19)%
% of revenue	40%	42%	48%				

2018 Compared to 2017. Sales and marketing expenses decreased \$3.7 million in fiscal year 2018 as compared to fiscal year 2017. The decrease was primarily due to a decrease of \$2.8 million in personnel and related costs, a decrease of \$0.8 million in stock-based compensation, each due to lower headcount, and a decrease of \$0.9 million in other expenses primarily due to lower spending for sales and marketing-related equipment and programs offset by an increase of \$0.8 million in professional services.

2017 Compared to 2016. Sales and marketing expenses decreased \$15.4 million in fiscal year 2017 as compared to fiscal year 2016. The decrease was primarily due to a decrease of \$8.5 million in personnel and related costs and \$3.2 million in stock-based compensation, each due to lower headcount, a decrease of \$1.4 million in spending for sales and marketing-related programs, a decrease of \$0.9 million in travel related expenses, and the remaining decrease of \$1.4 million in other expenses primarily due to lower professional services and facilities expenses.

General and Administrative

Our general and administrative expenses consist primarily of personnel costs, including bonuses, stock-based compensation and travel expenses for our executive, finance, human resources, legal and operations employees, as well as compensation for our board of directors. General and administrative expenses also include fees for outside consulting, legal, audit, investor relations, and accounting services and insurance, as well as depreciation and certain allocated facilities and information technology infrastructure costs. Over time, we expect our general and administrative expenses to continue to increase in absolute dollars due to the additional legal, accounting, insurance, investor relations, information technology and other costs that we will continue to incur as a public company, as well as other costs associated with growing our business. Our general and administrative expenses may fluctuate as a percentage of our total revenue from period to period due to the seasonality of our total revenue and the timing and extent of our general and administrative expenses.

	Year Ended December 31,			2018 to 2017		2017 to 2016	
	2018	2017	2016	\$ Change	% Change	\$ Change	% Change
	(dollars in thousands)						
General and administrative	\$ 22,508	\$ 23,094	\$ 28,839	\$ (586)	(3)%	\$ (5,745)	(20)%
% of revenue	15%	15%	17%				

2018 Compared to 2017. General and administrative expense decreased \$0.6 million in fiscal year 2018 as compared to fiscal year 2017. The decrease was primarily due to a decrease of \$0.8 million in stock-based compensation expense offset by an increase of \$0.1 million in employee compensation expense and \$0.1 million in other expenses primarily related to professional services and office expenses.

2017 Compared to 2016. General and administrative expense decreased \$5.7 million in fiscal year 2017 as compared to fiscal year 2016. The decrease was primarily due to a decrease of \$1.7 million in personnel and related costs and \$0.5 million in stock-based compensation primarily due to lower headcount, a decrease of \$2.3 million legal and litigation expenses, which included a legal settlement payout in the prior year of \$1.2 million for a class action complaint related to our Form S-1 filing, a decrease of \$0.8 million in professional services and a decrease of \$0.9 million in expenses related to our headquarter relocation offset by \$0.5 million in facilities related expenses.

Interest Income

Our interest income primarily consists of interest earned on our cash and cash equivalent and short-term investments. We have invested our cash in money-market funds and other short-term, high quality investments. Historically, our interest income has not been material.

	Year Ended December 31,			2018 to 2017		2017 to 2016	
	2018	2017	2016	\$ Change	% Change	\$ Change	% Change
	(dollars in thousands)						
Interest Income	\$ 1,568	\$ 720	\$ 468	\$ 848	118%	\$ 252	54%

2018 Compared to 2017. Interest income increased for fiscal year 2018 compared to fiscal year 2017 primarily due to increasing interest rate and increase in on our short-term investments.

2017 Compared to 2016. Interest income increased for fiscal year 2017 compared to fiscal year 2016 primarily due to income earned on our short-term investments.

Interest Expense

Our interest expense consists primarily of interest on our indebtedness.

	Year Ended December 31,			2018 to 2017		2017 to 2016	
	2018	2017	2016	\$ Change	% Change	\$ Change	% Change
(dollars in thousands)							
Interest expense	\$ (748)	\$ (567)	\$ (474)	\$ (181)	32%	\$ (93)	20%

2018 Compared to 2017. The increase in our interest expense for fiscal year 2018 compared to fiscal year 2017 was primarily due to an increase in the interest rate associated with our Revolving Credit Facility.

2017 Compared to 2016. The increase in our interest expense for fiscal year 2017 compared to fiscal year 2016 was primarily due to an increase in the interest rate associated with our Revolving Credit Facility.

See Note 4 of our Consolidated Financial Statements included elsewhere in this Form 10-K for more information about our debt.

Other Income (Expense), Net

Our other income (expense), net primarily consists of gains and losses from foreign currency exchange transactions.

	Year Ended December 31,			2018 to 2017		2017 to 2016	
	2018	2017	2016	\$ Change	% Change	\$ Change	% Change
(dollars in thousands)							
Other income (expense), net	\$ (1,160)	\$ (308)	\$ 177	\$ (852)	277%	\$ (485)	(274)%

2018 Compared to 2017. The increase in other expense in fiscal year 2018 as compared to fiscal year 2017 was primarily due to a \$0.8 million impairment charge taken on our investment in a privately held company.

2017 Compared to 2016. The change in our other income is primarily related to changes due to foreign currency fluctuations.

Provision for Income Taxes

Our provision for income taxes consists primarily of foreign tax expense due to our cost-plus agreements with our foreign entities, which guarantee these foreign entities a profit, and to a lesser extent federal and state income tax expense. We expect our provision for income taxes to increase in absolute dollars in future periods.

	Year Ended December 31,			2018 to 2017		2017 to 2016	
	2018	2017	2016	\$ Change	% Change	\$ Change	% Change
(dollars in thousands)							
Provision for income taxes	\$ 160	\$ 603	\$ 269	\$ (443)	(73)%	\$ 334	124%

The change in our provision for income taxes was primarily related to foreign and state income taxes and was not significant. As of December 31, 2018, and 2017, respectively, we maintained a full valuation allowance against our domestic deferred tax assets, including net operating loss carryforwards and research and development and other tax credits.

Liquidity and Capital Resources

Capital Resources

As of December 31, 2018, we had cash and cash equivalents of \$26.0 million and short-term investments of \$66.1 million. \$90.5 million of our cash, cash equivalents and short-term investments were held within the United States.

In June 2012, we entered into our Revolving Credit Facility with Silicon Valley Bank which matures on March 31, 2019. We have been using the amount drawn under the Revolving Credit Facility for working capital and general corporate purposes. As of December 31, 2018, we had \$20.0 million of outstanding debt under our Revolving Credit Facility, and we were in compliance with all covenants under our loan agreement. See Note 4 to the Consolidated Financial Statements included in Part II, Item 8 of this Annual Report on Form 10-K.

We believe that our existing cash, cash equivalents and short-term investments will be sufficient to meet our anticipated working capital and capital expenditure needs for at least the next 12 months. Our future capital requirements will depend on many factors, including our growth rate, the timing and extent of our spending to support our research and development efforts, the expansion of our sales and marketing activities, the introduction of new and enhanced product and service offerings, the costs to ensure access to adequate manufacturing capacity, the level of market acceptance of our products and expenses we may incur from our ongoing litigation. However, we may be required to raise additional funds in the future through public or private debt or equity financing to meet additional working capital requirements.

Cash Flows

The following table summarizes our cash flows for the periods indicated:

	Year Ended December 31,		
	2018	2017	2016
	(in thousands)		
Net cash provided by (used in) operating activities	\$ 12,875	\$ 9,319	\$ (14,554)
Net cash provided by (used in) investing activities	(10,019)	(15,727)	276
Net cash provided by (used in) financing activities	(4,056)	(689)	2,883
Net increase (decrease) in cash and cash equivalents	<u>\$ (1,200)</u>	<u>\$ (7,097)</u>	<u>\$ (11,395)</u>

Operating Activities

We demonstrated positive cash flows from operating activities in five of the last eight quarters. However, we have historically experienced negative cash flows from operating activities as we continue to invest in our business. Our largest uses of cash from operating activities are for employee-related expenditures and purchases of finished products from our contract manufacturers. Our primary source of cash flows from operating activities is cash receipts from our channel partners. Our cash flows from operating activities will continue to be affected principally by the extent to which we grow our total revenue and our operating expenses, primarily in our sales and marketing and research and development functions, in order to grow our business.

For fiscal year 2018, cash provided by operating activities was \$12.9 million as a result of non-cash charges of \$17.9 million and a net change of \$13.3 million in our net operating assets and liabilities offset by our net loss of \$18.3 million. Non-cash charges consisted primarily of stock-based compensation of \$14.9 million, depreciation and amortization expense of \$3.0 million and impairment of investment in a privately held company of \$0.8 million offset by other charges of \$0.8 million. The net change in our net operating assets and liabilities was primarily due to a \$1.5 million decrease in accounts receivable primarily due to better collection in the period, a \$10.2 million increase in deferred revenue, a \$4.0 million increase in accounts payable and a \$0.3 million increase in accrued liabilities, partially offset by an increase of \$2.6 million in cash used for inventory purchases and \$0.1 million increase in other assets. Our days sales outstanding ("DSO") was 39 days as of December 31, 2018, which we calculate by dividing net accounts receivable at the end of the quarter by revenue recognized during the quarter, multiplied by the total days in the quarter. The decrease in DSO to 39 days as compared to 45 days as of December 31, 2017 is primarily due to the timing of shipments in the period.

For fiscal year 2017, cash provided by operating activities was \$9.3 million as a result of non-cash charges of \$19.6 million and a net change of \$11.8 million in our net operating assets and liabilities offset by our net loss of \$22.1 million. Non-cash charges consisted primarily of stock-based compensation of \$16.7 million and depreciation and amortization expense of \$3.1 million. The net change in our net operating assets and liabilities was primarily due to a \$8.5 million decrease in accounts receivable, a \$3.8 million increase in deferred revenue, a \$1.3 million increase in accounts payable partially offset by a \$0.9 million in cash used for inventory purchases, a \$0.5 million increase in prepaid expenses and a \$0.7 million decrease in accrued liabilities. Our DSO was 45 days as of December 31, 2017. The decrease in DSO to 45 days as compared to 58 days as of December 31, 2016 is primarily due to the timing of shipments in the period.

For fiscal year 2016, cash used in operating activities was \$14.6 million as a result of our net loss of \$38.2 million, partially offset by non-cash charges of \$25.5 million and a net change of \$1.9 million in our net operating assets and liabilities. Non-cash charges consisted primarily of stock-based compensation of \$21.7 million and depreciation and amortization expense of \$3.5 million. The net change in our net operating assets and liabilities was primarily due to a \$8.6 million increase in

deferred revenue as a result of an increase in sales of PCS and SaaS, a \$1.4 million decrease in prepaid expenses and other current assets, partially offset by a \$4.5 million decrease in accounts payable, a \$2.6 million decrease in accrued liabilities, a \$3.4 million increase in accounts receivable and a \$1.9 million cash used for inventory purchases. Our DSO was 58 days as of December 31, 2016.

Investing Activities

Our investing activities have primarily consisted of purchases of property and equipment, capitalized internally-developed software for our cloud service platform, an investment in a privately held company and purchases and sales of marketable securities.

For fiscal year 2018, cash used in investing activities was \$10.0 million, which we primarily attribute to cash used for purchases of marketable securities of \$94.2 million and cash used for purchases of property and equipment of \$2.4 million relating primarily to purchases of software, offset by maturities of marketable securities of \$86.7 million.

For fiscal year 2017, cash used in investing activities was \$15.7 million, which we primarily attribute to cash used for purchases of marketable securities of \$75.3 million and cash used for purchases of property and equipment of \$0.6 million relating primarily to manufacturing, research and development lab equipment, offset by maturities of marketable securities of \$60.2 million.

For fiscal year 2016, cash provided by investing activities was \$0.3 million, which we primarily attribute to maturities of marketable securities of \$50.8 million offset by \$46.8 million cash used for purchases of marketable securities, \$1.5 million cash used to purchase our investment in a privately held company and \$2.2 million cash used for purchases of property and equipment, relating primarily to manufacturing, research and development lab equipment.

Financing Activities

Our financing activities have primarily consisted of proceeds from and repayments against our Revolving Credit Facility, payments against our capital lease obligations, proceeds from our exercises by our current and former employees and service providers of stock options and from employee purchases under our stock purchase plan offset by our repurchases of treasury shares.

For fiscal year 2018, cash used in financing activities was \$4.1 million, primarily as a result of \$4.4 million cash used for repurchases of common stock, \$2.6 million of cash used to satisfy our estimate of minimum employee tax withholding requirements on vesting of restricted stock units and \$0.2 million cash used for payments against our capital lease obligations, offset by \$3.1 million in proceeds from employee purchases under our stock purchase plan and employees exercises of stock options.

For fiscal year 2017, cash used in financing activities was \$0.7 million, primarily as a result of \$4.1 million cash used for repurchases of treasury shares, \$1.2 million of cash used to satisfy our estimate of minimum employee tax withholding requirements on the vesting of restricted stock units and \$0.2 million cash used for payments against our capital lease obligations, offset by \$4.8 million in proceeds from employee purchases under our stock purchase plan and employee exercises of stock options.

For fiscal year 2016, cash provided by financing activities was \$2.9 million, primarily as a result of \$6.2 million in proceeds from employee purchases under our stock purchase plan and employees exercises of stock options offset by \$2.1 million cash used for repurchases of treasury shares, and \$1.1 million cash used to satisfy our estimate of minimum employee tax withholding requirements on the vesting of restricted stock units.

Contractual Obligations and Other Commitments

The following table summarizes our contractual obligations as of December 31, 2018:

	Payments Due by Period				Total
	Less Than 1 Year	1 to 3 Years	3 to 5 Years	More Than 5 Years	
	(in thousands)				
Contractual Obligations:					
Debt obligations ⁽¹⁾	\$ 20,000	\$ —	\$ —	\$ —	\$ 20,000
Interest expense on our debt obligations ⁽²⁾	205	—	—	—	205
Purchase commitments ⁽³⁾	4,960	—	—	—	4,960
Other commitments ⁽⁴⁾	3,242	7,170			10,412
Operating lease obligations ⁽⁵⁾	1,562	2,153	1,432	—	5,147
Capital lease obligations ⁽⁶⁾	176	340	245		761
Total contractual obligations	\$ 30,145	\$ 9,663	\$ 1,677	\$ —	\$ 41,485

⁽¹⁾ Debt includes \$20.0 million in outstanding borrowings on our Revolving Credit Facility. Subsequent to December 31, 2018, the maturity date on this credit facility was extended to March 31, 2021.

⁽²⁾ Represents our estimated interest expense on our outstanding debt obligations based on the interest rate in effect as of December 31, 2018.

⁽³⁾ Consists of minimum purchase commitments with our contract manufacturers that are non-cancelable and other open purchase orders. We based such minimum purchase commitments on our forecasted manufacturing requirements and typically provide for fulfillment with agreed or commercially standard lead times for the particular part or product. The timing and amount of payments may change due to changing business needs and other factors.

⁽⁴⁾ Other Commitments include payments for use of certain cloud services under a non-cancelable purchase agreement.

⁽⁵⁾ Operating leases include total future minimum rent payments under noncancelable operating lease agreements. In fiscal year 2018, we made regular lease payments of \$2.0 million under the operating lease agreements.

⁽⁶⁾ Consists of future payments for office furniture and equipment classified as capital lease. The table above excludes liabilities for uncertain tax positions and related interest and penalties accrual as the amount is insignificant.

We subcontract with other companies to manufacture our products. During the normal course of our business, our contract manufacturers procure components based upon orders we place and forecasts we provide. If we cancel all or part of an order, we may still be liable to the contract manufacturers for the cost of the components that they purchase in reliance on the orders or our forecasts. We periodically review our potential liability to our contract manufacturers, and we have no material accruals recorded as of December 31, 2018. Our financial position and results of operations could be negatively impacted if we were required to compensate the contract manufacturers for any unrecorded liabilities incurred.

Off-Balance Sheet Arrangements

Through December 31, 2018, we did not have any relationships with unconsolidated organizations or financial partnerships, such as structured finance or special purpose entities that would have been established for the purpose of facilitating off-balance sheet arrangements or other contractually narrow or limited purposes.

We have entered into agreements with some of our channel partners and end customers that contain indemnification provisions in the event of claims alleging that our products infringe the intellectual property rights of a third party. Under these agreements, we have, at our option and expense, the ability to resolve any infringement, replace our product with a non-infringing product that is equivalent-in-function, or refund to the partner or customers the total product price. Other guarantees or indemnification arrangements include guarantees of product and service performance. We have not recorded a liability related to these indemnifications and guarantee provisions and our guarantees and indemnification arrangements have not had any impact on our consolidated financial statements to date.

Critical Accounting Policies and Estimates

We prepare our consolidated financial statements in accordance with generally accepted accounting principles in the United States. The preparation of these financial statements requires us to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenue, costs and expenses, and related disclosures. We base our estimates on our historical experience and on various other assumptions that we believe to be reasonable. Actual results could differ significantly from our estimates. To the extent that there are material differences between these estimates and actual results, our future financial statement presentation, financial condition, results of operations and cash flows will be affected.

We believe that the assumptions and estimates associated with revenue recognition, inventory valuations, income taxes, stock-based compensation and warranty costs have the greatest potential impact on our consolidated financial statements. Therefore, we consider these to be our critical accounting policies and estimates. For further information on all of our significant accounting policies, see Note 1 of the Notes to Consolidated Financial Statements.

Revenue Recognition

The Company derives revenue from two sources: (i) product, which includes hardware and software license revenue, and (ii) subscription and support, which includes post-contract customer support ("PCS"), and software delivered as a service ("SaaS"). The Company follows the following five-step approach in recognizing revenue:

- ***Identification of the contract, or contracts, with a customer*** - A contract with a customer exists when (i) the Company enters into an enforceable contract with a customer that defines each party's rights regarding the goods or services to be transferred and identifies the payment terms related to these goods or services, (ii) the contract has commercial substance, and (iii) the Company determines that collection of substantially all consideration for goods or services that are transferred is probable based on the customer's intent and ability to pay the promised consideration. The Company applies judgment in determining the customer's ability and intention to pay, which the Company bases 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.
- ***Identification of the performance obligations in the contract*** - The Company identifies performance obligations promised in a contract based on the goods or services that the Company will transfer to the customer that are both capable of being distinct, whereby the customer can benefit from the goods or services either on its own or together with other resources that are readily available from third parties or from us, and are distinct in the context of the contract, whereby the transfer of the goods or services is separately identifiable from other promises in the contract. To the extent a contract includes multiple promised goods or services, the Company applies judgment to determine whether promised goods or services are capable of being distinct and distinct in the context of the contract.
- ***Determination of the transaction price*** - The Company determines the transaction price based on the consideration to which the Company will be entitled in exchange for transferring goods or services to the customer.
- ***Allocation of the transaction price to the performance obligations in the contract*** - If the contract contains a single performance obligation, the Company allocates the entire transaction price to the single performance obligation. The Company allocates the transaction price of contracts that contain multiple performance obligations to each performance obligation based on a relative SSP. The Company determines SSP based on the price at which the performance obligation is sold separately. If the Company cannot observe SSP through past transactions, the Company estimates SSP by taking into account available information such as market conditions and internally approved pricing guidelines related to the performance obligations.
- ***Recognition of revenue when, or as, the Company satisfies a performance obligation*** - The Company satisfies performance obligations either over time or at a point in time as discussed in further detail below. The Company recognizes revenue at the time the related performance obligation is satisfied by transferring a promised good or service to a customer.

The Company's product revenue consists of sales to distributors, and value-added resellers ("VARs") and an original equipment manufacturing partner ("OEM partner"). The Company considers purchase orders such distributors, VARs and OEM partner issue to the Company, which are in some cases governed by master sales agreements, to be the Company's contracts with such customers, as such documents provide enforceable rights and obligations between the Company and distributor, VAR or OEM partner. As part of its consideration of the contract, the Company evaluates certain factors, including the customer's

ability to pay (or credit risk). For each contract, the Company considers the promise to transfer goods or services to be the identified performance obligation. In determining the transaction price, the Company evaluates whether the price is subject to refund or adjustment to determine the net consideration to which the Company expects to be entitled. The Company allocates the transaction price to each distinct performance obligation based on a relative standalone selling price. The Company recognizes revenue when control of the product or service is transferred to the customer (i.e., when the performance obligation is satisfied). Further, in determining whether control has transferred, the Company considers if there is a present right to payment and legal title, along with risks and rewards of ownership has transferred to the customer.

