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

FORM 10-K

(Mark One)

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

For the fiscal year ended June 30, 2020

or

☐ **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: 001-34630

Aspen Technology, Inc.
(Exact name of registrant as specified in its charter)

Delaware	**04-2739697**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)

20 Crosby Drive	
Bedford	
Massachusetts	**01730**
(Address of principal executive offices)	(Zip Code)

Registrant's telephone number, including area code: **781-221-6400**

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

Title of Each Class	Trading Symbol	Name of Each Exchange on Which Registered
Common stock, $0.10 par value per share	**AZPN**	**NASDAQ Global Select Market**

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

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

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

Large accelerated filer	☒	Accelerated filer	☐
Non-accelerated filer ☐ (Do not check if a smaller reporting company)		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 has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒

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

As of December 31, 2019, the aggregate market value of common stock (the only outstanding class of common equity of the registrant) held by non-affiliates of the registrant was $7,351,100,942 based on a total of 60,788,067 shares of common stock held by non-affiliates and on a closing price of $120.93 on December 31, 2019 for the common stock as reported on The NASDAQ Global Select Market.

There were 67,780,992 shares of common stock outstanding as of December 2, 2020.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's Proxy Statement related to its 2020 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission pursuant to Regulation 14A not later than 120 days after the end of the fiscal year covered by this Form 10-K are incorporated by reference in Part III, Items 10-14 of this Form 10-K.

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Our registered trademarks include aspenONE and Aspen Plus. All other trademarks, trade names and service marks appearing in this Form 10-K are the property of their respective owners.

Our fiscal year ends on June 30, and references to a specific fiscal year are the twelve months ended June 30 of such year (for example, "fiscal 2020" refers to the year ended June 30, 2020).

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS AND INDUSTRY DATA

This Form 10-K contains "forward-looking statements" within the meaning of Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934. Forward-looking statements relate to future events or our future financial performance. We generally identify forward-looking statements by terminology such as "anticipate," "believe," "could," "estimate," "expect," "intend," "may," "potential," "should," "target," or the negative of these terms or other similar words. These statements are only predictions. The outcome of the events described in these forward-looking statements is subject to known and unknown risks, uncertainties and other factors that may cause our, our customers' or our industry's actual results, levels of activity, performance or achievements expressed or implied by these forward-looking statements, to differ. "Item 1. Business," "Item 1A. Risk Factors" and "Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations" as well as other sections in this Form 10-K, discuss some of the factors that could contribute to these differences. The forward-looking statements made in this Form 10-K relate only to events as of the date on which the statements are made. We undertake no obligation to update any forward-looking statement to reflect events or circumstances after the date on which the statement is made or to reflect the occurrence of unanticipated events. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures or investments we may make. The industry in which we operate is subject to a high degree of uncertainty and risk due to variety of factors, including those described in "Item 1A. Risk Factors." Unless the context indicates otherwise, references in this report to "we", "us", "our" and other similar references mean Aspen Technology, Inc. and its subsidiaries.

PART I

Item 1. Business.

Overview

We are a global leader in asset optimization software that optimizes asset design, operations and maintenance in complex, industrial environments. We combine decades of process modeling and operations expertise with big data, artificial intelligence, and advanced analytics. Our purpose-built software improves the competitiveness and profitability of our customers by increasing throughput, energy efficiency, and production levels, reducing unplanned downtime, plant emissions, and safety risks, enhancing capital efficiency, and decreasing working capital requirements over the entire asset lifecycle to support operational excellence.

Our software incorporates our proprietary mathematical and empirical models of manufacturing and planning processes and reflects the deep domain expertise we have amassed from focusing on solutions for the process and other capital-intensive industries for over 35 years. We have developed our applications to design and optimize processes across three principal business areas: engineering, manufacturing and supply chain, and asset performance management. We are a recognized market and technology leader in providing process optimization and asset performance management software for each of these business areas.

We have established sustainable competitive advantages based on the following strengths:

- Innovative products that can enhance our customers' profitability and productivity;
- Long-term customer relationships;
- Large installed base of users of our software; and
- Long-term license contracts.

We have approximately 2,400 customers globally. Our customers consist of companies engaged in the process and other capital-intensive industries such as energy, chemicals, engineering and construction, as well as pharmaceuticals, food and beverage, transportation, power, metals and mining, pulp and paper, and consumer packaged goods.

Industry Background

The process manufacturing industries consist of companies that typically manufacture finished products by applying a controlled chemical process either to a raw material that is fed continuously through the plant or to a specific batch of raw material.