The Company makes sales of products to certain distributors under terms allowing certain price adjustments and limited rights of return (known as “stock rotation”) of the Company’s products held in their inventory. The Company recognizes revenue from sales to distributors upon the transfer of control of the product to the distributor. Frequently, distributors need to sell product at a discounted price lower than the standard distribution price in order to win business. After the Company verifies that the distributor had obtained the Company’s pre-approval for the discount claim, the Company may issue a credit memo to the distributor representing a rebate of the amount of the discount. In determining the transaction price, the Company considers these price adjustments to be variable consideration. The Company estimates such price adjustments using the expected-value method based on an analysis of actual credit claims at the distributor level, over a period of time the Company considers adequate to account for current pricing and business trends. Historically, actual price adjustments relative to those the Company estimates and includes when determining the transaction price have not materially differed. Stock rotation rights provide distributor with the ability to return certain specified amounts of inventory. Stock rotation adjustments are an additional form of variable consideration which the Company also estimates using the expected-value method based on historical return rates. Historically, distributor stock rotation adjustments have not been material.

The Company makes sales to certain distributors, VARs and its OEM partner under terms that do not include rights of return or price concessions after the product is shipped. Accordingly, upon application of steps one through five above, the Company recognizes product revenue upon shipment and transfer of control.

The Company generally provides a limited lifetime warranty that its products will substantially conform to the published specifications. The Company limits its liability to either a credit equal to the purchase price or replacement of the defective part. The Company does not consider activities related to such warranty a separate performance obligation.

Payment terms and conditions vary by contract, customer type and customer location. Company’s standard payment terms are 30 days from the invoice date. In instances where the timing of the Company’s revenue recognition differs from the timing of its invoicing, the Company has determined that its contracts generally do not include a significant financing component. The primary purpose of the Company’s invoicing terms is to provide customers with simplified and predictable ways of purchasing the Company’s products and services, not for the Company’s customers to provide financing or for the Company to provide customers with financing.

The Company records accounts receivable at the invoiced amount, net of an allowance for doubtful accounts. The Company recognizes a receivable in the period the Company delivers goods or provide services or when the Company’s right to consideration is unconditional.

Beginning with our adoption of ASC 606 on January 1, 2018, the Company generally recognizes revenue when it ships products to its customers, including to its stocking distributors, provided that all other revenue recognition criteria have been met. The stocking distributors then hold inventory to meet end customer demand. Accordingly, under ASC 606, the Company’s product revenue may benefit when its product deliveries to such stocking distributors exceed their delivery in the period of product to the Company’s end customers. The Company expects over time such incremental revenue in any period to be a small portion of the Company’s overall revenue, as levels of product inventory the Company’s distributors maintain will normalize relative to changes in the Company’s business. As the Company exited 2017, its stocking distributors held little product inventory. Over the course of 2018, the Company built inventory with these distributors, which as of the Company’s fourth quarter of 2018 represented approximately three weeks of global quarterly product demand. Under ASC 606, the Company’s revenue for its first, third and fourth quarters, and the full year of 2018 benefited from this inventory build. Over the near term, the Company intends to manage stocking distributor inventory levels within a range representing approximately two-to-three weeks of global quarterly product demand. However, actual inventory in the hands of the Company’s stocking distributors may be higher or lower than this target range at any time, depending on the requirements of the Company’s business, the product demand of the Company’s channel partners and the timing of the Company’s product shipments to its stocking distributors. As a result of the Company’s adoption of ASC 606, beginning January 1, 2018, if the Company is unable to effectively manage inventory holding patterns of its stocking distributors the Company’s revenue it recognizes during any period could be materially affected.

Significant Judgments

The Company's contracts with customers often include promises to transfer multiple products and services to the customer. The Company may exercise significant judgment when determining whether products and services are considered distinct performance obligations that should be accounted for separately versus together. The Company may also exercise judgment to determine whether the software license is considered distinct and accounted for separately, or not distinct and accounted for together with the hardware and recognized upon transfer of control.

The Company may further require judgment to determine the SSP for each distinct performance obligation. The Company determines SSP for the purposes of allocating the arrangement, primarily based on historical transaction pricing. The Company segregates historical transactions based on its pricing model and go-to-market strategy, which includes factors such as type of sales channel (VAR, OEM or distributor), the geographies in which the Company sells its products and services (domestic or international) and offering type (product series, software subscriptions and level of support for PCS).

The Company makes certain estimates and maintain allowances for sales returns and other programs based on our historical experience. The Company includes shipping charges billed to channel partners in product revenue and include the related shipping costs in cost of product revenue.

Inventory

Our inventory consists of hardware products and related component parts, which we state at the lower of cost, which approximates actual cost computed on a first-in, first-out basis, or market value. We evaluate inventory for excess and obsolete products, based on management's assessment of future demand and market conditions, and technological obsolescence of our products. We do not reverse inventory write-downs, once established, as they establish a new cost basis for the inventory. We include inventory write-downs as a component of cost of product revenue in the statements of operations.

Income Taxes

We account for income taxes under an asset and liability approach for deferred income taxes, which requires recognition of deferred income tax assets and liabilities for the expected future tax consequences of events that we have recognized in our consolidated financial statements, but have not been reflected in taxable income. We make estimates and judgments in the calculation of certain tax liabilities and in the determination of the recoverability of certain deferred income tax assets, which arise from temporary differences and carryforwards. We measure our deferred income tax assets and liabilities using the currently enacted tax rates that apply to taxable income in effect for the years in which we expect to realize or settle those tax assets. We regularly assess the likelihood that we will realize our deferred income tax assets based on our historical level of taxable income, projections for our future taxable income and tax planning strategies. To the extent that we believe that any amounts are not more likely than not to be realized, we record a valuation allowance to reduce our deferred income tax assets. We regularly review our tax positions and benefits to be realized. We recognize tax liabilities based upon estimates of whether, and the extent to which, additional taxes will be due when such estimates are more likely than not to be sustained. We will not recognize an uncertain income tax position if it has less than a 50% likelihood of being sustained. We recognize interest and penalties related to income tax matters as income tax expense in the statements of operations.

Stock-Based Compensation

We calculate compensation expense for all stock-based awards based on the estimated fair values on the date of grant. Our stock-based awards include stock options, restricted stock units ("RSUs"), and purchase rights under the employee stock purchase plan ("ESPP"). We determine the fair value of each RSU granted using the fair value of our common stock on the date of the grant. The Company issues RSUs to employees which are based on Company's achievement of certain performance conditions. We estimate the fair value of these performance-based RSU using the fair value of our common stock on the date of the grant. We assess the probability of these RSUs expected to vest based on its estimated achievement of performance conditions for each reporting period. The Company also issues RSUs that are contingent on the Company's achievement of certain stock price targets. We estimate the fair value of these market-based RSUs using the Mont Carlo option-pricing model on the date of grant as these RSUs contain both market and service conditions. We estimate the fair value of each stock option using the Black-Scholes option pricing model. We calculate the fair value of each stock purchase right under our ESPP based on the closing price of our stock on the date of grant and the value of a call and put option estimated using the Black-Scholes pricing model. The Black-Scholes pricing model requires assumptions including the market value of our common stock, expected term of the award, expected volatility of the price of our common stock, risk-free interest rates, and expected dividend yield.

We determine the expected term of employee stock options using the simplified method as provided by the Securities and Exchange Commission. We presume the simplified method to be the average of the time-to-vesting and the contractual life of the options. We base the expected term of purchase under our ESPP on the contractual terms. We derive the expected

volatility from the historical stock volatilities of our common stock and the common stock of several publicly traded comparable companies over a period approximately equal to the expected term of the expected life of the options. We base the risk-free interest rate on the U.S. treasury yield curve in effect at the time of grant for zero-coupon U.S. treasury notes with maturities equal to the option's expected term. We assume the expected dividend to be zero as we have never paid dividends and have no current plans to do so.

Recent Accounting Pronouncements

Refer to Recent Accounting Pronouncements, under Note 1, Description of Business and Summary of Significant Accounting Policies, of the Notes to Consolidated Financial Statements for recent accounting pronouncements that could have an effect on us.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Interest Rate Sensitivity

Our exposure to market risk for changes in interest rates relates primarily to our cash, cash equivalents, short-term investments and our outstanding debt obligations. We had cash, cash equivalents and short-term investments of \$92.1 million and \$84.9 million as of December 31, 2018 and December 31, 2017, respectively. We held these amounts primarily in bank deposits, money market funds, certificates of deposit, commercial paper and bonds issued by corporate institutions and U.S. government agencies. Such interest-earning instruments carry a degree of interest rate risk. To date, fluctuations in interest income have not been significant.

We have outstanding debt of \$20.0 million as of December 31, 2018, consisting of our borrowing under our Revolving Credit Facility. The Revolving Credit Facility bears interest at a variable rate.

We do not enter into investments for trading or speculative purposes and have not used any derivative financial instruments to manage our interest rate risk exposure. We have not been exposed to material risks due to changes in interest rates. A hypothetical 10% change in interest rates during any of the periods we present in this report would not have had a material impact on our financial statements.

Foreign Currency Risk

We denominate all of our sales in U.S. dollars and, therefore, our revenues are not currently subject to significant foreign currency risk. However, during periods when the exchange rate of the U.S. dollar to foreign currencies is strong, the price of our products outside the United States could be less competitive, reducing our sales or requiring us to lower pricing for our products outside the United States in order to maintain sales and revenue performance. We denominate our operating expenses in the currencies of the countries in which our operations are located, including in EMEA and APAC, and may be subject to fluctuations due to changes in foreign currency exchange rates. To date, we have not used derivative financial instruments to mitigate our exposure to foreign currency exchange risks. A hypothetical 10% change in foreign currency exchange rates applicable to our business would not have a material impact on our consolidated financial statements in any of the periods presented.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the stockholders and the Board of Directors of Aerohive Networks, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Aerohive Networks, Inc. and subsidiaries (the "Company") as of December 31, 2018 and 2017, the related consolidated statements of operations, comprehensive loss, stockholders' equity, and cash flows, for each of the three years in the period ended December 31, 2018, and the related notes (collectively referred to as 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 three years in the period ended December 31, 2018, in conformity with accounting principles generally accepted in the United States of America.

Change in Accounting Principle

As discussed in Note 1 to the financial statements, the Company has changed its method of accounting for revenue in fiscal year 2018 due to adoption of Accounting Standards Codification Topic 606, *Revenue from Contracts with Customers* and all subsequent amendments (collectively, "ASC 606"). The Company adopted ASC 606 using the full retrospective approach.

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 the 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. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits, we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

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/ DELOITTE & TOUCHE LLP

San Jose, California
March 1, 2019

We have served as the Company's auditor since 2007.

AEROHIVE NETWORKS, INC.
Consolidated Balance Sheets
(in thousands, except share and per share amounts)

	December 31, 2018	December 31, 2017
		(As Adjusted)*
ASSETS		
CURRENT ASSETS:		
Cash and cash equivalents	\$ 26,049	\$ 27,249
Short-term investments	66,052	57,675
Accounts receivable, net	16,185	17,662
Inventories	16,117	13,495
Prepaid expenses and other current assets	6,399	6,396
Total current assets	130,802	122,477
Property and equipment, net	5,947	6,381
Goodwill	513	513
Other assets	4,255	4,900
Total assets	\$ 141,517	\$ 134,271
LIABILITIES AND STOCKHOLDERS' EQUITY		
CURRENT LIABILITIES:		
Accounts payable	\$ 16,129	\$ 11,946
Accrued liabilities	8,937	8,602
Debt, current	20,000	—
Deferred revenue, current	38,786	33,279
Total current liabilities	83,852	53,827
Debt, non-current	—	20,000
Deferred revenue, non-current	38,475	33,761
Other liabilities	1,582	1,769
Total liabilities	123,909	109,357
Commitments and contingencies (Note 5)		
Stockholders' equity:		
Preferred stock, par value of \$0.001 per share - 25,000,000 shares authorized as of December 31, 2018 and December 31, 2017; no shares issued and outstanding as of December 31, 2018 and December 31, 2017	—	—
Common stock, par value of \$0.001 per share - 500,000,000 shares authorized as of December 31, 2018 and December 31, 2017; 55,867,619 and 54,171,498 shares issued and outstanding as of December 31, 2018 and December 31, 2017, respectively	56	55
Additional paid-in capital	293,910	278,528
Treasury stock - 2,469,978 and 1,361,243 shares as of December 31, 2018 and December 31, 2017, respectively	(10,584)	(6,216)
Accumulated other comprehensive loss	(14)	(30)
Accumulated deficit	(265,760)	(247,423)
Total stockholders' equity	17,608	24,914
Total liabilities and stockholders' equity	\$ 141,517	\$ 134,271

See notes to consolidated financial statements.

* The Company has adjusted certain amounts for the retrospective change in accounting policy for revenue recognition
(See Note 1)

AEROHIVE NETWORKS, INC.
Consolidated Statements of Operations
(in thousands, except share and per share amounts)

	Year Ended December 31,		
	2018	2017	2016
Revenue:		(As Adjusted)*	(As Adjusted)*
Product	\$ 108,738	\$ 113,133	\$ 134,558
Subscription and support	46,171	40,425	33,280
Total revenue	154,909	153,558	167,838
Cost of revenue ⁽¹⁾ :			
Product	39,293	37,116	42,735
Subscription and support	13,612	12,893	12,066
Total cost of revenue	52,905	50,009	54,801
Gross profit	102,004	103,549	113,037
Operating expenses:			
Research and development ⁽¹⁾	35,646	36,418	41,504
Sales and marketing ⁽¹⁾	61,687	65,385	80,812
General and administrative ⁽¹⁾	22,508	23,094	28,839
Total operating expenses	119,841	124,897	151,155
Operating loss	(17,837)	(21,348)	(38,118)
Interest income	1,568	720	468
Interest expense	(748)	(567)	(474)
Other income (expense), net	(1,160)	(308)	177
Loss before income taxes	(18,177)	(21,503)	(37,947)
Provision for income taxes	160	603	269
Net loss	\$ (18,337)	\$ (22,106)	\$ (38,216)
Net loss per share, basic and diluted	\$ (0.33)	\$ (0.42)	\$ (0.76)
Weighted-average shares used in computing net loss per share, basic and diluted	55,050,119	53,227,342	50,332,872

(1) Includes stock-based compensation as follows:

Cost of revenue	\$ 913	\$ 1,132	\$ 1,305
Research and development	4,178	4,171	5,393
Sales and marketing	4,325	5,103	8,269
General and administrative	5,467	6,269	6,735
Total stock-based compensation	\$ 14,883	\$ 16,675	\$ 21,702

See notes to consolidated financial statements.

* The Company has adjusted certain amounts for the retrospective change in accounting policy for revenue recognition
(See Note 1)

AEROHIVE NETWORKS, INC.
Consolidated Statements of Comprehensive Loss
(in thousands)

	Year Ended December 31,		
	2018	2017	2016
		(As Adjusted)*	(As Adjusted)*
Net loss	\$ (18,337)	\$ (22,106)	\$ (38,216)
Unrealized gain on available-for-sale investments, net of tax	16	1	30
Comprehensive loss	\$ (18,321)	\$ (22,105)	\$ (38,186)

See notes to consolidated financial statements.

* The Company has adjusted certain amounts for the retrospective change in accounting policy for revenue recognition
(See Note 1)

AEROHIVE NETWORKS, INC.

Consolidated Statements of Stockholders' Equity
(in thousands, except share and per share data)

	Common Stock		Treasury Stock	Additional paid-in capital	Accumulated deficit	Accumulated Other Comprehensive Loss	Total Stockholders' Equity
	Shares	Amount	Amount				
					(As Adjusted)*		(As Adjusted)*
Balances at December 31, 2015	49,017,293	\$ 49	—	\$ 231,289	\$ (190,346)	\$ (61)	\$ 40,931
Cumulative effect adjustment from adoption of ASC 606 (See Note 1)					3,468		3,468
Shares issued upon exercise of options	444,660	—	—	870	—	—	870
Common stock issued under ESPP	1,209,410	1	—	5,325	—	—	5,326
Issuance of common stock upon vesting of RSUs	2,099,785	2	—	(2)	—	—	—
Shares repurchased for tax withholdings on vesting of RSUs	(188,984)	—	—	(1,121)	—	—	(1,121)
Repurchase of treasury stock	(364,627)	—	(2,139)	—	—	—	(2,139)
Exercise of common stock warrants	27,715	—	—	—	—	—	—
Stock-based compensation	—	—	—	21,702	—	—	21,702
Unrealized gain on available for sale investments	—	—	—	—	—	30	30
Net loss	—	—	—	—	(38,216)	—	(38,216)
Balances at December 31, 2016	52,245,252	52	(2,139)	258,063	(225,094)	(31)	30,851
Cumulative effect adjustment from adoption of ASU 2016-09	—	—	—	223	(223)	—	—
Shares issued upon exercise of options	427,089	—	—	759	—	—	759
Common stock issued under ESPP	943,071	1	—	4,000	—	—	4,001
Issuance of common stock upon vesting of RSUs	1,851,519	2	—	(2)	—	—	—
Shares repurchased for tax withholdings on vesting of RSUs	(298,817)	—	—	(1,190)	—	—	(1,190)
Repurchase of treasury stock	(996,616)	—	(4,077)	—	—	—	(4,077)
Stock-based compensation	—	—	—	16,675	—	—	16,675
Unrealized gain on available for sale investments	—	—	—	—	—	1	1
Net loss	—	—	—	—	(22,106)	—	(22,106)
Balances at December 31, 2017	54,171,498	55	(6,216)	278,528	(247,423)	(30)	24,914
Shares issued upon exercise of options	148,191	—	—	173	—	—	173
Common stock issued under ESPP	921,465	—	—	2,923	—	—	2,923
Issuance of common stock upon vesting of RSUs	2,377,035	2	—	(2)	—	—	—
Shares repurchased for tax withholdings on vesting of RSUs	(641,835)	—	—	(2,596)	—	—	(2,596)
Repurchase of treasury stock	(1,108,735)	(1)	(4,368)	1	—	—	(4,368)
Stock-based compensation	—	—	—	14,883	—	—	14,883
Unrealized gain on available for sale investments	—	—	—	—	—	16	16
Net loss	—	—	—	—	(18,337)	—	(18,337)
Balances at December 31, 2018	55,867,619	\$ 56	\$ (10,584)	\$ 293,910	\$ (265,760)	\$ (14)	\$ 17,608

See notes to consolidated financial statements.

* The Company has adjusted certain amounts for the retrospective change in accounting policy for revenue recognition (See Note 1)

AEROHIVE NETWORKS, INC.
Consolidated Statements of Cash Flows
(in thousands)

	Year Ended December 31,		
	2018	2017	2016
		(As Adjusted)*	(As Adjusted)*
Cash flows from operating activities			
Net loss	\$ (18,337)	\$ (22,106)	\$ (38,216)
Adjustments to reconcile net loss to net cash provided by (used in) operating activities:			
Depreciation and amortization	3,034	3,083	3,534
Stock-based compensation	14,883	16,675	21,702
Impairment of investment in a privately held company	750	—	—
Others	(786)	(134)	278
Changes in operating assets and liabilities:			
Accounts receivable, net	1,477	8,528	(3,366)
Inventories	(2,622)	(866)	(1,854)
Prepaid expenses and other current assets	(3)	(494)	1,398
Other assets	(105)	87	80
Accounts payable	4,027	1,322	(4,522)
Accrued liabilities	344	(701)	(2,643)
Other liabilities	(8)	126	425
Deferred revenue	10,221	3,799	8,630
Net cash provided by (used in) operating activities	<u>12,875</u>	<u>9,319</u>	<u>(14,554)</u>
Cash flows from investing activities			
Purchases of property and equipment	(2,444)	(595)	(2,161)
Maturities and sales of short-term investments	86,652	60,150	50,761
Purchases of short-term investments	(94,227)	(75,282)	(46,824)
Investment in privately held company	—	—	(1,500)
Net cash provided by (used in) investing activities	<u>(10,019)</u>	<u>(15,727)</u>	<u>276</u>
Cash flows from financing activities			
Proceeds from employee stock option exercises and employee stock purchase plan	3,096	4,760	6,196
Payment for shares withheld for tax withholdings on vesting of restricted stock units	(2,596)	(1,190)	(1,121)
Payments to repurchase common stock	(4,368)	(4,077)	(2,139)
Payments on capital lease obligation	(188)	(182)	(53)
Net cash provided by (used in) financing activities	<u>(4,056)</u>	<u>(689)</u>	<u>2,883</u>
Net decrease in cash and cash equivalents	(1,200)	(7,097)	(11,395)
Cash and cash equivalents at beginning of period	27,249	34,346	45,741
Cash and cash equivalents at end of period	<u>\$ 26,049</u>	<u>\$ 27,249</u>	<u>\$ 34,346</u>
Supplemental disclosure of cash flow information			
Income taxes paid	\$ 158	\$ 360	\$ 666
Interest paid	\$ 765	\$ 576	\$ 484
Supplemental disclosure of noncash investing and financing activities			
Unpaid property and equipment purchases	\$ 222	\$ 66	\$ 205
Property and equipment purchased under capital lease	\$ —	\$ —	\$ 1,120

See notes to consolidated financial statements.