Process industry characteristics and dynamics are complex and the scale of operation is very large; therefore, any small improvement in the high-volume feedstocks used, or to the chemical process applied, can have a significant impact on the efficiency and cost-effectiveness of manufacturing operations. As a result, process manufacturers, as well as the engineering and construction firms that partner with these manufacturers, have extensive technical requirements and need sophisticated, integrated software to help design, operate and maintain complex manufacturing assets. The unique characteristics associated with process manufacturing create special demands for business applications that frequently exceed the capabilities of generic or non-process manufacturing software packages.

Industry Specific Challenges Facing the Process Industries

Companies in different segments of the process industries face specific challenges that drive the need for software solutions that design, operate and maintain manufacturing environments more effectively:

Energy. Our energy markets are comprised of three primary sectors: Exploration and Production, also called "upstream," Oil and Gas Production and Processing, also called "midstream," and Refining and Marketing, also called "downstream":

- Companies engaged in Exploration and Production explore for and produce hydrocarbons. They target reserves in increasingly diverse geographies involving geological, logistical and political challenges. They need to design and develop ever larger, more complex and more remote production, gathering and processing facilities as quickly as possible with the objective of optimizing production and ensuring regulatory compliance.

- Companies engaged in Oil and Gas Production and Processing produce and gather oil and natural gas from well heads, clean it, process it, and separate it into oil, dry natural gas, and natural gas liquids in preparation for transport to downstream markets. The processing capacity of oil and gas processing plants in North America has increased significantly in recent years to process the oil and gas extracted from shale deposits.

- Companies engaged in Refining and Marketing convert crude oil through a thermal and chemical manufacturing process into end products such as gasoline, jet and diesel fuels and into intermediate products for downstream chemical manufacturing companies. These companies are characterized by high volumes and low operating margins. In order to deliver better margins, they focus on optimizing feedstock selection and product mix, reducing energy and capital costs, maximizing throughput, and minimizing inventory, all while operating safely and in accordance with regulations.

Chemicals. The chemicals industry includes both bulk and specialty chemical companies:

- Bulk chemical producers manufacture commodity chemicals and compete primarily on price; they seek to achieve economies of scale and manage operating margin pressure by building larger, more complex plants located near feedstock sources.

- Specialty chemical manufacturers, which primarily manufacture highly differentiated customer-specific products, face challenges in managing diverse product lines, multiple plants, complex supply chains and product quality.

Engineering and construction. Engineering and construction firms that work with process manufacturers compete on a global basis by bidding on and executing on complex, large-scale projects. They need a digital environment in which optimal plant designs can be produced quickly and efficiently, incorporating highly accurate modeling, analysis and cost estimation technology. In addition, these projects require software that enables significant collaboration internally, with the manufacturer, and in many cases, with other engineering and construction firms.

Companies in the metals and mining, consumer packaged goods, power, pulp and paper, pharmaceuticals and biofuels industries are also seeking asset optimization solutions that help them deliver improved financial and operating results in the face of varied process manufacturing challenges.

Complexity of the Process Industries

Companies in the process industries constantly face pressure on margins causing them to continually seek ways to operate more efficiently. At the same time, these manufacturers face complexity as a result of the following:

Globalization of markets. Process manufacturers are continuously expanding their operations to take advantage of growing demand and more economically viable sources of feedstocks. Process manufacturers must be able to design, build and operate plants efficiently and economically while managing and optimizing ever broadening supply chains.

Market volatility. Process manufacturers must react quickly to frequent changes in feedstock prices, temporary or longer-term feedstock shortages, and rapid changes in finished product prices. Unpredictable commodity markets strain the manufacturing and supply chain operations of process manufacturers, which must evaluate and implement changes in inventory levels, feedstock inputs, equipment usage and operational processes to remain competitive.

Environmental and safety regulations. Process companies must comply with an expanding array of data maintenance and reporting requirements under governmental and regulatory mandates, and the global nature of their operations can subject them to numerous regulatory regimes. These companies are increasingly relying upon software applications to model potential outcomes, store operating data and develop reporting capabilities in response to heightened scrutiny and oversight because of environmental, safety and other implications of their products and manufacturing processes.

Evolving Workforce. Process companies must adapt to the changing nature of the technical workforce. A generation of highly experienced plant operators and engineers is nearing retirement. New entrants to the workforce must be able to effectively leverage organization knowledge to become productive with far fewer years of experience.

Market Opportunity

Process industries have been focusing on digital transformation initiatives to improve productivity for more than 40 years. In the 1980s, process manufacturers implemented distributed control systems, or DCS, to automate the management of plant hardware. DCS use computer hardware, communication networks and industrial instruments to measure, record and automatically control process variables. In the 1990s, these manufacturers adopted enterprise resource planning, or ERP, systems to streamline back office functions and interact with DCS. These systems allowed process manufacturers to track, monitor and report the performance of each plant, rather than rely on traditional paper and generic desktop spreadsheets.