* The Company has adjusted certain amounts for the retrospective change in accounting policy for revenue recognition
(See Note 1)

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. DESCRIPTION OF BUSINESS AND SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Nature of Operations

Aerohive Networks, Inc. was incorporated in Delaware on March 15, 2006, and, together with its subsidiaries (the "Company"), has designed and developed a leading cloud and enterprise Wi-Fi solution that enables the Company's customers to use the power of the Wi-Fi, cloud, analytics and applications to transform how they serve their customers. The Company's products include Wi-Fi access points, access switches and SD-WAN capable routers required to build an edge-access network; a cloud services platform for centralized management; data collection and analytics; and applications that leverage the network to provide additional capabilities to the business and IT organizations. Together, these products, service platforms and applications create a simple, scalable, and secure solution to deliver a better-connected experience.

The Company has offices in North America, Europe, and Asia Pacific and employs staff around the world.

Basis of Presentation and Consolidation

The Company prepared the accompanying consolidated financial statements in accordance with generally accepted accounting principles in the United States ("GAAP"), which includes the accounts of Aerohive Networks, Inc. and its wholly owned subsidiaries. All intercompany accounts and transactions have been eliminated in consolidation.

Use of Estimates

The preparation of the accompanying consolidated financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the amounts the Company reported in the consolidated financial statements and accompanying notes. Those estimates and assumptions include, among others, the determination of a standalone selling price ("SSP") for revenue arrangements with multiple performance obligations, determination of fair value of stock-based awards, inventory valuation, accounting for income taxes, including the valuation reserve on deferred tax assets and uncertain tax positions, allowance for sales reserves, allowance for rebate reserves, allowance for doubtful accounts, and warranty costs. Management evaluates estimates and assumptions on an ongoing basis using historical experience and other factors and adjusts those estimates and assumptions when facts and circumstances dictate. As the Company cannot determine future events and their effects with precision, actual results could differ from these estimates and assumptions, and those differences could be material to the consolidated financial statements.

Foreign Currency

The functional currency of the Company's foreign subsidiaries is the U.S. dollar. The Company remeasures the transactions denominated in currencies other than the functional currency at the average exchange rate in effect during the period. At the end of each reporting period, the Company remeasures its subsidiaries' monetary assets and liabilities to the U.S. dollar using exchange rates in effect at the end of the reporting period. The Company remeasures its non-monetary assets and liabilities at historical exchange rates. The Company records gains and losses related to remeasurement in other income (expense), net in the consolidated statements of operations. Foreign currency exchange gain (losses) has not been significant in any period presented and the Company has not undertaken any hedging transactions related to foreign currency exposure.

Concentrations of Credit Risk and Significant Customers

Financial instruments that potentially subject the Company to concentrations of credit risk consist primarily of cash and cash equivalents, short-term investments and accounts receivable. The Company maintains cash equivalents in money market funds. The Company maintains short-term investments in U.S. treasuries, corporate securities and commercial paper.

The Company sells its products primarily to channel partners, which include distributors, value-added resellers ("VARs"), managed service providers ("MSPs") and original equipment manufacturers ("OEMs"). The Company's accounts receivable are typically unsecured and are derived from revenue earned from customers located in the Americas, Europe, the Middle East and Africa, and Asia Pacific. The Company performs ongoing credit evaluations to determine customer credit, but generally does not require collateral from its customers. The Company maintains reserves for estimated credit losses and these losses have historically been within management's expectations.

The Company has entered into separate agreements with certain individual channel partners that are part of a consolidated group of entities which collectively constitutes greater than 10% of the Company's total revenue or gross accounts receivable balance for certain periods, as presented in the tables below.

The percentages of revenue from a consolidated group of entities (Channel Partner A and Channel Partner B) greater than 10% of total consolidated revenue were as follows:

	Year Ended December 31,		
	2018	2017 (As Adjusted)	2016 (As Adjusted)
Channel Partner A	15.4%	16.1%	15.0%
Channel Partner B	40.8%	27.7%	12.4%

The percentages of receivables from a consolidated group of entities (Channel Partner A and Channel Partner B) greater than 10% of total consolidated accounts receivable were as follows:

	As of December 31,	
	2018	2017
Channel Partner A	31.7%	27.9%
Channel Partner B	21.4%	29.4%

Fair Value Measurements

The Company's financial instruments consist of cash and cash equivalents, short-term investments, accounts receivable, accounts payable, accrued liabilities and short-term debt. The Company states accounts receivable, accounts payable and accrued liabilities at their carrying value, which approximates fair value due to the short time to the expected receipt or payment. The carrying amount of the Company's short-term debt approximates its fair value as the stated interest rate approximates market rates currently available to the Company. As of December 31, 2018, the Company has not elected the fair value option for any financial assets and liabilities for which such an election would have been permitted.

Cash and Cash Equivalents

The Company considers all highly liquid investments with maturities of three months or less when purchased to be cash equivalents. Cash and cash equivalents consist of cash on hand and highly liquid investments in money market funds, including overnight investments. Due to the short-term nature and liquidity of these financial instruments, the carrying value of these assets approximates fair value.

Short-Term Investments

The Company classifies all its investments as available-for-sale at the time of purchase since it is management's intent that these investments be available for current operations, and as such, includes these investments as short-term investments on its balance sheets. These investments consist of investments with original maturities longer than three months, including commercial paper, investment-grade corporate and government debt securities with Moody's and S&P ratings of A-/A3 or better. The Company records short-term investments classified as available-for-sale at fair market value with the related unrealized gains and losses included in accumulated other comprehensive income (loss), a component of stockholders' equity. The Company records realized gains and losses in the consolidated statements of operations. The Company adjusts investments for amortization of premiums and discounts to maturity and includes such amortization in interest income (expense), net. The Company periodically assesses whether its investments with unrealized loss positions are other-than-temporarily impaired. Other-than-temporary impairment charges exist when the entity has the intent to sell the security, it will more likely than not be required to sell the security before anticipated recovery or it does not expect to recover the entire amortized cost basis of the security. The Company determines other-than-temporary impairments based on the specific identification method and reports them in the consolidated statements of operations.

Allowance for Doubtful Accounts

The Company records accounts receivable at invoiced amounts, net of allowances for doubtful accounts. The Company evaluates the collectability of its accounts receivable based on known collection risks and historical experience. In circumstances where the Company is aware of a specific customer's inability to meet its financial obligations (e.g., bankruptcy filings or substantial downgrading of credit ratings), the Company records a specific reserve for bad debts against amounts due to reduce the net recognized receivable to the amount the Company reasonably believes will be collected. For all other customers, the Company records reserves for bad debts based on the length of time the receivables are past due and the Company's historical experience of collections and write-offs. If circumstances change, such as higher-than-expected defaults or an unexpected material adverse change in a major customer's ability to meet its financial obligations, the Company may reduce the estimate of the recoverability of the amounts due, potentially by a significant amount.

Amounts which the Company recorded in the consolidated statements of operations relating to allowance for doubtful accounts were immaterial for the fiscal years ended December 31, 2018, 2017 and 2016, respectively.

Other Account Receivable Allowances

The Company provides certain pricing discounts (known as "rebates") and limited return rights to certain of its channel partners with stocking rights. Estimates for these allowances are determined based on the negotiated terms, historical experience and inventory levels in the channel. The other account receivable allowances the company recorded for rebates and sales returns were approximately \$3.8 million and \$1.2 million, respectively as of December 31, 2018. These other allowances were immaterial as of December 31, 2017.

Inventory

Inventory consists of hardware products and related component parts, which the Company states at the lower of cost, which approximates actual cost computed on a first-in, first-out basis, or market value. The Company evaluates inventory for excess and obsolete products, based on management's assessment of future demand and market conditions, and technological obsolescence of its products. The Company does not reverse inventory write-downs, once established, as they establish a new cost basis for the inventory. The Company includes inventory write-downs as a component of cost of product revenue in the accompanying consolidated statements of operations. For the fiscal years ended December 31, 2018, 2017 and 2016, the Company's provisions for excess and obsolete inventories were \$2.1 million, \$3.0 million and \$1.7 million, respectively. The Company uses contract manufacturers to provide manufacturing services for its products.

Software Development Costs

The Company has not capitalized the costs to develop the Company's perpetual license software offerings because the Company's current software development process is essentially completed concurrent with the establishment of technological feasibility. As such, the Company expenses all related software development costs as incurred and includes them in research and development expenses in the consolidated statements of operations.

The Company expenses research and development costs incurred during the preliminary project stage related to the Company's cloud-managed networking platform as incurred. The Company begins capitalization when the preliminary project stage is complete, management with the relevant authority authorizes and commits to the funding of the software project, and it is probable the project will be completed. The Company ceases capitalization when the project is substantially complete and ready for its intended purpose. The Company amortizes the capitalized costs on a straight-line basis over the estimated useful life, generally three to five years.

There were no software developments costs that the Company capitalized for the fiscal years ended December 31, 2018 and 2017. The Company includes such internal-use software in the software category in property and equipment. The Company amortizes the capitalized software development costs to cost of subscription and support on a straight-line basis over an estimated useful life.

Property and Equipment, net

The Company states property and equipment at cost, less accumulated depreciation and amortization. The Company computes depreciation using the straight-line method over the estimated useful lives of the related assets. The Company amortizes leasehold improvements on a straight-line basis over the shorter of the estimated useful lives of the assets or the remaining lease term. Depreciation on property and equipment ranges from two to seven years.

Goodwill

Goodwill represents the excess purchase consideration of an acquired entity over the fair value of the net tangible and intangible assets acquired.

The Company has determined that it operates as one reporting unit and performs its annual impairment test of goodwill during the fourth quarter of each fiscal year or whenever events or circumstances change that would indicate that goodwill might be impaired. Triggering events that may indicate impairment include, but are not limited to, a significant adverse change in the business climate, unanticipated competition, loss of key personnel, significant changes in the manner the Company uses the acquired assets or the strategy for the overall business, significant negative industry or economic trends or significant underperformance relative to historical operations or projected future results of operations.

In conducting the impairment test, the Company first assesses qualitative factors to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying amount as a basis for determining whether it is necessary to perform the two-step goodwill impairment test. If the qualitative step is not passed, the Company performs a two-step impairment test whereby in the first step, the Company must compare the fair value of the reporting unit with its carrying amount. If the carrying amount exceeds its fair value, the Company performs the second step of the goodwill impairment test to determine the amount of impairment. The second step, measuring the impairment loss, compares the implied fair value of the goodwill with the carrying value of the goodwill. The Company recognizes any excess of the goodwill carrying value over the implied fair value as an impairment loss. No impairment of goodwill was identified during the fiscal years ended December 31, 2018, 2017 and 2016.

Impairment of Long-Lived Assets

The Company periodically reviews carrying amounts of long-lived assets, including property and equipment and intangible assets subject to depreciation and amortization for impairment whenever events or changes in circumstances indicate that the carrying value of these assets may not be recoverable or that the useful life is shorter than the Company had originally estimated. The Company measures recoverability of these assets by comparing the carrying amount of each asset to the future undiscounted cash flows the asset is expected to generate over their remaining lives. If the asset is considered to be impaired, the Company measures the amount of any impairment as the difference between the carrying value and the fair value of the impaired asset. If the useful life is shorter than originally estimated, the Company amortizes the remaining carrying value over the new shorter useful life.

No impairment of any long-lived assets was identified for the fiscal years ended December 31, 2018, 2017 and 2016.

Revenue Recognition

The Company derives revenue from two sources: (i) product, which includes hardware and software license revenue, and (ii) subscription and support, which includes post-contract customer support ("PCS"), and software delivered as a service ("SaaS"). The Company follows the following five-step approach in recognizing revenue:

- ***Identification of the contract, or contracts, with a customer*** - A contract with a customer exists when (i) the Company enters into an enforceable contract with a customer that defines each party's rights regarding the goods or services to be transferred and identifies the payment terms related to these goods or services, (ii) the contract has commercial substance, and (iii) the Company determines that collection of substantially all consideration for goods or services that are transferred is probable based on the customer's intent and ability to pay the promised consideration. The Company applies judgment in determining the customer's ability and intention to pay, which the Company bases 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.
- ***Identification of the performance obligations in the contract*** - The Company identifies performance obligations promised in a contract based on the goods or services that the Company will transfer to the customer that are both capable of being distinct, whereby the customer can benefit from the goods or services either on its own or together with other resources that are readily available from third parties or from us, and are distinct in the context of the contract, whereby the transfer of the goods or services is separately identifiable from other promises in the contract. To the extent a contract includes multiple promised goods or services, the Company applies judgment to determine whether promised goods or services are capable of being distinct and distinct in the context of the contract.
- ***Determination of the transaction price*** - The Company determines the transaction price based on the consideration to which the Company will be entitled in exchange for transferring goods or services to the customer.
- ***Allocation of the transaction price to the performance obligations in the contract*** - If the contract contains a single performance obligation, the Company allocates the entire transaction price to the single performance obligation. The Company allocates the transaction price of contracts that contain multiple performance obligations to each performance obligation based on a relative SSP. The Company determines SSP based on the price at which the performance obligation is sold separately. If the Company cannot observe SSP through past transactions, the Company estimates SSP by taking into account available information such as market conditions and internally approved pricing guidelines related to the performance obligations.

- **Recognition of revenue when, or as, the Company satisfies a performance obligation** - The Company satisfies performance obligations either over time or at a point in time as discussed in further detail below. The Company recognizes revenue at the time the related performance obligation is satisfied by transferring a promised good or service to a customer.

The Company's product revenue consists of sales to distributors, and value-added resellers ("VARs") and an original equipment manufacturing partner ("OEM partner"). The Company considers purchase orders such distributors, VARs and OEM partner issue to the Company, which are in some cases governed by master sales agreements, to be the Company's contracts with such customers, as such documents provide enforceable rights and obligations between the Company and distributor, VAR or OEM partner. As part of its consideration of the contract, the Company evaluates certain factors, including the customer's ability to pay (or credit risk). For each contract, the Company considers the promise to transfer goods or services to be the identified performance obligation. In determining the transaction price, the Company evaluates whether the price is subject to refund or adjustment to determine the net consideration to which the Company expects to be entitled. The Company allocates the transaction price to each distinct performance obligation based on a relative standalone selling price. The Company recognizes revenue when control of the product or service is transferred to the customer (i.e., when the performance obligation is satisfied). Further, in determining whether control has transferred, the Company considers if there is a present right to payment and legal title, along with risks and rewards of ownership has transferred to the customer.

The Company makes sales of products to most distributors under terms allowing certain price adjustments and limited rights of return (known as "stock rotation") of the Company's products held in their inventory. The Company recognizes revenue from sales to distributors upon the transfer of control of the product to the distributor. Frequently, distributors need to sell product at a discounted price lower than the standard distribution price in order to win business. After the Company verifies that the distributor had obtained the Company's pre-approval for the discount claim, the Company may issue a credit memo to the distributor representing a rebate of the amount of the discount. In determining the transaction price, the Company considers these price adjustments to be variable consideration. The Company estimates such price adjustments using the expected-value method based on an analysis of actual credit claims at the distributor level, over a period of time the Company considers adequate to account for current pricing and business trends. Historically, actual price adjustments relative to those the Company estimates and includes when determining the transaction price have not materially differed. Stock rotation rights provide distributor with the ability to return certain specified amounts of inventory. Stock rotation adjustments are an additional form of variable consideration which the Company also estimates using the expected-value method based on historical return rates. Historically, distributor stock rotation adjustments have not been material.

The Company makes sales to certain distributors, VARs and its OEM partner under terms that do not include rights of return or price concessions after the product is shipped. Accordingly, upon application of steps one through five above, the Company recognizes product revenue upon shipment and transfer of control.

The Company generally provides a limited lifetime warranty that its products will substantially conform to the published specifications. The Company limits its liability to either a credit equal to the purchase price or replacement of the defective part. The Company does not consider activities related to such warranty a separate performance obligation.

Payment terms and conditions vary by contract, customer type and customer location. Company's standard payment terms are 30 days from the invoice date. In instances where the timing of the Company's revenue recognition differs from the timing of its invoicing, the Company has determined that its contracts generally do not include a significant financing component. The primary purpose of the Company's invoicing terms is to provide customers with simplified and predictable ways of purchasing the Company's products and services, not for the Company's customers to provide financing or for the Company to provide customers with financing.

The Company records accounts receivable at the invoiced amount, net of an allowance for doubtful accounts. The Company recognizes a receivable in the period the Company delivers goods or provide services or when the Company's right to consideration is unconditional.

Significant Judgments

The Company's contracts with customers often include promises to transfer multiple products and services to the customer. The Company may exercise significant judgment when determining whether products and services are considered distinct performance obligations that should be accounted for separately versus together. The Company may also exercise judgment to determine whether the software license is considered distinct and accounted for separately, or not distinct and accounted for together with the hardware and recognized upon transfer of control.

The Company may further require judgment to determine the SSP for each distinct performance obligation. The Company determines SSP for the purposes of allocating the arrangement, primarily based on historical transaction pricing. The Company segregates historical transactions based on its pricing model and go-to-market strategy, which includes factors such as type of sales channel (VAR, OEM or distributor), the geographies in which the Company sells its products and services (domestic or international) and offering type (product series, software subscriptions and level of support for PCS).

Disaggregation of Revenue

Product Revenue - The Company's product revenue consists of revenue from the sale of the Company's hardware products, the majority of which contains an embedded HiveOS software, the Company's proprietary operating system that is not considered to be distinct in the context of the contract. Therefore, the Company considers its hardware appliances together with related embedded HiveOS software (collectively, the "hardware") as a single performance obligation. The Company transfers these items to the customer concurrently. The Company recognizes hardware revenue upon transfer of control to its customers, which occurs upon shipment. The Company's product revenue includes the sales of software licenses of HiveManager, a license-based unified networking management system, which consists of the purchase of a perpetual license of the HiveManager software. The Company generally recognizes revenue from its software licenses upon transfer of control to its customers.

Subscription and Support Revenue - The Company's subscription and support revenue consists of revenue from SaaS and PCS arrangements. SaaS arrangements with customers do not provide the right to take possession of the software at any time during the hosting period and have a defined contract term. PCS arrangements include software updates, access to technical support personnel, and expedited replacement of defective hardware products. Each of the promised services is distinct in the context of the contract as the services are not inputs to a combined output for which the Company provides any significant integration service, the provision of each service does not significantly modify or customize the other, and the Company could provide each service independently of the other. Though the Company has identified that each of the performance obligations is distinct, as each of the performance obligations represents a series of distinct services that has the same pattern of transfer (stand ready obligations) and the same measure of progress of transfer (days of service) the Company will account for the all series as a single performance obligation. The Company recognizes revenue from SaaS and PCS arrangements on a straight-line basis over the service contract term, which is typically one, three or five years. The contract term typically commences upon transfer of control of the corresponding products to our customer.

Costs to Obtain and Fulfill a Contract

The Company capitalizes certain contract acquisition costs consisting primarily of commissions paid and the related payroll taxes when customer contracts are signed. The Company capitalizes commission expenses earned by sales personnel and the related payroll taxes that are incremental to obtaining customer contracts. The Company amortizes deferred sales commission amounts based on the expected future revenue streams under the customer contracts. The Company includes amortization of deferred sales commissions in sales and marketing expense in the accompanying consolidated statements of operations. The Company classifies deferred commissions as current or non-current based on the timing of when the Company expects to recognize the expense. The Company periodically reviews these costs for impairment.

The Company records deferred revenue when it invoices the customer, collection is probable, and the associated revenue has not yet been earned. The current portion of deferred revenue represents the amounts the Company expects to recognize as revenue within one year of the consolidated balance sheet date. See Note 3, Consolidated Balance Sheet Components, for the changes in the deferred revenue and deferred commissions during the year ended December 31, 2018 and 2017, respectively.

Contracted-But-Not-Recognized Revenue

The Company's contracted-but-not-invoiced performance obligations do not include the option for its customers to cancel. The Company's revenue allocated to remaining performance obligations represents contracted revenue that the Company has not yet recognized ("contracted-but-not-recognized"), which includes deferred revenue and non-cancelable amounts that the Company will invoice and recognize as revenue in future periods. Contracted-but-not-recognized revenue was \$78.7 million as of December 31, 2018, of which the Company expects to recognize approximately 51% over the next 12 months and the remainder thereafter.

Warranty Liability

The Company maintains a warranty accrual for estimated future warranty obligations based on unit volumes by hardware product family together with anticipated future warranty costs. The Company's generally covers its Wi-Fi access points, branch routers and switches by a limited lifetime warranty, and its other hardware accessory products by a limited warranty for a period of one year.

Advertising Costs

The Company charges advertising costs to sales and marketing expenses as incurred in the consolidated statements of operations. Advertising expense was immaterial for the fiscal years ended December 31, 2018, 2017 and 2016.

Research and Development Expenses

The Company charges research and development costs, other than capitalized software development costs, to operations as incurred, which consist primarily of personnel costs (including compensation costs and stock-based compensation), outside services, expensed materials, depreciation and an allocation of overhead expenses (including facilities and information technology infrastructure costs).

Comprehensive Income (Loss)

Comprehensive income (loss) consists of all components of net income (loss) and all components of other comprehensive income (loss) within stockholders' equity. The Company's other comprehensive income (loss) includes unrealized gains and losses from its available-for-sale securities that the Company does not consider other-than-temporarily impaired, net of taxes.

Stock-Based Compensation

The Company measures compensation expense for all stock-based awards based on the estimated fair values on the date of grant. The Company's stock-based awards include stock options, restricted stock units (RSU) and purchase rights under the employee stock purchase plan (ESPP). The Company determines the fair value of each RSU granted using the fair value of the Company's common stock on the date of the grant. The Company issues RSUs to employees which are based on Company's achievement of certain performance conditions. The Company estimates the fair value of these performance-based RSU using the fair value of our common stock on the date of the grant. The Company assesses the probability of these RSUs expected to vest based on its estimated achievement of performance conditions for each reporting period. The Company also issues RSUs that are contingent on the Company's achievement of certain stock price targets. The Company estimates the fair value of these market-based RSUs using the Mont Carlo option-pricing model on the date of grant as these RSUs contain both market and service conditions. The Company estimates the fair value of each stock option using the Black-Scholes option pricing model. The Company calculates the fair value of each stock purchase right under the Company's ESPP based on the closing price of the Company's stock on the date of grant and the value of a call and put option estimated using the Black-Scholes pricing model. The Black-Scholes pricing model requires assumptions including the market value of the Company's common stock, expected term of the award, expected volatility of the price of the Company's common stock, risk-free interest rates, and expected dividend yield. The Company recognizes stock-based compensation for all stock-based awards on a straight-line basis over the requisite service period, except for market-based RSUs which are recognized on a graded-vesting method over the estimated term.

Income Taxes

The Company accounts for income taxes under an asset and liability approach for deferred income taxes, which require recognition of deferred income tax assets and liabilities for the expected future tax consequences of events that have been recognized in the consolidated financial statements, but have not been reflected in taxable income. The Company makes estimates and exercises judgments in the calculation of certain tax liabilities and in the determination of the recoverability of certain deferred income tax assets, which arise from temporary differences and carryforwards. The Company measures deferred income tax assets and liabilities using the currently enacted tax rates that apply to taxable income in effect for the years in which the Company expects those tax assets to be realized or settled. The Company regularly assesses the likelihood that deferred income tax assets will be realized based on historical levels of taxable income, projections for future taxable income, and tax planning strategies. To the extent that the Company believes any amounts are not more likely than not to be realized, the Company records a valuation allowance to reduce the deferred income tax assets. The Company regularly assesses the need for a valuation allowance on its deferred tax assets, and to the extent that the Company determines that an adjustment is needed, the Company records such adjustment in the period that the Company makes the determination.

The Company regularly reviews its tax positions and benefits to be realized. The Company recognizes tax liabilities based upon estimates of whether, and the extent to which, additional taxes will be due when such estimates are more likely than not to be sustained. The Company will not recognize an uncertain income tax position if it has less than a 50% likelihood of being sustained. The Company recognizes interest and penalties related to income tax matters as income tax expense in the accompanying consolidated statements of operations.

Recently Adopted Accounting Pronouncements

In May 2014, the FASB issued ASU 2014-09, *Revenue from Contracts with Customers (Topic 606)*, which supersedes the revenue recognition requirements in *Revenue Recognition (Topic 605)* and most industry-specific guidance. This standard requires entities to recognize revenue when they transfer promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled to in exchange for those goods or services. In the first quarter of 2018, the Company adopted ASC 606, using the full retrospective method, which required the Company to restate its historical financial information to be consistent with the standard. The most significant impact of the standard related to the way the Company accounts for arrangements with its stocking distributors. The Company previously deferred the recognition of revenue and the cost of revenue from sales to these stocking distributors until the stocking distributors had sold the products to their customers (known as “sell-through” revenue recognition). Under the new standard, the Company recognizes all revenue and related cost of revenue on sales to stocking distributors upon shipment and transfer of control (known as “sell-in” revenue recognition), rather than deferring recognition until the stocking distributors report that they have sold the products to their customers, provided that all other revenue recognition criteria have been met. The Company also attributes the impact to its revenue and deferred revenue balance to the removal of the limitation on contingent revenue, which accelerates revenue recognition for certain contracts. Further, the adoption of this standard also resulted in differences in the timing of recognition of contract costs, such as sales commissions.

The Company has finalized the adoption of the standard and adjusted product revenue was \$113.1 million and \$134.6 million for fiscal years ended December 31, 2017 and 2016, respectively, and subscription and support revenue was \$40.4 million and \$33.3 million for fiscal years ended December 31, 2017 and 2016, respectively. The adoption of the standard resulted in a decrease in total deferred revenue of \$3.3 million as of December 31, 2017, driven by the Company's recognition in the period of revenue related to stocking distributors upon shipment and also the removal of the limitation on contingent revenue accelerating revenue recognition for certain contracts. The adoption of the standard resulted in a decrease of \$0.3 million in capitalized contract costs as of December 31, 2017. In addition, the adoption of the standard had no significant impact on the provision for income taxes and the net cash provided by (used in) operating, investing, or financing activities on the Company's consolidated statements of cash flows.

ASC 606 Adoption Impact to Previously Reported Results

The following tables presents the impacts to reported results from the Company's adoption of the standard on the Company's consolidated balance sheets and consolidated statements of operations.

The adoption of the new revenue recognition standard is expected to impact our reported results as follows:

Consolidated Balance Sheet (in thousands)

	December 31, 2017		
	As Reported	Impact of Adoption	As Adjusted
Prepaid expenses and other current assets	\$ 6,513	\$ (117) (1)	\$ 6,396
Total current assets	122,594	(117)	122,477
Other assets	5,124	(224) (1)	4,900
Total assets	\$ 134,612	\$ (341)	\$ 134,271
Deferred Revenue, current	34,281	(1,002) (2)	33,279
Total current liabilities	54,829	(1,002)	53,827
Deferred Revenue, non-current	36,083	(2,322) (2)	33,761
Total liabilities	112,681	(3,324)	109,357
Accumulated deficit	(250,406)	2,983	(247,423)
Total stockholders' equity	21,931	2,983	24,914
Total liabilities and stockholders' equity	\$ 134,612	\$ (341)	\$ 134,271

(1) Impact of cumulative change in commissions expense and cost of revenue

(2) Impact of cumulative change in revenue

Consolidated Statements of Operations (in thousands, except share and per share amounts)

	Year Ended December 31, 2017		
	As Reported	Impact of Adoption	As Adjusted
Product revenue	\$ 111,839	\$ 1,294	\$ 113,133
Subscription and support revenue	41,060	(635)	40,425
Total revenue	152,899	659	153,558
Cost of revenue- Product	37,337	(221)	37,116
Total cost of revenue	50,230	(221)	50,009
Gross profit	102,669	880	103,549
Sales and marketing	65,325	60	65,385
Total operating expenses	124,837	60	124,897
Operating loss	(22,168)	820	(21,348)
Net loss	\$ (22,926)	\$ 820	\$ (22,106)
Net loss per share, basic and diluted	\$ (0.43)	\$ 0.01	\$ (0.42)

	Year Ended December 31, 2016		
	As Reported	Impact of Adoption	As Adjusted
Product revenue	\$ 136,570	\$ (2,012)	\$ 134,558
Subscription and support revenue	33,255	25	33,280
Total revenue	169,825	(1,987)	167,838
Cost of revenue- Product	43,231	(496)	42,735
Total cost of revenue	55,297	(496)	54,801
Gross profit	114,528	(1,491)	113,037
Sales and marketing	80,998	(186)	80,812
Total operating expenses	151,341	(186)	151,155
Operating loss	(36,813)	(1,305)	(38,118)
Net loss	\$ (36,911)	\$ (1,305)	\$ (38,216)
Net loss per share, basic and diluted	\$ (0.73)	\$ (0.03)	\$ (0.76)

Effect on certain items in the Statement of Cash Flows (operating activities, in thousands)

	Year Ended December 31, 2017		
	As Reported	Impact of Adoption	As Adjusted
Cash flows from operating activities:			
Net loss:	\$ (22,926)	\$ 820	\$ (22,106)
Adjustments to reconcile net loss to net cash provided by operating activities:			
Prepaid expenses and other current assets	(224)	(270)	(494)
Other assets	(24)	111	87
Deferred revenue	4,460	(661)	3,799

	Year Ended December 31, 2016		
	As Reported	Impact of Adoption	As Adjusted
Cash flows from operating activities:			
Net loss:	\$ (36,911)	\$ (1,305)	\$ (38,216)
Adjustments to reconcile net loss to net cash provided by operating activities:			
Prepaid expenses and other current assets	2,081	(683)	1,398
Other assets	80	—	80
Deferred revenue	6,642	1,988	8,630

Revenues by geographic location, based on the billing address of the respective channel partner's bill-to location, which reflect the Company's adoption of ASC 606, are as follows: (in thousands)

	Year Ended December 31, 2017		
	As Reported	Impact of Adoption	As Adjusted
Americas	\$ 96,446	\$ 260	\$ 96,706
Europe, Middle East and Africa	43,925	751	44,676
Asia Pacific	12,528	(352)	12,176
Total revenues	\$ 152,899	\$ 659	\$ 153,558

	Year Ended December 31, 2016		
	As Reported	Impact of Adoption	As Adjusted
Americas	\$ 102,458	\$ 29	\$ 102,487
Europe, Middle East and Africa	49,681	111	49,792
Asia Pacific	17,686	(2,127)	15,559
Total revenues	<u>\$ 169,825</u>	<u>\$ (1,987)</u>	<u>\$ 167,838</u>

Other Recently Adopted Accounting Pronouncements

In January 2016, the FASB issued ASU 2016-01, *Recognition and Measurement of Financial Assets and Financial Liabilities*, which provides guidance for the recognition, measurement, presentation, and disclosure of financial assets and liabilities. In February 2018, the FASB issued ASU No. 2018-03, *Technical Corrections and Improvements to Financial Instruments*, to clarify certain aspects of ASU No. 2016-01. The Company adopted these standards effective January 1, 2018. The Company's adoption of these standards did not have a material impact on the Company's financial statements.

In August 2016, the FASB issued ASU 2016-15, *Statement of Cash Flows - Classification of Certain Cash Receipts and Cash Payments*, which provides guidance to decrease the diversity in practice in how certain cash receipts and cash payments are presented and classified in the statement of cash flows. The Company adopted ASU 2016-15 in the first quarter of 2018. The Company's adoption of this standard did not have a material impact on the Company's financial statements.

Recent Accounting Pronouncements

In February 2016, the FASB issued ASU 2016-02, *Leases (Topic 842)*, which supersedes the lease accounting requirements in Topic 840. This standard requires a dual approach for lessee accounting under which a lessee would account for leases as finance leases or operating leases. Both finance leases and operating leases will result in the lessee recognizing a right-of-use asset and a corresponding lease liability. For finance leases, the lessee would recognize interest expense and amortization of the right-of-use asset, and for operating leases, the lessee would recognize a straight-line total lease expense. The standard also requires qualitative and quantitative disclosures to supplement the amounts recorded in the financial statements so that users can understand more about the nature of an entity's leasing activities, including the Company's significant judgments and changes in judgments. This standard is effective beginning January 1, 2019. The Company will adopt ASU 2016-02 in the first quarter of 2019 utilizing the modified retrospective transition method through a cumulative-effect adjustment at the beginning of the first quarter of 2019 and will not restate comparative periods. The Company will elect the package of practical expedients permitted under the transition guidance, which allows the Company to carryforward its historical lease classification, its assessment on whether a contract is or contains a lease, and its indirect costs for any leases that exist prior to adoption of the new standard. The Company will also elect to combine lease and non-lease components. For leases with a term of 12 months or less, the Company plans to elect the short-term lease exemption, which allows the Company to not recognize right-of-use assets or lease liabilities for qualifying leases existing at transition and new leases the Company may enter into in the future. While the Company continues to assess all impacts of the adoption, the Company currently expects to recognize a right-of-use assets and corresponding lease liabilities of approximately \$4.0 million to \$5.0 million on the balance sheet which represents the present value of the remaining lease payments at January 1, 2019. See Note 5 *Commitments and Contingencies* for information about the Company's lease commitments. The Company do not expect the adoption of this guidance to have significant impact on its consolidated income statement.

In January 2017, the FASB issued ASU 2017-04, *Simplifying the Test for Goodwill Impairment*, which removes Step 2 of the goodwill impairment test, which requires a hypothetical purchase price allocation. An impairment charge will now be the amount by which a reporting unit's carrying value exceeds its fair value, not to exceed the carrying amount of goodwill. The standard is effective for fiscal years beginning after December 15, 2021, with early adoption permitted. The Company currently plans to adopt this standard in 2021 when it becomes effective.

2. FAIR VALUE MEASUREMENTS

The Company records its financial assets and liabilities at fair value. The Company categorizes these assets and liabilities based upon the level of judgment associated with inputs the Company uses to measure the fair value. The categories are as follows:

Level 1	Quoted prices (unadjusted) in active markets that are accessible at the measurement date for identical assets or liabilities.
Level 2	Observable prices that are based on inputs not quoted on active markets, but corroborated by market data.
Level 3	Unobservable inputs are used when little or no market data is available.

The Company classified its cash equivalents and short-term marketable investments within Level 1 and Level 2 in the fair value hierarchy as of December 31, 2018 and 2017. Level 1 assets include highly liquid money market funds that the Company includes in cash equivalents. The Company classifies these instruments within Level 1 of the fair-value hierarchy because the Company values them based on quoted market prices in active markets. Level 2 assets include U.S. treasuries, corporate securities and commercial paper. The Company classifies these instruments within Level 2 of the fair value hierarchy because the Company values them based on pricing the Company obtains from an independent pricing service, which may use quoted market prices for identical or comparable instruments or model driven valuations using observable market data or inputs corroborated by observable market data. The Company classifies these instruments as short-term investments unless their maturities are three months or less when purchased, in which case the Company includes them in cash and cash equivalents. The Company uses inputs, such as actual trade data, benchmark yields, broker/dealer quotes or alternative pricing sources with reasonable levels of price transparency, which the Company obtains from quoted market prices, independent pricing vendors, or other sources, to determine the ultimate fair value of these assets.

The components of the Company's Level 1 and Level 2 assets are as follows:

	December 31, 2018				
	Amortized Cost	Gross Unrealized Gain (Loss)	Estimated Fair Value	Cash equivalents	Short-term investments
	(in thousands)				
Level 1:					
Money market funds	8,482	—	8,482	8,482	—
	\$ 8,482	\$ —	\$ 8,482	\$ 8,482	\$ —
Level 2:					
U.S. treasuries	8,988	(2)	8,986	—	8,986
Corporate securities	20,698	(12)	20,686	—	20,686
Commercial paper	36,380	—	36,380	—	36,380
	\$ 66,066	\$ (14)	\$ 66,052	\$ —	\$ 66,052
Total	\$ 74,548	\$ (14)	\$ 74,534	\$ 8,482	\$ 66,052
	December 31, 2017				
	Amortized Cost	Gross Unrealized Gain (Loss)	Estimated Fair Value	Cash equivalents	Short-term investments
	(in thousands)				
Level 1:					
Money market funds	7,538	—	7,538	7,538	—
	\$ 7,538	\$ —	\$ 7,538	\$ 7,538	\$ —
Level 2:					
U.S. treasuries	9,480	(3)	9,477	—	9,477
Corporate securities	15,293	(27)	15,266	—	15,266
Commercial paper	32,932	—	32,932	—	32,932
	\$ 57,705	\$ (30)	\$ 57,675	\$ —	\$ 57,675
Total	\$ 65,243	\$ (30)	\$ 65,213	\$ 7,538	\$ 57,675

All short-term investments the Company held as of December 31, 2018 and December 31, 2017, contractually mature within one year from these respective dates.

Unrealized gains and losses related to these investments are due to interest rate fluctuations as opposed to credit quality. In addition, the Company does not intend to sell, and it is not more likely than not that the Company would be required

to sell, these investments before recovery of their cost basis. As a result, there was no other-than-temporary impairment for these investments as of December 31, 2018 and December 31, 2017.

3. CONSOLIDATED BALANCE SHEET COMPONENTS

Prepaid expenses and other current assets

Prepaid expenses and other current assets consist of the following:

	As of December 31,	
	2018	2017
	(As Adjusted)	
	(in thousands)	
Deferred sales commissions, current portion	\$ 3,171	\$ 3,072
Prepaid expenses	2,478	2,543
Other	750	781
Total prepaid expenses and other current assets	<u>\$ 6,399</u>	<u>\$ 6,396</u>

Property and Equipment, net

Property and equipment, net consists of the following:

	Estimated Useful Lives	As of December 31,	
		2018	2017
		(in thousands)	
Computer and other equipment	3 years	\$ 1,668	\$ 1,713
Manufacturing, research and development laboratory equipment	3 years	5,693	4,630
Software	2 to 5 years	9,462	8,182
Office furniture and equipment	3 to 7 years	2,052	2,061
Leasehold improvements	shorter of useful life or lease term	1,049	1,017
Property and equipment, gross		19,924	17,603
Less: Accumulated depreciation and amortization		(13,977)	(11,222)
Property and equipment, net		<u>\$ 5,947</u>	<u>\$ 6,381</u>

The software category includes the capitalized internal-use software for the Company's cloud service platform. The Company amortizes these capitalized costs to cost of subscription and support revenue on a straight-line basis over an estimated useful life of the software of five years.

Depreciation and amortization expense was \$3.0 million, \$3.1 million and \$3.5 million for the fiscal years ended December 31, 2018, 2017 and 2016, respectively.

Office furniture and equipment classified under capital lease was \$1.2 million at December 31, 2018 and 2017, respectively and the related accumulated depreciation was \$0.7 million and \$0.4 million at December 31, 2018 and 2017, respectively.

Other assets

Other assets consist of the following:

	As of December 31,	
	2018	2017
	(As Adjusted)	
	(in thousands)	
Deferred sales commissions, non-current portion	\$ 3,085	\$ 2,947
Investment in privately held company	750	1,500
Other	420	453
Total other assets	<u>\$ 4,255</u>	<u>\$ 4,900</u>

Deferred sales commission

The current portion of deferred commission represents the amounts that the Company expects to recognize as commission expense within one year of the consolidated balance sheet date. Significant changes in the balance of total deferred commission (contract asset) during the year ended December 31, 2018 and 2017 are as follows:

	As of December 31,	
	2018	2017
	(As Adjusted)	
	(in thousands)	
Beginning balance	\$ 6,019	\$ 5,766
Recognized	(12,961)	(13,257)
Additions	13,198	13,510
Total deferred commissions	\$ 6,256	\$ 6,019
Current portion	\$ 3,171	\$ 3,072
Non-current portion	\$ 3,085	\$ 2,947

Of the \$6.3 million total deferred commission balance as of December 31, 2018, the Company expects to recognize approximately 51% as commission expense over the next 12 months and the remainder thereafter.

Investment in privately held company

In January 2016, the Company paid \$1.5 million in cash to purchase a convertible note issued by a privately held company, which provides Wi-Fi application and analytics. In June 2017, the convertible note and accrued interest on the note converted into shares of preferred stock of the privately held company and the note was cancelled. The accrued interest on the note was immaterial. The Company currently has no significant voting rights, investor rights or influence over the privately held company. Since the investment has no readily determinable market value, the Company elected the measurement alternative. The Company reviews the carried value of the investment quarterly for indicators of fair value changes when there are observable prices less any potential impairment. As of December 31, 2018, the Company noted the deterioration in the fair value of the investment and as such took an impairment charge of approximately \$0.8 million. The fair value of the investment as of December 31, 2018 was determined to be \$0.8 million. The Company has classified the investment as other assets on the consolidated balance sheet.