Many process manufacturers have implemented both DCS and ERP systems but have realized that their investments in hardware and back-office systems are inadequate. DCS are only able to control and monitor processes based on fixed sets of parameters and cannot dynamically react to changes in the manufacturing process unless instructed by end users. ERP systems can only record what is produced in operations. Although DCS and ERP systems help manage manufacturing performance, neither of these systems can optimize what is produced, how it is produced or where it is produced. Moreover, neither can help a process manufacturer understand how to improve its processes or how to identify opportunities to decrease operating expenses.

As digital transformation initiatives were extended to each aspect of asset operations, the opportunity to optimize across the full asset lifecycle came into focus. Asset optimization software focuses on the optimum design, operation, and maintenance of the manufacturing process; how the design is optimized for optimum operations and reliability, how the process is operated for optimal economic, safety, and sustainable performance, and how the design and operations impact the longevity and reliability of the equipment. By connecting DCS and ERP systems with intelligent applications, asset optimization software allows a manufacturer to make faster economic decisions, resulting in safer, greener, and more reliable asset operations. Examples of how asset optimization software can optimize a manufacturing environment include incorporating process manufacturing domain knowledge, supporting real-time decision making, predicting equipment failure, and providing the ability to respond and adapt to operational changes. Furthermore, these solutions can optimize the supply chain by helping a manufacturer to understand the operating conditions in each plant, enabling more efficient and optimized production decisions.

Process manufacturers employ highly skilled technical personnel specializing in areas such as process design, equipment design, control engineering, manufacturing operations, analytics, planning, scheduling, and supply chain management. To drive efficiency and improve operating margins, these personnel need to collaborate across functional areas and increasingly rely on software to enable this collaboration as well as automate complex tasks associated with their jobs. Process companies must adapt to the changing nature of the technical workforce. A generation of highly experienced plant operators and engineers is nearing retirement. As a result, we believe there is increasing demand for intelligent software applications that capture and automate expert knowledge and are intuitive and easy-to-learn.

aspenONE Solutions

We provide integrated asset optimization software solutions designed and developed specifically for the process and other capital-intensive industries. Customers use our solutions to improve their competitiveness and profitability by increasing throughput and productivity, reducing operating and maintenance costs, increasing reliability, enhancing capital efficiency, enabling collaboration among different functions, increasing safety, reducing risk, and decreasing working capital requirements. Our aspenONE solutions are organized into three suites: 1) engineering; 2) manufacturing and supply chain; and 3) asset performance management (APM):

Engineering. Our engineering software is used to develop process designs of new plants, re-vamp existing plants, and simulate and optimize existing processes. Through the use of advanced modeling technologies our engineering software can create digital twins of plant process and equipment that are used to troubleshoot and fine tune plant performance.

Manufacturing and Supply Chain. Our manufacturing software is used to optimize day-to-day processing activities, enabling process manufacturers to make better, more profitable decisions and to improve plant performance. Our supply chain management software is designed to enable process manufacturers to reduce inventory levels, increase asset efficiency, respond rapidly to market demands and optimize supply chain operations.

Asset Performance Management. Our asset performance management software is used to understand and predict the reliability of a system; be it multiple assets, a single asset, or equipment in a plant. The factors that impact reliability include how operating conditions degrade equipment performance over time, or how process conditions lead to equipment failure, and the ability to predict when the equipment will fail and prescribe actions to avoid such occurrences. The APM suite is a comprehensive suite of machine learning and analytics technologies which, when used in a standalone or integrated manner with historical and real time asset and equipment data, can help our customers improve their return on capital employed.

Our aspenONE licensing model is primarily a subscription offering under which customers receive access to all the products within the aspenONE suite(s) they license, including the right to any new unspecified future software products and updates that may be introduced into the licensed aspenONE software suite. This affords customers the ability to use our software whenever required and to experiment with different applications to best solve whatever critical business challenges they face.

We offer customer support, professional services and training services to our customers. Under our aspenONE licensing model, software maintenance and support is included for the term of the arrangement. Professional services are offered to customers as a means to further implement and extend our technology across their corporations.

The key benefits of our aspenONE solutions include:

Broad and comprehensive software suites. We believe that we offer the most comprehensive suites of software applications addressing the engineering, manufacturing and supply chain and maintenance requirements of process manufacturers. While some competitors offer solutions in one or two principal business areas, no other vendor can match the breadth of our aspenONE offerings. In addition, we have developed an extensive array of software applications that address extremely specific and complex industry and end user challenges, such as feedstock selection, dynamic optimization of plant assets, and production planning and scheduling for petroleum and chemicals companies.