Accrued Liabilities

Accrued liabilities consist of the following:

	As of December 31,	
	2018	2017
	(in thousands)	
Accrued compensation	\$ 7,492	\$ 6,971
Accrued expenses and other liabilities	1,169	1,385
Warranty liability, current portion	276	246
Total accrued liabilities	\$ 8,937	\$ 8,602

Deferred Revenue

The current portion of deferred revenue represents the amounts that the Company expects to recognize as revenue within one year of the consolidated balance sheet date. Significant changes in the balance of total deferred revenue (contract liability) during the year ended December 31, 2018 and 2017 are as follows:

	As of December 31,	
	2018	2017
	(As Adjusted)	
	(in thousands)	
Beginning balance	\$ 67,040	\$ 63,239
Recognized	(46,171)	(40,425)
Additions	56,392	44,226
Total deferred revenue	\$ 77,261	\$ 67,040
Current portion	\$ 38,786	\$ 33,279
Non-current portion	\$ 38,475	\$ 33,761

Of the \$77.3 million total deferred revenue balance as of December 31, 2018, the Company expects to recognize approximately 50% as revenue over the next 12 months and the remainder thereafter.

Warranty Liability

The following table summarizes the activity related to the Company's accrued liability for estimated future warranty:

	As of December 31,	
	2018	2017
	(in thousands)	
Beginning balance	\$ 577	\$ 975
Charges to operations	801	606
Obligations fulfilled	(735)	(941)
Changes in existing warranty	(28)	(63)
Total product warranties	\$ 615	\$ 577
Current portion	\$ 276	\$ 246
Non-current portion	\$ 339	\$ 331

Changes in existing warranty reflect a combination of changes in expected warranty claims and changes in the related costs to service such claims.

4. DEBT

Financing Agreements

In June 2012, the Company entered into a revolving credit facility with Silicon Valley Bank (the "Revolving Credit Facility"). The Revolving Credit Facility is collateralized by substantially all of the Company's property, other than intellectual property. Since January 1, 2016, the Revolving Credit Facility bears interest rate at the lesser of (i) LIBOR rate plus 1.75% or (ii) prime rate minus 1.0%. In March 2017, the Company amended the Revolving Credit Facility to extend the maturity date by two years and reduce the minimum cash requirements. The weighted-average interest rate of the Revolving Credit Facility was 3.74% and 2.89% for the fiscal years ended December 31, 2018 and 2017, respectively.

The Revolving Credit Facility contains customary negative covenants which, unless waived by the bank, limit the Company's ability to, among other things, incur additional indebtedness, grant liens, make investments, repurchase stock, pay dividends, transfer assets or engage in merger and acquisition activity, including merge or consolidate with a third party. The Revolving Credit Facility also requires the Company to maintain a minimum adjusted quick ratio of 1.25 to 1.00 and a minimum net cash, cash equivalents and short-term investments balance with the bank as of the last day of each month of \$35.0 million and to demonstrate the absence of defined events of default in order to assure full access to the available borrowing. The Revolving Credit Facility also contains customary events of default, subject to customary cure periods for certain defaults, that include, among other things, non-payment defaults, covenant defaults, material judgment defaults, bankruptcy and insolvency defaults, cross-defaults to certain other material indebtedness, and defaults due to inaccuracy of representation and warranties. Upon an event of default, the bank may declare all or a portion of the Company's outstanding obligations to be immediately due and payable and exercise other rights and remedies provided for under the Revolving Credit Facility. During the existence of an event of default, interest on the obligations under the Revolving Credit Facility could be increased by 5.0%. As of December 31, 2018 and 2017, the Company was in compliance with these covenants.

The Revolving Credit Facility currently provides, among other things, (i) a maturity date of March 31, 2019; and (ii) a revolving line up to \$20.0 million, subject to certain conditions.

As of December 31, 2018, \$20.0 million remains outstanding under the Revolving Credit Facility, and the Company classifies this amount as a current liability in the consolidated balance sheet.

5. COMMITMENTS AND CONTINGENCIES

Lease Commitments

The Company currently leases its main office facility in Milpitas, California, which lease is set to expire in June 2023. In addition, the Company leases office space for its subsidiaries in the United Kingdom, the Netherlands, Korea, France and China under non-cancelable operating leases that expire at various times through September 2022. The Company has also entered into various lease agreements in other locations in the United States and globally to support its sales and research and development functions.

The Company recognizes rent expense on a straight-line basis over the lease period. Future minimum lease payments by year under operating leases as of December 31, 2018 are as follows:

Year Ending December 31,	Amount
	(in thousands)
2019	\$ 1,562
2020	1,082
2021	1,071
2022	987
2023	445
Total	<u>\$ 5,147</u>

Rent expense was \$1.9 million, \$1.9 million and \$2.4 million for the fiscal years ended December 31, 2018, 2017 and 2016, respectively.

Capital Lease Obligations

The Company has certain office furniture and equipment that it classifies as capital leases. The terms of the capital leases range from three years to seven years. The interest expense is immaterial in any particular period. Future minimum lease payments by year under capital lease obligations as of December 31, 2018 are as follows:

Year Ending December 31,	Amount
	(in thousands)
2019	\$ 176
2020	171
2021	169
2022	162
2023	83
Total	<u>\$ 761</u>
Less: current portion of capital lease obligations	<u>\$ 176</u>
Non-current portion of capital lease obligations	<u>\$ 585</u>

Manufacturing Commitments

The Company subcontracts with manufacturing companies to manufacture its hardware. The contract manufacturers procure components based on non-cancellable orders the Company places with them. If the Company cancels all or part of an order, the Company is liable to the contract manufacturers for the cost of the related components they purchased under such orders.

As of December 31, 2018 and December 31, 2017, the Company had manufacturing commitments with contract manufacturers for inventory totaling approximately \$5.0 million and \$6.0 million, respectively.

Other Purchase Commitments

In August 2018, the Company amended an agreement with a third-party provider for our use of certain cloud services. Under the non-cancelable addendum, the Company is committed to a minimum purchase of \$11.7 million between September 2018 and August 2021. As of December 31, 2018, the Company's purchase commitment under the addendum was \$10.4 million.

Contingencies

The Company may be subject to legal proceedings and litigation arising from time to time. The Company will record a liability when it believes that it is both probable that a loss has been incurred and the amount can be reasonably estimated. The Company expects periodically to evaluate developments in its legal matters that could affect the amount of liability that it has previously accrued, if any, and make adjustments as appropriate. The Company exercises significant judgment to determine both likelihood of there being, and the estimated amount of, a loss related to such matters, and the Company's judgment may be incorrect. The Company cannot reasonably determine in advance the outcome of any litigation proceeding. Until the final resolution of any such matter for which the Company may be required to accrue, the Company may have an exposure to loss in excess of the amount the Company has accrued, and such excess amount could be significant.

The Company is currently engaged in the following separate security litigations:

In January 2018, three purported class actions were filed in the United States District Court for the Northern District of California against the Company and two of its officers. Those actions were subsequently consolidated into a single action titled as *McGovney v. Aerohive Networks, Inc., et al.*, Case No. 5:18-cv-00435. The consolidated complaint, as amended, alleges that the defendants made false and misleading statements, in particular regarding the Company's financial outlook for the fourth quarter of 2017. The complaint asserts claims for violations of Sections 10(b) and 20(a) of the Exchange Act and SEC Rule 10b-5 on behalf of those who purchased the Company's common stock between November 1, 2017 and January 16, 2018, inclusive. The complaint seeks monetary damages in an unspecified amount.

On March 26, 2018, a purported shareholder derivative complaint was filed in the California Superior Court for the County of Santa Clara against the Company's board of directors and two of its officers. The action is titled *Flores v. Flynn, et.al.*, Case No. 18CV325517. The complaint alleges that the same general conduct alleged in the securities class actions also constituted a breach of fiduciary duty, waste of corporate assets, abuse of control, mismanagement, and unjust enrichment. The complaint seeks monetary damages in an unspecified amount, restitution, and certain changes to the Company's corporate governance and internal procedures. On July 9, 2018, pursuant to a stipulation between the parties, the Court stayed the case until the completion of the motion-to-dismiss stage of the federal class action described above.

In September 2018, Modern Telecom Systems, LLC, or MTS, filed a complaint in the U.S. District Court, for the District of Delaware, asserting that certain of the Company's products which utilize aspects of the IEEE 802.11 standard infringed United States Patent No. 6,504,886 prior to such patent's expiration. The Company is evaluating the possible application of these claims, if any, to its products.

The Company is also engaged in separate litigation in Korea brought by a former employee, who asserted claims that Company wrongfully terminated his employment. Following administrative proceedings, the Company has been ordered to reinstate the employee and pay certain past wages. The Company is appealing this matter to the civil law courts in Korea.

For the fiscal year ended December 31, 2018, the liabilities incurred to settle the above matters were not material to the consolidated financial statements.

The outcomes of the legal proceedings are inherently unpredictable, subject to significant uncertainties, and could be material to the Company's operating results and cash flows for any particular period.

The Company intends to defend these lawsuits vigorously, and is not able to predict or estimate any range of reasonably possible loss related to these lawsuits. If these matters have an adverse outcome, they may have a material impact on the Company's financial position, results of operations or cash flows.

Guarantees

The Company typically enters into agreements with its customers that contain indemnification provisions in the event of claims alleging that the Company's products infringe the intellectual property rights of a third party. The Company has at its option and expense, the ability to resolve any infringement, replace product with a non-infringing product that is equivalent-in-function, or refund to the customers the total product price. These agreements also typically include guarantees of product and service performance. The Company has not recorded a liability related to these indemnification and guarantee provisions and the Company's indemnification and guarantee provisions have not had any impact on the consolidated financial statements to date.

6. STOCKHOLDERS' EQUITY

Common Stock and Preferred Stock

On April 2, 2014, in connection with the IPO, the Company filed an amended and restated certificate of incorporation to increase the amount of common stock authorized for issuance to 500 million shares at par value of \$0.001 per share, and to increase the amount of preferred stock authorized for issuance to 25 million shares with a \$0.001 par value per share.

Each holder of common stock is entitled to one vote for each share of common stock held. As of December 31, 2018 and 2017, the Company had 55,867,619 and 54,171,498 of common stock issued and outstanding, respectively. As of December 31, 2018 and 2017, the Company had no shares of preferred stock issued or outstanding.

Common Stock reserved for Future Issuance

As of December 31, 2018, the Company had reserved shares of common stock for future issuance as follows:

	<u>As of December 31,</u> <u>2018</u>
Common stock reserved for future grants under the 2014 Equity Incentive Plan	9,498,884
Common stock reserved for purchase under the 2014 Employee Stock Purchase Plan	1,252,784
Options and Restricted Stock Units issued and outstanding	7,660,969
Total reserved shares of common stock for future issuance	<u>18,412,637</u>

Stock Repurchase Program

In February 2016, the Company's board of directors authorized a stock repurchase program of up to \$10.0 million, with stock purchases made from time to time in compliance with applicable securities laws in the open market or in privately negotiated transactions. The timing and amounts of any purchases will be based on market conditions and other factors including price, regulatory requirements and capital availability. The authorization does not require that the purchase of any minimum number of shares, and the Company may suspend, modify or discontinue the program at any time without prior notice. In August 2017, the Company's board of directors extended this program to June 30, 2018. In November 2017, the Company's board of directors increased the authorized amount under the stock repurchase program to \$20.0 million. In July 2018, the Company's board of directors extended this program through June 30, 2020.

During the fiscal year ended December 31, 2018, the Company repurchased a total of 1,108,735 shares of its common stock on the open market at a total cost of \$4.4 million with an average price per share of \$3.94. During the fiscal year ended December 31, 2017, the Company repurchased a total of 996,616 shares of its common stock on the open market at a total cost of \$4.1 million with an average price per share of \$4.09. As of December 31, 2018, we had repurchased under this program 2,469,978 shares of our common stock at a total price of \$10.6 million with an average purchase price of \$4.29 per share of the Company's common stock. Approximately \$9.4 million remains available as of December 31, 2018 for repurchases under this program.

7. STOCK-BASED COMPENSATION

2014 Equity Incentive Plan

On March 26, 2014, the Company's 2014 Equity Incentive Plan ("2014 Plan") became effective. On March 27, 2014, the Company terminated its earlier 2006 Global Share Plan ("2006 Plan"), added all reserved-but-unissued shares under the 2006 Plan to the 2014 Plan and rolled into the 2014 Plan all shares underlying stock awards granted under the 2006 Plan that

otherwise would return to the 2006 Plan. The Company may not grant additional awards under the 2006 Plan, but the 2006 Plan will continue to govern outstanding awards previously granted under the 2006 Plan.

The 2014 Plan provides for the grant of incentive stock options within the meaning of Section 422 of the Internal Revenue Code, only to employees of the Company or any parent or subsidiary of the Company, and for the grant of nonstatutory stock options, restricted stock, restricted stock units, stock appreciation rights, performance units and performance shares to employees, directors and consultants of the Company, and the employees and consultants of any parent or subsidiary of the Company.

The 2014 Plan provides for automatic annual increases in the number of shares reserved for issuance. On the first day of each fiscal year beginning January 1, 2017 through January 1, 2024, the number of shares of common stock reserved for issuance under the 2014 Plan may increase by an amount equal to the least of (i) 4,000,000 Shares, (ii) 5% of the Company's outstanding shares on the last day of the immediately preceding fiscal year, or (iii) such number of shares determined by the board of directors. In January 2018, the Company effected an increase of the 2,708,575 number of shares reserved under the 2014 Plan. As of December 31, 2018, the Company had 9,498,884 total shares of common stock reserved and available for grant under the 2014 Plan.

The following table summarizes the total number of shares available for grant under the 2014 Plan as of December 31, 2018:

	Shares Available for Grant
Balance, December 31, 2017	7,997,691
Authorized	2,708,575
Options granted	—
Options canceled	657,715
Awards granted	(3,570,032)
Awards canceled	1,704,935
Balance, December 31, 2018	9,498,884

Stock Options

The following table summarizes the information about outstanding stock option activity:

	Options Outstanding			
	Number of Shares Underlying Outstanding Options	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term (Years)	Aggregate Intrinsic Value
				(in thousands)
Balance, December 31, 2017	4,247,911	\$ 6.03	5.80	\$ 4,472
Options granted	—	—		
Options exercised	(148,191)	1.17		
Options canceled	(657,715)	7.33		
Balance, December 31, 2018	3,442,005	\$ 5.99	4.61	\$ 1,546
Options exercisable, December 31, 2018	3,255,141	\$ 5.96	4.49	\$ 1,546

The weighted-average grant-date fair value of options granted was \$3.15 per share for the fiscal year ended December 31, 2016. The aggregate grant-date fair value of the Company's stock options granted was \$3.0 million for the fiscal years ended December 31, 2016. There were no options granted during the fiscal year ended December 31, 2017 and 2018.

The aggregate intrinsic value of stock options exercised was \$0.4 million, \$1.3 million and \$1.8 million for the fiscal years ended December 31, 2018, 2017 and 2016, respectively. The intrinsic value for each share underlying an option represents the difference between the option exercise price per share and the closing stock price of a share of the Company's common stock. The total grant-date fair value of the options vested was \$1.4 million, \$2.8 million and \$7.0 million for the fiscal years ended December 31, 2018, 2017 and 2016, respectively.

The stock options outstanding and exercisable under the Company's stock option plan as of December 31, 2018, are as follows:

Range of Exercise Prices	Options Outstanding			Options Vested and Exercisable	
	Number of Options Outstanding	Weighted Average Remaining Contractual Term (Years)	Weighted Average Exercise Price per Share	Number of Options Exercisable	Weighted Average Exercise Price per Share
\$0.25 - \$2.05	805,845	2.41	\$ 1.35	805,845	\$ 1.35
\$2.28 - \$6.00	685,477	3.92	5.85	670,477	5.86
\$6.09 - \$7.15	1,105,000	6.77	6.70	941,144	6.71
\$7.48 - \$10.00	758,263	4.47	9.42	750,255	9.44
\$11.05 - \$11.31	87,420	4.40	11.15	87,420	11.15
	<u>3,442,005</u>	4.61	\$ 5.99	<u>3,255,141</u>	\$ 5.96

Restricted Stock Units

The Company currently grants Restricted Stock Units ("RSUs") to certain employees and directors. The RSUs vest over a period of time, generally one to three years, and are subject to the participant's continuing service to the Company over that period. Until vested, RSUs do not have the voting and dividend participation rights of common stock and the shares underlying the awards are not considered issued and outstanding.

The following is a summary of the Company's RSU activity and related information for the fiscal year ended December 31, 2018:

	Restricted Stock Units Outstanding	
	Shares	Weighted Average Grant Date Fair Value Per Share
Balance, December 31, 2017	4,089,067	\$ 6.47
Awards granted	3,570,032	4.02
Awards vested	(2,377,035)	5.14
Awards canceled	(1,063,100)	5.04
Balance, December 31, 2018	<u>4,218,964</u>	<u>\$ 4.35</u>

The weighted-average grant-date fair value of RSUs granted was \$4.02, \$4.89 and \$6.20 per share for the fiscal years ended December 31, 2018, 2017 and 2016, respectively. The aggregate grant-date fair value of RSUs granted for the fiscal years ended December 31, 2018, 2017 and 2016 was \$14.3 million, \$17.1 million and \$20.4 million, respectively. The aggregate fair value of shares vested during the fiscal years ended December 31, 2018, 2017 and 2016 was \$12.2 million, \$10.9 million and \$12.5 million, respectively.

The number of RSUs vested during a particular period includes shares that the Company withheld during the period on behalf of certain employees to satisfy the minimum statutory tax withholding requirements, as determined by the Company. During the fiscal years ended December 31, 2018, 2017 and 2016, the Company withheld 641,835, 298,817 and 188,984 shares of stock, respectively, for an aggregate value of \$2.6 million, \$1.2 million and \$1.1 million, respectively. The Company returned such withheld shares to the 2014 Plan, which were then available under the plan terms for future issuance.

The Company granted 378,644 shares of RSUs as performance-based restricted stock units ("PBRsUs") to certain executives during the year ended December 31, 2017, pursuant to the 2014 Plan. Each PBRsU represents the right to receive one share of the Company's common stock upon vesting, subject to the Company's achievement of certain performance conditions. 251,037 of these PBRsU awards vested during the year ended December 31, 2018. The aggregate fair value of these PBRsUs vested during the fiscal year ended December 31, 2018 was approximately \$1.2 million. For certain PBRsUs, to the

extent the 2017 and 2018 performance metrics has not been met, the remaining portion of unvested shares will be subject to vesting in the upcoming fiscal year based on the annual performance target for the fiscal year 2019. The remaining shares were cancelled due to termination or not achieving certain performance metrics. At each reporting period, the Company assesses the probability of the number of these PBRsUs expected to vest based on its achievement of the performance condition. Approximately 14,014 of these PBRsUs remain outstanding as of December 31, 2018 which are expected to vest during fiscal year 2019. The Company did not grant any PBRsU awards during the year ended December 31, 2018.

The Company granted 351,500 and 358,000 shares of RSUs as market-based restricted stock units ("MBRSUs") to certain executives, excluding CEO, during the year ended December 31, 2018 and 2017 respectively, pursuant to the 2014 Plan. Each MBRSU represents the right to receive one share of the Company's common stock upon vesting subject to the Company's achievement of certain stock price targets. The Company estimated the fair value of the MBRSUs using the Monte Carlo option-pricing model as of the date of grant as the MBRSUs contain both market and service conditions. The weighted-average grant-date fair value of these MBRSUs was \$3.05 and \$4.18 per share, respectively. The Company records the total expense related to all of the MBRSUs on a graded-vesting method over the estimated term. 139,000 shares of these MBRSU awards vested during the year ended December 31, 2018. The aggregate fair value of these MBRSUs vested during the fiscal year ended December 31, 2018 was approximately \$0.6 million.

2014 Employee Stock Purchase Plan

The 2014 Employee Stock Purchase Plan ("ESPP") is a ten-year plan, effective in March 2014. The ESPP authorizes the Company to issue shares of common stock pursuant to purchase rights it grants to its employees and those of its designated subsidiaries. The ESPP provides for automatic annual increases in the number of shares reserved for issuance. Under the ESPP, on the first day of fiscal year 2017, the number of shares of common stock reserved and available for issuance increased by 1,000,000 shares. On the first day of each fiscal year beginning January 1, 2018 through January 1, 2024, the number of shares of common stock reserved for issuance may increase in an amount equal to the least of (i) 1,000,000 shares, (ii) 1.0% of the Company's outstanding shares on the first day of the applicable fiscal year, or (iii) such number of shares determined by the board of directors. In January 2018, the Company effected an increase of 541,715 shares reserved under the ESPP. As of December 31, 2018, the Company had 1,252,784 total shares of common stock reserved and available for issuance under the ESPP.

Under the ESPP, the Company grants stock purchase rights to all eligible employees, currently covering a one-year offering period ending December 1, 2019. During the fiscal year ended December 31, 2018, the Company granted stock purchase rights to all eligible employees covering a one-year offering period ended December 1, 2018, with purchase dates at the end of each interim six-month purchase period. Employees purchase shares using employee payroll deductions at purchase prices equal to 85% of the lesser of the fair market value of the Company's common stock at either the first day of each offering period or the date of purchase. The ESPP currently has a reset provision: If the closing price of the Company's common stock on the last day of any purchase period during an offering period is lower than the closing sales price on the first day of the related offering period, that offering period will terminate upon the purchase of shares for such purchase period and participants will be automatically re-enrolled in the immediately following offering period. As a result, the reference price for purposes of determining the purchase price of shares for subsequent purchase periods for all participants of the new offering period resets to such lower price. No participant may purchase more than \$25,000 worth of common stock in any calendar year, or 5,000 shares of common stock in any six-month purchase period. For the fiscal years ended December 31, 2018, 2017 and 2016, the Company issued 921,465, 943,071 and 1,209,410 shares under the ESPP, respectively.

Determination of Fair Values

The Company determines the expected term of employee stock options using the simplified method as provided by the Securities and Exchange Commission. The Company presumes the simplified method to be the average of the time-to-vesting and the contractual life of the options. The Company bases the expected term of ESPP purchase rights on the contractual terms. Since the Company has not had sufficient public trading history of its common stock, the Company derives the expected volatility from the historical stock volatilities of the common stock of several publicly traded comparable companies over a period approximately equal to the expected term of the expected life of the options. The Company bases the risk-free interest rate on the U.S. treasury yield curve in effect at the time of grant for zero-coupon U.S. treasury notes with maturities equal to the option's expected term. The Company assumes the expected dividend to be zero as the Company has never paid dividends and has no current plans to do so.

The Company used the following weighted-average assumptions to value the Company's stock options granted:

	Year Ended December 31,		
	2018	2017	2016
Stock options:			
Expected term (in years)	N/A	N/A	5.78
Expected volatility	N/A	N/A	55%
Risk free interest rate	N/A	N/A	1.49%
Dividend rate	N/A	N/A	—%

N/A - Not applicable. No options granted in those years.

The Company used the following weighted-average assumptions to value MBRSUs under the Monte Carlo model:

	Year Ended December 31,		
	2018	2017	2016
MBRSUs:			
Expected volatility	44%	46%	53%
Risk free interest rate	2.61%	1.45%	1.07%

N/A - Not applicable. No MBRSUs granted in those years.

The Company used the following weighted-average assumptions to value employee stock purchase rights under the Black-Scholes model:

	Year Ended December 31,		
	2018	2017	2016
ESPP purchase rights:			
Expected term (in years)	0.5 - 1.00	0.5 - 1.00	0.5 - 1.00
Expected volatility	37% - 52%	34% - 48%	34% - 44%
Risk free interest rate	1.45% - 2.70%	0.60% - 1.62%	0.49% - 0.82%

Stock-based Compensation Expense

The Company recognized the following total stock-based compensation expense related to the stock-based awards in the consolidated statements of operations:

	Year Ended December 31,		
	2018	2017	2016
	(in thousands)		
Cost of revenue	\$ 913	\$ 1,132	\$ 1,305
Research and development	4,178	4,171	5,393
Sales and marketing	4,325	5,103	8,269
General and administrative	5,467	6,269	6,735
Total stock-based compensation	\$ 14,883	\$ 16,675	\$ 21,702

The following table presents stock-based compensation expense by award-type:

	Year Ended December 31,		
	2018	2017	2016
	(in thousands)		
Stock Options	\$ 1,472	\$ 2,976	\$ 4,933
Restricted Stock Units	11,744	12,192	14,316
Employee Stock Purchase Plan	1,667	1,507	2,453
Total stock-based compensation	\$ 14,883	\$ 16,675	\$ 21,702

The stock-based compensation expense recorded for restricted stock units for fiscal years 2018, 2017 and 2016 includes the amount of stock-based compensation recorded for PBRU's of approximately \$0.2 million, \$1.0 million and \$0.8 million, respectively and MBRU's of approximately \$1.0 million, \$1.0 million and \$0.8 million, respectively.

As of December 31, 2018, unrecognized stock-based compensation related to outstanding stock options, RSUs (including PBRU's and MBRU's) and ESPP purchase rights was \$0.5 million, \$15.0 million and \$1.3 million, respectively, which the Company expects to recognize over weighted-average periods of 0.51 years, 1.84 years and 0.92 years, respectively.

8. NET LOSS PER SHARE

The Company calculates basic and diluted net loss per share by dividing the net loss by the weighted-average number of common shares outstanding during the period. Diluted net loss per share is the same as basic net loss per share, since the effects of potentially dilutive securities are antidilutive.

The following table presents the computation of basic and diluted net loss per share:

	Year Ended December 31,		
	2018	2017	2016
		(As Adjusted)	(As Adjusted)
	(in thousands, except for share and per share data)		
Numerator:			
Net loss	\$ (18,337)	\$ (22,106)	\$ (38,216)
Denominator:			
Weighted-average shares used to compute net loss per share, basic and diluted	55,050,119	53,227,342	50,332,872
Net loss per share:			
Basic and diluted	\$ (0.33)	\$ (0.42)	\$ (0.76)

The Company excluded the following period-end outstanding common stock equivalents from the computation of diluted net loss per share for the periods presented because including them would have been antidilutive:

	Year Ended December 31,		
	2018	2017	2016
Shares of common stock issuable under the Equity Incentive Plan	7,660,969	8,336,978	10,585,444
Employee Stock Purchase Plan	116,112	82,625	99,680
Total	7,777,081	8,419,603	10,685,124

9. INCOME TAXES

The geographical breakdown of the Company's loss before income taxes for the fiscal years ended December 31, 2018, 2017 and 2016 is as follows:

	Year Ended December 31,		
	2018	2017	2016
		(As Adjusted)	(As Adjusted)
	(in thousands)		
Domestic	\$ (11,832)	\$ (15,168)	\$ (28,826)
Foreign	(6,345)	(6,335)	(9,122)
Loss before income Taxes	\$ (18,177)	\$ (21,503)	\$ (37,948)

The components of the income tax provision are as follows:

	Year Ended December 31,		
	2018	2017	2016
	(in thousands)		
Current:			
State	\$ (19)	\$ 13	\$ 23
Federal	—	—	—
Foreign	183	506	237
Total current	\$ 164	\$ 519	\$ 260
Deferred:			
State	\$ 4	\$ 1	\$ —
Federal	1	(60)	12
Foreign	(9)	143	(3)
Total deferred	\$ (4)	\$ 84	\$ 9
Total income tax provision	\$ 160	\$ 603	\$ 269

The Company has intercompany services agreements with its subsidiaries located in the United Kingdom, Netherlands, New Zealand, Australia, Canada and China, which requires payment for services rendered by these subsidiaries at an arm's-length transaction price. The foreign tax expense represents foreign income tax payable by these subsidiaries on profit generated on intercompany services agreements.

Undistributed earnings of the Company's foreign subsidiaries were approximately \$12.3 million, \$11.0 million, and \$10.0 million as of December 31, 2018, 2017 and 2016, respectively, and the Company considers them to be permanently reinvested outside of the United States. As such, no U.S. income taxes have been provided for on these earnings.

The reconciliation of federal statutory income tax provision to the Company's effective income tax provision is as follows:

	Year Ended December 31,		
	2018	2017	2016
	(in thousands)		
U.S. federal taxes at statutory tax rate	\$ (3,817)	\$ (7,311)	\$ (12,902)
State taxes, net of federal benefit	(12)	10	15
Change in valuation allowance	2,202	(17,224)	9,062
Foreign tax rate differential	1,506	2,802	3,334
Tax rate change	—	20,999	—
Stock-based compensation	940	2,006	1,805
Tax credits	(740)	(516)	(947)
Other	81	(163)	(98)
Provision for income taxes	\$ 160	\$ 603	\$ 269

Foreign tax rate differential is primarily due to losses incurred in foreign jurisdictions that are subject to tax rates that are lower than the United States tax rate.

The tax effects of temporary differences that give rise to significant components of the Company's deferred tax assets for federal and state income taxes are as follows:

	As of December 31,	
	2018	2017
	(in thousands)	
Deferred tax assets:		
Net operating loss carryforwards	\$ 33,487	\$ 30,522
Research and development credits	9,364	8,053
Accruals and reserves	2,729	2,781
Deferred revenue	7,990	8,278
Stock-based compensation	2,546	2,573
Other	246	190
Gross deferred tax assets	56,362	52,397
Valuation allowance	(54,356)	(50,112)
Total deferred tax assets	\$ 2,006	\$ 2,285
Deferred tax liabilities:		
Internally developed software	\$ (377)	\$ (687)
Deferred Commission	(1,503)	(1,468)
Goodwill	(66)	(55)
Gross deferred tax liabilities	\$ (1,946)	\$ (2,210)
Net deferred tax asset (liabilities)	\$ 60	\$ 75

Realization of deferred tax assets is dependent on future taxable income, the existence and timing of which is uncertain. Based on the Company's history of losses, management has determined it cannot conclude that it is more likely than not that the deferred tax assets will be realized, and accordingly has placed a full valuation allowance on the net deferred tax assets. The Company recorded a full valuation allowance of \$54.4 million and \$50.1 million against its deferred tax assets as of December 31, 2018 and 2017.

The undistributed earnings from the Company's profitable foreign subsidiaries are not subject to a U.S. tax provision because it is management's intention to permanently reinvest such undistributed earnings outside of the United States. The Company evaluates its circumstances and reassesses this determination on a periodic basis. As of December 31, 2018, the determination of the unrecorded deferred tax liability related to these earnings was immaterial. If circumstances change and it becomes apparent that some or all of the undistributed earnings of the Company's foreign subsidiaries will be remitted in the foreseeable future, the Company will be required to recognize a deferred tax liability on those amounts.

The net operating loss and tax credit carryforwards as of December 31, 2018, are as follows:

	Amount	Year Begin to Expire
	(in thousands)	
Net operating losses, federal	\$ 132,248	2026
Net operating losses, state	85,727	2019
Research and development credits, federal	7,211	2026
Research and development credits, state	8,637	No expiration

Utilization of the net operating loss carryforwards and credits may be subject to a substantial annual limitation due to the ownership change limitations provided by the Internal Revenue Code of 1986, as amended ("Code"), and similar state provisions. The annual limitation may result in the expiration of net operation losses and credits before utilization. The Company completed an analysis under Sections 382 and 383 of the Code through the fiscal year ended December 31, 2017 and determined that an ownership change, as defined under Sections 382 and 383 of the Code, had not occurred. Future ownership changes may limit the Company's ability to utilize its net operating loss and credit carryforwards.

Uncertain Tax Positions

The following is a reconciliation of the beginning and ending amount of the Company's total gross unrecognized tax benefit liabilities:

	Year Ended December 31,		
	2018	2017	2016
	(in thousands)		
Gross unrecognized tax benefit - beginning balance	\$ 4,801	\$ 4,441	\$ 3,316
Increases (decreases) related to tax positions from prior years	150	(359)	(21)
Increases related to tax positions taken during current year	638	719	1,146
Gross unrecognized tax benefit - ending balance	\$ 5,589	\$ 4,801	\$ 4,441

The Company maintains liabilities for uncertain tax positions. These liabilities involve considerable judgment and estimation and are continuously monitored by management based on the best information available, including changes in tax regulations, the outcome of relevant court cases, and other information. The Company recognizes potential accrued interest and penalties related to unrecognized tax benefits as income tax expense. During the fiscal years ended December 31, 2018, 2017 and 2016, the Company accrued an insignificant amount of interest and penalties related to unrecognized tax benefits.

The Company's total unrecognized tax benefit, if recognized, would affect its effective tax rate by \$0.06 million. The remainder of the unrecognized tax benefits would be offset by a change in the valuation allowance. While it is often difficult to predict the final outcome of any particular uncertain tax position, the Company does not believe that the amount of unrecognized tax benefits will change significantly in the next 12 months.

The Company files income tax returns in the U.S. federal, various U.S. state and foreign tax jurisdictions. The Company is currently subject to U.S. federal and various state income tax examinations for the 2006 through 2017 calendar tax years.

Fiscal years outside the normal statutes of limitation remain open to audit by tax authorities due to tax attributes generated in those early years which have been carried forward and may be audited in subsequent years when utilized. The Company is not currently being audited in any jurisdiction.

On December 22, 2017, the U.S. government enacted comprehensive tax legislation commonly referred to as the Tax Cuts and Jobs Act (the "TCJA"). The TCJA reduces the U.S. statutory corporate tax rate to 21%, effective January 1, 2018. Consequently, the Company recorded a decrease to its federal deferred tax assets of \$21.0 million, which was fully offset by a reduction in the Company's valuation allowance of \$21.0 million for the fiscal year ended December 31, 2017. The other provisions of the TCJA, including the one-time transition tax on the mandatory deemed repatriation of cumulative foreign earnings, did not have a material impact on the Company's financial statements as of December 31, 2018.

Further on December 22, 2017, the SEC staff issued Staff Accounting Bulletin No. 118, *Income Tax Accounting Implications of the Tax Cuts and Jobs Act* ("SAB 118"), which allowed companies to record provisional amounts during a measurement period not to extend beyond one year from the TCJA enactment date. The Company's accounting for the TCJA is complete and the Company did not have any significant adjustments to the provisional amounts recorded as of December 31, 2017. As of December 22, 2018, the Company have completed the accounting for the income tax effects of the TCJA.

Additionally, the TCJA creates a new requirement that certain income (i.e., GILTI) earned by controlled foreign corporations (CFCs) must be included currently in the gross income of the CFCs' U.S. shareholder. Under U.S. GAAP, the Company is allowed to make an accounting policy election of either (1) treating taxes due on future U.S. inclusions in taxable income related to GILTI as a current-period expense when incurred (the "period cost method") or (2) factoring such amounts into a Company's measurement of its deferred taxes (the "deferred method"). The Company selected the period cost method.

10. SEGMENT INFORMATION

The Company's chief operating decision maker (CODM) is its Chief Executive Officer. The Company derives its revenue primarily from sales of products and subscription and support services. The Company's CODM reviews financial information presented on a consolidated basis for purposes of allocating resources and evaluating financial performance. Accordingly, the Company determined that it operates as one reportable and operating segment.

The following table represents the Company's revenue based on the billing address of the respective channel partners:

	Year Ended December 31,		
	2018	2017	2016
		(As Adjusted)	(As Adjusted)
	(in thousands)		
Americas	\$ 91,556	\$ 96,706	\$ 102,487
Europe, Middle East and Africa	50,021	44,676	49,792
Asia Pacific	13,332	12,176	15,559
Total revenues	\$ 154,909	\$ 153,558	\$ 167,838

The Company has included within the Americas in the above table revenue from sales in the United States of \$83.8 million, \$90.0 million and \$94.7 million, respectively for the fiscal years ended December 31, 2018, 2017 and 2016, respectively. Aside from the United States, no country comprised 10% or more of the Company's total revenue for each of the fiscal years ended December 31, 2018, 2017 and 2016.

The following table summarizes the property and equipment, net by location:

	As of December 31,	
	2018	2017
	(in thousands)	
United States	\$ 4,514	\$ 5,323
People's Republic of China	1,269	875
Europe, Middle East and Africa	164	183
Total property and equipment, net	\$ 5,947	\$ 6,381

11. SUBSEQUENT EVENTS

In January 2019, the Company authorized an increase of approximately 2.8 million shares of common stock reserved for issuance under the 2014 Equity Incentive Plan and an increase of 0.6 million shares of common stock reserved for issuance under the 2014 Employee Stock Purchase Plan. The Company's board of directors approved the increases pursuant to the "evergreen" provisions of the respective plans.

In January 2019, the Company entered into a fourth amendment of its revolving credit facility with Silicon Valley Bank, to extend the revolving line maturity date to March 31, 2021 and to adjust the interest on our outstanding borrowings to the lesser of (i) LIBOR rate plus 1.50% or (ii) prime rate minus 1.25%, or lesser of (i) LIBOR rate plus 1.75% or (ii) prime rate minus 1.00% depending on the provisions of the loan agreement.

12. UNAUDITED SELECTED QUARTERLY FINANCIAL DATA

The following table sets forth the Company's consolidated statements of operations data for the eight quarters ended December 31, 2018. The Company prepared this unaudited quarterly information on the same basis as the Company's audited consolidated financial statements and, in management's opinion, the following includes all adjustments, consisting only of normal recurring adjustments, necessary for the fair presentation of this data.

	Three Months Ended							
	Dec 31, 2018	Sept 30, 2018	June 30, 2018	March 31, 2018	Dec 31, 2017	Sept 30, 2017	June 30, 2017	March 31, 2017
					(As Adjusted)	(As Adjusted)	(As Adjusted)	(As Adjusted)
(In thousands)								
Revenue:								
Product	\$ 25,587	\$ 28,817	\$ 29,268	\$ 25,066	\$ 24,899	\$ 29,162	\$ 32,105	\$ 26,967
Subscription and support	12,528	11,735	11,207	10,701	10,828	10,139	10,096	9,362
Total revenue	38,115	40,552	40,475	35,767	35,727	39,301	42,201	36,329
Cost of revenue:								
Product	9,648	10,595	10,379	8,671	7,951	9,880	10,470	8,815
Subscription and support	3,481	3,344	3,383	3,404	3,320	3,244	3,153	3,176
Total cost of revenue	13,129	13,939	13,762	12,075	11,271	13,124	13,623	11,991
Gross profit	24,986	26,613	26,713	23,692	24,456	26,177	28,578	24,338
Operating expenses:								
Research and development	9,257	8,529	8,581	9,279	8,386	9,260	9,222	9,550
Sales and marketing	14,837	15,449	15,731	15,670	14,384	16,153	17,411	17,437
General and administrative	6,039	5,243	5,272	5,954	5,608	5,700	5,489	6,297
Operating loss	(5,147)	(2,608)	(2,871)	(7,211)	(3,922)	(4,936)	(3,544)	(8,946)
Interest income	505	437	337	289	236	180	164	140
Interest expense	(205)	(196)	(183)	(164)	(155)	(135)	(147)	(130)
Other income (expense), net	(950)	(6)	(31)	(173)	(40)	(90)	(93)	(85)
Loss before income taxes	(5,797)	(2,373)	(2,748)	(7,259)	(3,881)	(4,981)	(3,620)	(9,021)
Provision for (benefit from) income taxes	(42)	60	84	58	234	75	197	97
Net loss	\$ (5,755)	\$ (2,433)	\$ (2,832)	\$ (7,317)	\$ (4,115)	\$ (5,056)	\$ (3,817)	\$ (9,118)

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

None.

ITEM 9A. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

Our management is responsible for establishing and maintaining adequate internal control over financial reporting. Management, with the participation of our chief executive officer and our chief financial officer, evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2018. The term "disclosure controls and procedures," as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act, means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC's rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the company's management, including its principal executive and principal financial officers, as appropriate to allow timely

decisions regarding required disclosure. Management recognizes that any controls and procedures, no matter how well-designed and operated, can provide only reasonable assurance of achieving their objectives, and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on the evaluation of our disclosure controls and procedures as of December 31, 2018, our chief executive officer and chief financial officer concluded that, as of such date, our disclosure controls and procedures were effective at the reasonable assurance level.

Management's Annual Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Rule 13a-15 (f) under the Exchange Act). Management conducted an assessment of the effectiveness of our internal control over financial reporting based on the criteria set forth in Internal Control - Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework). Based on the assessment, management has concluded that its internal control over financial reporting was effective as of December 31, 2018 to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements in accordance with U.S. GAAP.

Changes in Internal Control over Financial Reporting

There were no changes in our internal control over financial reporting identified in connection with the evaluation required by Rule 13a-15 (d) and 15d-15(d) of the Exchange Act that occurred during the quarter ended December 31, 2018 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

ITEM 9B. OTHER INFORMATION

None.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS, AND CORPORATE GOVERNANCE

The information required by this item is incorporated by reference to our Proxy Statement for our 2019 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year ended December 31, 2018.

ITEM 11. EXECUTIVE COMPENSATION

The information required by this item is incorporated by reference to our Proxy Statement for our 2019 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year ended December 31, 2018.

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

The information required by this item is incorporated by reference to our Proxy Statement for our 2019 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year ended December 31, 2018.

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

The information required by this item is incorporated by reference to our Proxy Statement for our 2019 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year ended December 31, 2018.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The information required by this item is incorporated by reference to our Proxy Statement for our 2019 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year ended December 31, 2018.

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

Documents filed as part of this report are as follows:

1. Consolidated Financial Statements

Our Consolidated Financial Statements are listed in the “Index to Consolidated Financial Statements” Under Part II, Item 8 of this report.

2. Financial Statement Schedules

All financial statement schedules are omitted because the information called for is not required or is shown either in the consolidated financial statements or in the notes thereto.

3. Exhibits

- [3.1](#) [Eighth Amended and Restated Certificate of Incorporation of the Company, as amended, as currently in effect.](#)
- [3.2](#) [Amended and Restated Bylaws of the Company.](#)
- [4.7](#) [Specimen common stock certificate of the Company.](#)
- [10.1+](#) [Form of Indemnification Agreement between the Company and each of its directors and executive officers.](#)
- [10.2+](#) [2006 Global Share Plan, as amended, effective April 1, 2017.](#)
- [10.3+](#) [2014 Equity Incentive Plan, as amended, effective April 1, 2017.](#)
- [10.4+](#) [2014 Employee Stock Purchase Plan, as amended July 18, 2018 and form of agreement thereunder.](#)
- [10.5+](#) [Offer Letter, dated January 16, 2007, by and between the Company and David K. Flynn.](#)
- [10.6+](#) [Offer Letter, effective December 11, 2012, by and between the Company and Steve Debenham.](#)
- [10.7+](#) [Offer Letter dated August 27, 2015 by and between the Company and John Ritchie.](#)
- [10.8+](#) [Form of Separation and Change in Control Severance Agreement, entered into by and between the Company and certain executive officers.](#)
- [10.9+](#) [Form of Amendment to Separation and Change in Control Agreement, entered into by and between the Company and certain executive officers.](#)
- [10.10+](#) [Amended and Restated Separation and Change in Control Severance Agreement, effective as of April 1, 2018, by and between the Company and David K. Flynn.](#)
- [10.11+](#) [Separation and Change in Control Severance Agreement, effective as of October 1, 2013, by and between the Company and Steve Debenham.](#)
- [10.12+](#) [Form of Separation and Change in Control Severance Agreement, entered into by and between the Company and certain of its senior officers.](#)
- [10.13+](#) [Separation and Change in Control Severance Agreement, effective as of August 31, 2015, by and between the Company and John Ritchie.](#)
- [10.14](#) [Premises Lease Contract, effective October 1, 2013, by and between CECEP Industry Development C.I.C., Ltd. and Aerohive Networks \(Hangzhou\) Co., Ltd.](#)
- [10.15](#) [Lease of First Floor Offices, South Block, West Block and Lower Ground Offices, South Block, The Courtyard, 16-18 West Street, Farnham, Surrey, GU9 7DR, dated September 21, 2017, by and between Ecclesiastical Insurance Office PLC and Aerohive Networks Europe Limited.](#)
- [10.16](#) [Amended and Restated Loan and Security Agreement, dated as of February 18, 2016, by and between the Company and Silicon Valley Bank.](#)
- [10.17](#) [First Amendment dated as of March 21, 2017, to Amended and Restated Loan and Security Agreement, dated as of February 18, 2016, by and between the Company and Silicon Valley Bank.](#)
- [10.18](#) [Second Amendment, to Amended and Restated Loan and Security Agreement, dated August 22, 2017, by and between the Company and Silicon Valley Bank.](#)
- [10.19+](#) [Executive Incentive Compensation Plan.](#)
- [10.20+](#) [Outside Director Compensation Policy \(Amended as of May 10, 2016\).](#)
- [10.21+](#) [Form of Stock Option Agreement.](#)
- [10.22+](#) [Form of Restricted Stock Unit Agreement.](#)
- [10.23+](#) [Form of Performance-Based Stock Option Agreement.](#)
- [10.24+](#) [Form of Performance-Based Restricted Stock Unit Agreement.](#)
- [10.25](#) [Sublease Agreement, dated February 3, 2016, by and between Bayer Healthcare LLC and Aerohive Networks, Inc.](#)
- [10.26+](#) [Offer Letter dated November 16, 2015 by and between the Company and Alan Amrod.](#)
- [10.27+](#) [Amended and Restated Separation and Change in Control Severance Agreement, effective as of April 1, 2018, by and between the Company and Alan Amrod.](#)
- [10.28+](#) [Executive Temporary Relocation Agreement dated April 19, 2018, by and between the Company and Alan Amrod.](#)
- [10.1](#) [Third Amendment to Amended and Restated Loan and Security Agreement, dated December 11, 2017, by and between the Company and Silicon Valley Bank.](#)
- [10.2](#) [Fourth Amendment to Amended and Restated Loan and Security Agreement, dated January 31, 2019, by and between the Company and Silicon Valley Bank.](#)
- [10.3](#) [Outside Director Compensation Policy \(Amended as of February 1, 2019\).](#)

<u>21.1</u>	<u>List of subsidiaries of the Company.</u>
<u>23.1</u>	<u>Consent of Deloitte and Touche LLP, Independent Registered Public Accounting Firm.</u>
<u>24.1</u>	<u>Power of Attorney (included on the signature page to the 10-K).</u>
<u>31.1^</u>	<u>Certification of Chief Executive Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.</u>
<u>31.2^</u>	<u>Certification of Chief Financial Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.</u>
<u>32.1^</u>	<u>Certification of Chief Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.</u>
<u>32.2^</u>	<u>Certification of Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.</u>
101.INS	XBRL Instance Document.
101.SCH	XBRL Taxonomy Extension Schema Document.
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document.
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document.
101.LAB	XBRL Taxonomy Extension Labels Linkbase Document.
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document.

+ Indicates a management contract or compensation plan.

^ In accordance with Item 601(b)(32)(ii) of Regulation S-K and SEC Release Nos. 33-8238 and 34-47986, Final Rule; Management's Reports on Internal Control over Financial Reporting and Certification of Disclosure in Exchange Act Periodic Reports, the Certification furnished in Exhibit 32.1 and 32.2 hereto is deemed to accompany this Form 10-K and will not be filed for purposes of Section 18 of the Exchange Act. Such certification will not be deemed incorporated by reference into any filing under the Securities Act or the Exchange Act, except to the extent that the Registrant specifically incorporates it by reference.

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, on the 1st day of March 2019.

AEROHIVE NETWORKS, INC.

By: /s/ David K. Flynn

David K. Flynn

President and Chief Executive Officer

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints David K. Flynn and John Ritchie and each of them, his attorneys-in-fact, each with the power of substitution, for him in any and all capacities, to sign any and all amendments to this Annual Report on Form 10-K and to file the same, with exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, hereby ratifying and confirming all that each of said attorneys-in-fact, or his substitute or substitutes, may do or cause to be done by virtue hereof.

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 and on the dates indicated:

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ David K. Flynn</u> David K. Flynn	President, Chief Executive Officer and Chair of the Board (Principal Executive Officer)	March 1, 2019
<u>/s/ John Ritchie</u> John Ritchie	Chief Financial Officer (Principal Accounting and Financial Officer)	March 1, 2019
<u>/s/ Remo Canessa</u> Remo Canessa	Director	March 1, 2019
<u>/s/ Curt Garner</u> Curt Garner	Director	March 1, 2019
<u>/s/ Frank J. Marshall</u> Frank J. Marshall	Director	March 1, 2019
<u>/s/ John Gordon Payne</u> John Gordon Payne	Director	March 1, 2019
<u>/s/ Conway 'Todd' Rulon-Miller</u> Conway 'Todd' Rulon-Miller	Director	March 1, 2019
<u>/s/ Christopher J. Schaepe</u> Christopher J. Schaepe	Director	March 1, 2019

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Section 2: EX-10.1 (EXHIBIT 10.1)

THIRD AMENDMENT TO AMENDED AND RESTATED LOAN AND SECURITY AGREEMENT

THIS THIRD AMENDMENT TO AMENDED AND RESTATED LOAN AND SECURITY AGREEMENT (this “**Amendment**”) is entered into this 11 day of December, 2017, by and between **SILICON VALLEY BANK**, a California

corporation (“**Bank**”) and **AEROHIVE NETWORKS, INC.**, a Delaware corporation (“**Borrower**”).

RECITALS

A. Bank and Borrower have entered into that certain Amended and Restated Loan and Security Agreement dated as of February 18, 2016 (as the same may from time to time be further amended, modified, supplemented or restated, the “**Loan Agreement**”).

B. Bank has extended credit to Borrower for the purposes permitted in the Loan Agreement.

C. Borrower has requested that Bank amend the Loan Agreement to make certain revisions to the Loan Agreement as more fully set forth herein.

D. Bank has agreed to so amend certain provisions of the Loan Agreement, but only to the extent, in accordance with the terms, subject to the conditions and in reliance upon the representations and warranties set forth below.

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing recitals and other good and valuable consideration, the receipt and adequacy of which is hereby acknowledged, and intending to be legally bound, the parties hereto agree as follows:

1. Definitions. Capitalized terms used but not defined in this Amendment, including its preamble and recitals, shall have the meanings given to them in the Loan Agreement.

2. Amendments to Loan Agreement.

2.1 Section 13 (Definitions).

(a) The following new defined term is hereby inserted alphabetically in Section 13.1 of the Loan Agreement:

“**Liquidity**” is, at any time, the sum of (a) the aggregate amount of unrestricted and unencumbered cash and Cash Equivalents held at such time by Borrower in Deposit Accounts or Securities Accounts maintained with Bank or its Affiliates, and (b) the Availability Amount.

(b) The definition of “**Permitted Investments**” set forth in Section 13.1 of the Loan Agreement is hereby amended by deleting clause (f) in its entirety and replacing it with the following:

(f) Investments (i) by Borrower in Subsidiaries and (ii) by Subsidiaries in other Subsidiaries or in Borrower, so long as (1) an Event of Default has not occurred and is continuing and would not exist immediately after such Investment, (2) Borrower has Liquidity of at least Fifteen Million Dollars (\$15,000,000) immediately prior to, and immediately after, such Investment, (3) Borrower and its Subsidiaries shall have complied with customary practices related to such Investments, (4) such Investments are consistent with past practices, and (5) such Investments are made in the ordinary course of business;

3. Limitation of Amendments.

3.1 The amendments set forth in Section 2, above, are effective for the purposes set forth herein and shall be limited precisely as written and shall not be deemed to (3) be a consent to any amendment, waiver or modification of any other term or condition of any Loan Document, or (3) otherwise prejudice any right or remedy which Bank may now have or may have in the future under or in connection with any Loan Document.

3.2 This Amendment shall be construed in connection with and as part of the Loan Documents and all terms, conditions, representations, warranties, covenants and agreements set forth in the Loan Documents, except as herein amended, are hereby ratified and confirmed and shall remain in full force and effect.

4. Representations and Warranties. To induce Bank to enter into this Amendment, Borrower hereby represents and warrants to Bank as follows:

4.1 Immediately after giving effect to this Amendment (a) the representations and warranties contained in the Loan Documents are true, accurate and complete in all material respects as of the date hereof (except to the extent such representations and warranties relate to an earlier date, in which case they are true and correct as of such date), and (b) no Event of Default has occurred and is continuing;

4.2 Borrower has the power and authority to execute and deliver this Amendment and to perform its obligations under the Loan Agreement, as amended by this Amendment;

4.3 The organizational documents of Borrower delivered to Bank on the March 31, 2015 remain true, accurate and complete and have not been amended, supplemented or restated and are and continue to be in full force and effect;

4.4 The execution and delivery by Borrower of this Amendment and the performance by Borrower of its obligations under the Loan Agreement, as amended by this Amendment, have been duly authorized;

4.5 The execution and delivery by Borrower of this Amendment and the performance by Borrower of its obligations under the Loan Agreement, as amended by this Amendment, do not and will not contravene (4) any law or regulation binding on or affecting Borrower, (4) any contractual restriction with a Person binding on Borrower, (4) any order, judgment or decree of any court or other governmental or public body or authority, or subdivision thereof, binding on Borrower, or (4) the organizational documents of Borrower;

4.6 The execution and delivery by Borrower of this Amendment and the performance by Borrower of its obligations under the Loan Agreement, as amended by this Amendment, do not require any order, consent, approval, license, authorization or validation of, or filing, recording or registration with, or exemption by any governmental or public body or authority, or subdivision thereof, binding on Borrower, except as already has been obtained or made; and

4.7 This Amendment has been duly executed and delivered by Borrower and is the binding obligation of Borrower, enforceable against Borrower in accordance with its terms, except as such enforceability may be limited by bankruptcy, insolvency, reorganization, liquidation, moratorium or other similar laws of general application and equitable principles relating to or affecting creditors' rights.

5. Integration. This Amendment and the Loan Documents represent the entire agreement about this subject matter and supersede prior negotiations or agreements. All prior agreements, understandings, representations, warranties, and negotiations between the parties about the subject matter of this Amendment and the Loan Documents merge into this Amendment and the Loan Documents.

6. Counterparts. This Amendment may be executed in any number of counterparts and all of such counterparts taken together shall be deemed to constitute one and the same instrument.

7. Effectiveness. This Amendment shall be deemed effective upon (7) the due execution and delivery to Bank of this Amendment by each party hereto, and (7) Borrower's payment of Bank's legal fees and expenses incurred in connection with the negotiation and preparation of this Amendment.

[Signature page follows.]

IN WITNESS WHEREOF, the parties hereto have caused this Amendment to be duly executed and delivered as of the date first written above.

BORROWER:

AEROHIVE NETWORKS, INC.

By /s/ John Ritchie
Name: John Ritchie
Title: CFO

BANK:

SILICON VALLEY BANK

By /s/ Kyle Larrabee
Name: Kyle Larrabee
Title: Vice President

[Signature Page to Third Amendment to Amended and Restated Loan and Security Agreement]

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Section 3: EX-10.2 (EXHIBIT 10.2)

**FOURTH AMENDMENT
TO
AMENDED AND RESTATED LOAN AND SECURITY AGREEMENT**

THIS FOURTH AMENDMENT TO AMENDED AND RESTATED LOAN AND SECURITY AGREEMENT (this “**Amendment**”) is entered into this 31 day of January, 2019, by and between **SILICON VALLEY BANK**, a California corporation (“**Bank**”) and **AEROHIVE NETWORKS, INC.**, a Delaware corporation (“**Borrower**”).

RECITALS

A. Bank and Borrower have entered into that certain Amended and Restated Loan and Security Agreement dated as of February 18, 2016 (as the same has been, and may from time to time be further amended, modified, supplemented or restated, the “**Loan Agreement**”).

B. Bank has extended credit to Borrower for the purposes permitted in the Loan Agreement.

C. Borrower has requested that Bank amend the Loan Agreement to (i) extend the Revolving Line Maturity Date and (ii) make certain other revisions to the Loan Agreement, each as more fully set forth herein.

D. Bank has agreed to so amend certain provisions of the Loan Agreement, but only to the extent set forth below, in accordance with the terms, subject to the conditions and in reliance upon the representations and warranties set forth below.

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing recitals and other good and valuable consideration, the receipt

and adequacy of which is hereby acknowledged, and intending to be legally bound, the parties hereto agree as follows:

1. Definitions. Capitalized terms used but not defined in this Amendment, including its preamble and recitals, shall have the meanings given to them in the Loan Agreement.

2. Amendments to Loan Agreement.

2.1 Section 3.5 (Procedures for Borrowing). Subsection (a)(i) of Section 3.5 of the Loan Agreement is hereby amended by deleting the first sentence of such Subsection and replacing it with the following:

Subject to the prior satisfaction of all other applicable conditions to the making of an Advance set forth in this Agreement, an Advance shall be made upon Borrower's (via an individual duly authorized by an Administrator) irrevocable written notice delivered to Bank in the form of a Notice of Borrowing or without instructions if any Advances is necessary to meet Obligations which have become due.

2.2 Section 6.2 (Financial Statements, Reports, Certificate). Section 6.2 of the Loan Agreement is hereby amended by deleting the “and” at the end of Section 6.2(k) of the Loan Agreement, replacing the “.” at the end of Section 6.2(l) with “; and”, and by adding Section 6.2(m) of the Loan Agreement immediately after Section 6.2(l) of the Loan Agreement as follows:

(m) Beneficial Ownership Information. In the event that (i) Borrower is no longer a public company, (ii) Borrower’s securities are no longer listed on a public exchange, or (iii) Borrower’s securities are no longer traded on a public market subject to the Exchange Act, prompt written notice of any changes to the beneficial ownership information set out in Section 2(d)–(g) of the Perfection Certificate. Borrower understands and acknowledges that Bank relies on such true, accurate and up-to-date beneficial ownership information to meet Bank’s regulatory obligations to obtain, verify and record information about the beneficial owners of its legal entity customers.

2.3 Section 6.10 (Access to Collateral; Books and Records). Section 6.10 of the Loan Agreement is hereby amended by deleting the penultimate sentence of such Section and replacing it with the following:

In the event Borrower and Bank schedule an audit more than eight (8) days in advance, and Borrower cancels or seeks to or reschedules the audit with less than eight (8) days written notice to Bank, then (without limiting any of Bank’s rights or remedies) Borrower shall pay Bank a fee of Two Thousand Dollars (\$2,000) plus any out-of-pocket expenses incurred by Bank to compensate Bank for the anticipated costs and expenses of the cancellation or rescheduling.

2.4 Section 6.15 (Online Banking). Section 6.15 of the Loan Agreement is hereby deleted in its entirety and replaced with the following:

6.15 Online Banking.

(a) Utilize Bank’s online banking platform for all matters requested by Bank which shall include, without limitation (and without request by Bank for the following matters), uploading information pertaining to Accounts and Account Debtors, requesting approval for exceptions, requesting Credit Extensions, and uploading financial statements and other reports required to be delivered by this Agreement (including, without limitation, those described in Section 6.2 of this Agreement).

(b) Comply with the terms of Bank’s Online Banking Agreement as in effect from time to time and ensure that all persons utilizing Bank’s online banking platform are duly authorized to do so by an Administrator. Bank shall be entitled to assume the authenticity, accuracy and completeness on any information, instruction or request for a Credit Extension submitted via Bank’s online banking platform and to further assume that any submissions or requests made via Bank’s online banking platform have been duly authorized by an Administrator.

2.5 Section 13 (Definitions).

(a) The following new defined terms are hereby inserted alphabetically in Section 13.1 of the Loan Agreement:

“**Administrator**” is an individual that is named:

(a) as an “Administrator” in the “SVB Online Services” form completed by Borrower with the authority to determine who will be authorized to use SVB Online Services (as defined in Bank’s Online Banking Agreement as in effect from time to time) on behalf of Borrower; and

(b) as an Authorized Signer.

“**Fourth Amendment Effective Date**” is January 31 , 2019.

(b) The following terms and their respective definitions set forth in Section 13.1 of the Loan Agreement are hereby deleted in their entirety and replaced with the following:

“**Borrowing Base Report**” is that certain report of the value of certain Collateral in the form specified by Bank to Borrower from time to time.

“**LIBOR Rate Margin**” is (i) one and one-half of one percent (1.50%) if Borrower is Streamline Eligible, and (ii) one and three-quarters of one percent (1.75%) if Borrower is not Streamline Eligible.

“**Prime Rate Margin**” is (i) one and one-quarter of one percent (1.25%) if Borrower is Streamline Eligible, and (ii) one percent (1.00%) if Borrower is not Streamline Eligible.

“**Revolving Line Maturity Date**” is March 31, 2021.

“**Total Liabilities**” is on any day, obligations that should, under GAAP, be classified as liabilities on Borrower’s and its Subsidiaries’ consolidated balance sheets, but excluding (i) all Subordinated Debt (if any) and (ii) any Indebtedness arising in connection with leases which would be classified as operating leases under accounting standards in effect on the Fourth Amendment Effective Date.

2.6 Exhibit C (Borrowing Base Report). The Borrowing Base Report appearing as Exhibit C to the Loan Agreement is hereby deleted in its entirety and replaced with the following: “**Exhibit C – Intentionally Omitted**”.

2.7 Exhibit D (Compliance Certificate). The Compliance Certificate attached to the Loan Agreement as Exhibit D is hereby amended in its entirety and replaced with the Compliance Certificate attached hereto as Exhibit D. From and after the date of this Amendment, all references in the Loan Agreement to the Compliance Certificate shall mean the Compliance Certificate in the form attached hereto as Exhibit D.

3. Limitation of Amendments.

3.1 The amendments set forth in Section 2, above, are effective for the purposes set forth herein and shall be limited precisely as written and shall not be deemed to (1) be a consent to any amendment, waiver or modification of any other term or condition of any Loan Document, or (1) otherwise prejudice any right or remedy which Bank may now have or may have in the future under or in connection with any Loan Document.

3.2 This Amendment shall be construed in connection with and as part of the Loan Documents and all terms, conditions, representations, warranties, covenants and agreements set forth in the Loan Documents, except as herein amended, are hereby ratified and confirmed and shall remain in full force and effect.

4. Representations and Warranties. To induce Bank to enter into this Amendment, Borrower hereby represents and warrants to Bank as follows:

4.1 Immediately after giving effect to this Amendment (a) the representations and warranties contained in the Loan Documents are true, accurate and complete in all material respects as of the date hereof (except to the extent such representations and warranties relate to an earlier date, in which case they are true and correct as of such date), and (b) no Event of Default has occurred and is continuing;

4.2 Borrower has the power and authority to execute and deliver this Amendment and to perform its obligations under the Loan Agreement, as amended by this Amendment;

4.3 The organizational documents of Borrower delivered to Bank on the March 31, 2015 remain true, accurate and complete and have not been amended, supplemented or restated and are and continue to be in full force and effect;

4.4 The execution and delivery by Borrower of this Amendment and the performance by Borrower of its obligations under the Loan Agreement, as amended by this Amendment, have been duly authorized;

4.5 The execution and delivery by Borrower of this Amendment and the performance by Borrower of its obligations under the Loan Agreement, as amended by this Amendment, do not and will not contravene (1) any law or regulation binding on or affecting Borrower, (1) any contractual restriction with a Person binding on Borrower, (1) any order, judgment or decree of any court or other governmental or public body or authority, or subdivision thereof, binding on Borrower, or (1) the organizational documents of Borrower;

4.6 The execution and delivery by Borrower of this Amendment and the performance by Borrower of its obligations under the Loan Agreement, as amended by this Amendment, do not require any order, consent, approval, license, authorization or validation of, or filing, recording or registration with, or exemption by any governmental or public body or authority, or subdivision thereof, binding on Borrower, except as already has been obtained or made; and

4.7 This Amendment has been duly executed and delivered by Borrower and is the binding obligation of Borrower, enforceable against Borrower in accordance with its terms, except as such enforceability may be limited by bankruptcy, insolvency, reorganization, liquidation, moratorium or other similar laws of general application and equitable principles relating to or affecting creditors' rights.

5. Integration. This Amendment and the Loan Documents represent the entire agreement about this subject matter and supersede prior negotiations or agreements. All prior agreements, understandings, representations, warranties, and negotiations between the parties about the subject matter of this Amendment and the Loan Documents merge into this Amendment and the Loan Documents.

6. Counterparts. This Amendment may be executed in any number of counterparts and all of such counterparts taken together shall be deemed to constitute one and the same instrument.

7. Effectiveness. This Amendment shall be deemed effective upon (1) the due execution and delivery to Bank of this Amendment by each party hereto, (1) the due execution and delivery to Bank of the updated Perfection Certificate of Borrower, and (1) Borrower's payment of Bank's legal fees and expenses reasonably incurred in connection with the negotiation and preparation of this Amendment.

[Signature page follows.]

IN WITNESS WHEREOF, the parties hereto have caused this Amendment to be duly executed and delivered as of the date first written above.

BORROWER:

AEROHIVE NETWORKS, INC.

By /s/ John Ritchie

Name: John Ritchie

Title: CFO

BANK:

SILICON VALLEY BANK

By /s/ Charles Thor

Name: Charles Thor

Title: Director

[Signature Page to Fourth Amendment to Amended and Restated Loan and Security Agreement]

EXHIBIT D

COMPLIANCE CERTIFICATE

TO: SILICON VALLEY BANK
FROM: AEROHIVE NETWORKS, INC.

Date: _____

The undersigned authorized officer of Aerohive Networks, Inc. (“Borrower”) certifies on behalf of Borrower and not in any individual capacity that under the terms and conditions of the Amended and Restated Loan and Security Agreement between Borrower and Bank (the “Agreement”):

(1) Borrower is in complete compliance for the period ending _____ with all required covenants except as noted below; (2) no Events of Default have occurred and are continuing; (3) all representations and warranties in the Agreement are true and correct in all material respects on this date except as noted below; provided, however, that such materiality qualifier shall not be applicable to any representations and warranties that already are qualified or modified by materiality in the text thereof; and provided, further that those representations and warranties expressly referring to a specific date shall be true, accurate and complete in all material respects as of such date; (4) Borrower, and each of its Subsidiaries, has timely filed all required tax returns and reports, and Borrower has timely paid all foreign, federal, state and local taxes, assessments, deposits and contributions owed by Borrower except as otherwise permitted pursuant to the terms of Section 5.9 of the Agreement; and (5) no Liens have been levied or claims made against Borrower or any of its Subsidiaries relating to unpaid employee payroll or benefits of which Borrower has not previously provided written notification to Bank.

Attached are the required documents supporting the certification. The undersigned certifies that these are prepared in accordance with GAAP (subject in the case of unaudited financial statements to normal year-end adjustments and the absence of footnotes) consistently applied from one period to the next except as explained in an accompanying letter or footnotes. The undersigned acknowledges that no borrowings may be requested at any time or date of determination that Borrower is not in compliance with any of the terms of the Agreement, and that compliance is determined not just at the date this certificate is delivered. Capitalized terms used but not otherwise defined herein shall have the meanings given them in the Agreement.

Please indicate compliance status by circling Yes/No under “Complies” column.

<u>Reporting Covenant</u>	<u>Required</u>	<u>Complies</u>
Monthly financial statements with Compliance Certificate (“CC”)	When not Streamline Eligible: Monthly within 30 days	Yes No
Quarterly Compliance Certificate (“CC”) with latest quarterly SEC Filings	When Streamline Eligible: Quarterly within 45 days	Yes No
Annual financial statement (CPA Audited) + CC	FYE within 90 days	Yes No
SEC Filings (i.e., 10-Q, 10-K and 8-K)	Within 5 days after filing with SEC	Yes No
Borrowing Base Report	Only when not Streamline Eligible: Monthly within 30 days	Yes No
A/R & A/P Agings, Deferred Revenue Reports	Only when not Streamline Eligible: Monthly within 30 days	Yes No
Annual Board-Approved Financial Projections	Within 15 days after Board Approval	Yes No

<u>Streamline Eligibility</u>	<u>Required</u>	<u>Actual</u>	<u>Complies</u>	<u>Non-Formula Amount</u>	<u>Applicable Interest Rate</u>
If Net Cash is greater than or equal to:	\$35,000,000	\$ _____	Yes No	\$20,000,000	Libor + 1.50% Prime – 1.25%
If Net Cash is less than:	\$35,000,000	\$ _____	Yes No	\$10,000,000	Libor + 1.75% Prime – 1.00%

<u>Financial Covenant</u>	<u>Required</u>	<u>Actual</u>	<u>Complies</u>
Maintain on a Monthly Basis:			
Minimum Adjusted Quick Ratio	1.25:1.00	_____:1.00	Yes No

<u>External Accounts</u>	<u>Maximum Funds Allowed Therein</u>	<u>Actual</u>	<u>Complies</u>
External BOA Account	Up to \$500,000 in the aggregate	\$_____	
External Paypal Account	Up to \$500,000 in the aggregate	\$_____	Yes No

The following financial covenant analysis and information set forth in Schedule 1 attached hereto are true and accurate as of the date of this Certificate.

The following is a list of (i) any material change in the composition of the Intellectual Property, (ii) the registration of any copyright, including any subsequent ownership right of Borrower in or to any copyright, patent or trademark not previously disclosed in writing to Bank, and (iii) Borrower's knowledge of an event that could reasonably be expected to materially and adversely affect the value of the Intellectual Property:

(For the avoidance of doubt, Section 6.2(j) of the Agreement requires that Borrower provide written notice of the matters described in the aforementioned clauses (i), (ii) and (iii) promptly, but in no event later than forty-five (45) days after the last day of each quarter.)

The following are the exceptions with respect to the certification above: (If no exceptions exist, state "No exceptions to note.")

AEROHIVE NETWORKS, INC.

By: __
 Name: __
 Title: __

BANK USE ONLY

Received by: _____
 AUTHORIZED SIGNER

Date: _____

Verified: _____
 AUTHORIZED SIGNER

Date: _____

Compliance Status: Yes No

Schedule 1 to Compliance Certificate

Financial Covenants of Borrower

In the event of a conflict between this Schedule and the Loan Agreement, the terms of the Loan Agreement shall govern.

Dated: _____

I. Adjusted Quick Ratio (Section 6.7(a))

Required: 1.25:1.00

Actual:

A.	Aggregate value of Borrower and its Subsidiaries' consolidated, unrestricted cash and cash equivalents maintained with Bank	\$ _
B.	Aggregate value of Borrower and its Subsidiaries' consolidated net billed accounts receivable	\$ _
C.	Quick Assets (line A plus line B)	\$ _
D.	Aggregate value of Obligations to Bank	\$ _
E.	Aggregate value of obligations that should, under GAAP, be classified as liabilities on Borrower and its Subsidiaries' consolidated balance sheets, but excluding (i) all subordinated debt (if any), and (ii) any Indebtedness arising in connection with leases which would be classified as operating leases under accounting standards in effect on the Fourth Amendment Effective Date, and not otherwise reflected in line D above that matures within one (1) year	\$ _
F.	Current Liabilities (line D plus line E), minus all amounts received or invoiced in advance of performance under contracts and not yet recognized as revenue	\$ _
G.	On a consolidated basis, the sum (without duplication) of Borrower and its Subsidiaries' (a) outstanding principal amount of all Indebtedness, whether current or long-term, for borrowed money and all obligations and indebtedness evidenced by bonds, debentures, notes, loan agreements or other similar instruments, (b) purchase money Indebtedness, (c) the face amount of all outstanding letters of credit (including standby and commercial), and all Indebtedness arising under bankers' acceptances, bank guaranties, surety bonds and similar instruments, (d) indebtedness in respect of the deferred purchase price of property or services (other than trade accounts payable in the ordinary course of business), (e) Indebtedness in respect of capital leases and synthetic lease obligations, (f) without duplication, guarantees with respect to outstanding Indebtedness of the types specified in clauses (a) through (e) above of Persons other than the Borrower or any Subsidiary, and (g) indebtedness of the types referred to in clauses (a) through (f) above of any partnership or joint venture (other than a joint venture that is itself a corporation or limited liability company) in which the Borrower or a Subsidiary is a general partner or joint venturer, unless such indebtedness is expressly made non-recourse to the Borrower or such Subsidiary.	\$ _
H.	Aggregate Liabilities (line F plus line G)	\$ _
I.	Adjusted Quick Ratio (line C divided by line H)	—

Is line I equal to or greater than 1.25:1.00?

No, not in compliance Yes, in compliance

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Section 4: EX-10.3 (EXHIBIT 10.3)

Amended and Restated as of February 18, 2015

Amended as of May 26, 2015

Amended as of May 10, 2016

Amended as of February 1, 2019

Aerohive Networks, Inc. (the “**Company**”) believes that the granting of equity and cash compensation to members of its Board of Directors (the “**Board**,” and members of the Board, the “**Directors**”) represents an effective tool to attract, retain and reward Directors who are not employees of the Company (the “**Outside Directors**”). This Outside Director Compensation Policy (as amended, from time to time, the “**Policy**”) is intended to formalize aspects of the Company’s existing policy regarding cash compensation and grants of equity to its Outside Directors approved by the Board on February 18, 2015. Unless otherwise defined herein, capitalized terms used in this Policy will have the meaning given such term in the Company’s 2014 Equity Incentive Plan (the “**Plan**”). Each Outside Director will be solely responsible for any tax obligations he or she incurs as a result of the equity and cash payments such Outside Director receives under this Policy. This Policy will be effective as of the date set forth above, with such amendment to cash compensation obligations effective July 1, 2016.

1. CASH COMPENSATION

Annual Cash Retainer

Each Outside Director will be eligible to earn annual cash retainer fees as follows for service on the Board or as chair or a member of a committee of the Board (“**Committee**”):

Member of the Board:	\$	30,000
Chair of Board*:	\$	15,000*
Chair of Audit Committee:	\$	20,000
Member of Audit Committee (excluding Committee Chair):	\$	10,000
Chair of Compensation Committee:	\$	12,000
Member of Compensation Committee (excluding Committee Chair):	\$	6,000
Chair of Nominating and Corporate Governance Committee:	\$	7,500
Member of Nominating and Corporate Governance Committee (excluding Committee Chair):	\$	3,750

* Additional annual fee paid to Lead Director

This cash compensation will be paid quarterly in arrears, on a prorated basis. There are no per-meeting attendance fees for attending Board meetings.

2. EQUITY COMPENSATION

Outside Directors will be entitled to receive all types of Awards (except Incentive Stock Options) under the Plan (or the applicable equity plan in place at the time of grant), including discretionary Awards not covered under this Policy. All grants of Awards to Outside Directors pursuant to Section 2 of this Policy will be automatic and nondiscretionary, except as otherwise provided herein, and will be made in accordance with the following provisions:

(a) No Discretion. No person will have any discretion to select which Outside Directors will be granted any Awards under this Policy or to determine the number of Shares to be covered by such Awards, except pursuant to Section 7 below.

(b) Initial Awards. Subject to Section 11 of the Plan, each person who first becomes an Outside Director automatically will be granted a Restricted Stock Unit Award covering a number of Shares equal to the quotient of \$200,000 divided by the trailing thirty (30) day trading average closing price of a Share as reported by the NYSE (which price is measured as of the date immediately prior to the Award's date of grant) (the "**Initial Award**"), which grant will be automatically effective on the date on which such person first becomes an Outside Director, whether through election by the stockholders of the Company or appointment by the Board to fill a vacancy. Subject to Section 5 below and Section 14 of the Plan, each Initial Award will vest as to one-third (1/3rd) of the Shares subject thereto on each anniversary of the Initial Award's grant date, provided that the Outside Director remains a Service Provider through the applicable vesting date.

(c) Annual Awards. Subject to Section 11 of the Plan, on the date of each Annual Meeting of the Company's stockholders (the "**Annual Meeting**") beginning with the Company's 2016 Annual Meeting, each Outside Director automatically will be granted a Restricted Stock Unit Award covering a number of Shares equal to the quotient of \$125,000 divided by the trailing thirty (30) day trading average closing price of a Share as reported by the NYSE (which price is measured as of the date immediately prior to the Award's date of grant) (an "**Annual Award**"). Subject to Section 5 below and Section 14 of the Plan, each Annual Award will vest as to one hundred percent (100%) of the Shares subject thereto on the earlier to occur of (a) the one-year anniversary of the Annual Award's grant date or (b) the date immediately preceding the Annual Meeting following such Annual

Award's grant date, provided that the Outside Director remains a Service Provider through the applicable vesting date. An Annual Award may be granted to Outside Directors who have served on the Board at least six (6) months prior to the grant date.

(d) Terms Applicable to all Options Granted Under this Policy. The per Share exercise price for an Option granted under this Policy will be one hundred percent (100%) of the Fair Market Value of a Share on the grant date. The maximum term to expiration of the Initial Awards will be ten (10) years, subject to earlier termination as provided in the Plan.

3. VESTING ACCELERATION

In the event of a Change in Control, as defined in the Plan, all Shares then unvested and subject to an Award granted pursuant to this Policy will automatically be accelerated and vest in full.

4. TRAVEL EXPENSES

Each Outside Director's reasonable, customary and documented travel expenses to Board and Committee meetings will be reimbursed by the Company.

5. ADDITIONAL PROVISIONS

Except to the specific extent provided in this Policy, all provisions of the Plan and applicable Award Agreement will apply to Awards granted to Outside Directors.

6. SECTION 409A

In no event will cash compensation or travel reimbursement payments under this Policy be paid after the later of (a) the fifteenth (15th) day of the third (3rd) month following the end of the Company's fiscal year in which the compensation is earned or expenses are incurred, as applicable, or (b) the fifteenth (15th) day of the third (3rd) month following the end of the calendar year in which the compensation is earned or expenses are incurred, as applicable, in compliance with the "short-term deferral" exception under Section 409A of the Internal Revenue Code of 1986, as amended, and the final regulations and guidance thereunder, as may be amended from time to time (together, "Section 409A"). It is the intent of this Policy that this Policy and all payments hereunder be exempt from or otherwise comply with the requirements of Section 409A so that none of the

compensation to be provided hereunder will be subject to the additional tax imposed under Section 409A, and any ambiguities or ambiguous terms herein will be interpreted to be so exempt or comply.

7. **REVISIONS**

The Compensation Committee in its discretion may change and otherwise revise the terms of Awards granted under this Policy, including, without limitation, the number of Shares subject thereto, for Awards of the same or different type granted on or after the date the Compensation Committee determines to make any such change or revision.

Aerohive – Outside Director Compensation Policy (eff. 2-1-2019)

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Section 5: EX-21.1 (EXHIBIT 21.1)

Exhibit 21.1

SUBSIDIARIES OF AEROHIVE NETWORKS, INC.

<u>Name</u>	<u>Jurisdiction of Incorporation</u>
Aerohive Networks Europe Ltd	United Kingdom
Aerohive Networks Ltd.	Cayman
Aerohive Networks Canada Inc.	Canada

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Section 6: EX-23.1 (EXHIBIT 23.1)

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in Registration Statements Nos. 333-194902, 333-202813, 333-206325, 333-209784, 333-216240, and 333-223198 on Form S-8 of our report dated March 1, 2019, relating to the consolidated financial statements of Aerohive Networks, Inc. and its subsidiaries (the “Company”) (which report expresses an unqualified opinion and includes an explanatory paragraph relating to the Company’s change in method of accounting for revenue in fiscal year 2018 due to the adoption of Accounting Standards Codification Topic 606, *Revenue from Contracts with Customers*), appearing in the Annual Report on Form 10-K of the Company for the year ended December 31, 2018.

/s/ *DELOITTE & TOUCHE LLP*

San Jose, California
March 1, 2019

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Section 7: EX-31.1 (EXHIBIT 31.1)

Exhibit 31.1

CERTIFICATION OF CHIEF EXECUTIVE OFFICER PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, David K. Flynn, certify that:

1. I have reviewed this Annual Report on Form 10-K of Aerohive Networks, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, 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;
 - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 1, 2019

/s/ David K. Flynn

David K. Flynn
President and Chief Executive
Officer

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Section 8: EX-31.2 (EXHIBIT 31.2)

**CERTIFICATION OF CHIEF FINANCIAL OFFICER
PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, John Ritchie, certify that:

1. I have reviewed this Annual Report on Form 10-K of Aerohive Networks, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, 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;
 - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 1, 2019

/s/ John Ritchie

John Ritchie

Chief Financial Officer

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Section 9: EX-32.1 (EXHIBIT 32.1)

**PURSUANT TO 18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO SECTION 906
OF THE SARBANES-OXLEY ACT OF 2002**

Pursuant to the requirement set forth in Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended, (the "Exchange Act") and Section 1350 of Chapter 63 of Title 18 of the United States Code (18 U.S.C. §1350), I, David K. Flynn, President and Chief Executive Officer of Aerohive Networks, Inc. (the "Company"), hereby certify that, to the best of my knowledge:

1. The Company's Annual Report on Form 10-K for the period ended December 31, 2018, to which this Certification is attached as Exhibit 32.1 (the "Periodic Report"), fully complies with the requirements of Section 13(a) or Section 15(d) of the Exchange Act; and
2. The information contained in the Periodic Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: March 1, 2019

By: /s/ David K. Flynn
Name: David K. Flynn
Title: President and Chief Executive Officer

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Section 10: EX-32.2 (EXHIBIT 32.2)

Exhibit 32.2

**CERTIFICATION OF CHIEF FINANCIAL OFFICER
PURSUANT TO 18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO SECTION 906
OF THE SARBANES-OXLEY ACT OF 2002**

Pursuant to the requirement set forth in Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended, (the "Exchange Act") and Section 1350 of Chapter 63 of Title 18 of the United States Code (18 U.S.C. §1350), I, John Ritchie, Chief Financial Officer of Aerohive Networks, Inc. (the "Company"), hereby certify that, to the best of my knowledge:

1. The Company's Annual Report on Form 10-K for the period ended December 31, 2018, to which this Certification is attached as Exhibit 32.2 (the "Periodic Report"), fully complies with the requirements of Section 13(a) or Section 15(d) of the Exchange Act; and
2. The information contained in the Periodic Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: March 1, 2019

By: /s/ John Ritchie
Name: John Ritchie
Title: Chief Financial Officer

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