Integrated software solutions. aspenONE provides a standards-based framework that integrates applications, data and models within each of our software suites. Process manufacturers seeking to improve their business operations can use the integrated software applications in the aspenONE Manufacturing and Supply Chain suite to support real-time decision making both for individual production facilities and across multiple sites.

Flexible commercial model. Our aspenONE subscription licensing model provides a customer with access to all of the applications within and across the aspenONE suite(s) that the customer licenses, including the right to any new unspecified future software products and updates that may be introduced into the licensed aspenONE software suites. The customer can change or alternate the use of multiple applications in a licensed suite through the use of exchangeable units of measurement, or tokens, licensed in quantities determined by the customer. This enables the customer to use those applications whenever required and to experiment with different applications to best solve whatever critical business challenges the customer faces. The customer can easily increase its usage of our software as their business requirements evolve.

Our Competitive Strengths

In addition to the breadth and depth of our integrated aspenONE software and the flexibility of our aspenONE licensing model, we believe our key competitive advantages include the following:

Industry-leading innovation based on substantial process industry expertise. For over 35 years, our significant investment in research and development has led to a number of major process engineering advances considered to be industry-standard applications. Our development organization is comprised of software engineers, chemical engineers and data scientists. This combination of expertise has been essential to the development of leading products embedded with chemical engineering principles, optimization and machine learning algorithms, analytics, and the process industries' workflows and best practices. We recently embarked on a strategy to embed artificial intelligence within our products and solutions to support decision making and drive better results.

Rapid, high return on investment. Many customers purchase our software because they believe it will provide rapid, demonstrable and significant returns on their investment and increase their profitability. For some customers, economic benefits in the first year following installation have exceeded the total cost of our software. For many customers, even a relatively small improvement in performance can generate substantial recurring benefits due to the large production volumes and limited profit margins typical in process industries. In addition, our solutions can generate organizational efficiencies and operational improvements that can further increase a process company's profitability.

Growth Strategy

We seek to maintain and extend our position as a leading global provider of process optimization software and related services to the process industries. We have introduced a new strategy to evolve our scope of optimization from the process units in a plant to the process and the equipment in the plant or entire asset. We have expanded our reach in optimization from conceptualization and design, operations, and supply chain to the maintenance aspects of the plant. We plan to continue to build on our expertise in process optimization, our installed base, and long-term customer relationships to further expand our reach in the maintenance area of the plant. By focusing on asset optimization, we will be able to optimize the design and operations of a plant considering the performance and constraints of process equipment so as to optimize the full asset lifecycle. Our primary growth strategy is to expand organically within our core verticals by leveraging our market leadership position and driving increased usage and product adoption of the broad capabilities in our aspenONE offerings. Additionally, we seek acquisitions to accelerate our overall growth in the design and operations of the process, and acquisitions that will expand our maintenance solution to deliver asset optimization. To accomplish these goals, we will pursue the following activities:

Continue to provide innovative, market-leading solutions. Our most recent product introduction, Aspen Enterprise Insights (AEI), allows our customers to build enterprise applications that drive insights in a collaborative workflow. AEI leverages information from across the enterprise to create insights and value for our customers. We continue to research innovation that will transform the experience of our users with our products. We are researching ways to enhance our historical capabilities founded on first-principles of engineering with artificial intelligence capabilities to create a new generation of products that will deliver hybrid modeling functionality to create products that are more accurate in their predictions and model previously difficult to model areas of a process. These capabilities will require a cloud infrastructure for deployment in hybrid environments, edge or cloud, to support the ingestion of large amounts of data and high performance computing. The aggregation of the capabilities acquired through the Rt-Tech, Mnubo and Sabisu acquisitions will support the delivery of the cloud infrastructure. AEI will sit on top of the edge connectivity and cloud capabilities that will be in the future cloud infrastructure offering. Our next software release will begin the introduction of these capabilities. We expect software releases, including these capabilities, will continue for the foreseeable future as we enhance the product capabilities that our customers are accustomed to. In addition, our Aspen Mtell product recently received another award for "Technology Excellence in AI Manufacturing" from the *Singapore Business Review*, following the award received for "Best Asset Performance Monitoring" from *Hydrocarbon Processing* magazine.

Further penetrate existing customer base. We have an installed base of approximately 2,400 customers. Many of our customers only use a fraction of our products. We work with our customers to identify ways in which they can improve their business performance by using the entire licensed suite of aspenONE solutions, both at an individual user level and across all of their plant locations. Our customers are segmented based on their size and complexity. Our large complex customers are serviced by our Field Sales organization, while our other customers are serviced by our inside sales group. Additionally, we regularly enhance our products to make them easier to use and seek to increase productivity of users by offering more integrated workflows.

Adoption and usage in customer base. We strive for our customers to adopt and sustain the use of our products by maximizing the consumption of their token entitlement. We do so by focusing our go-to-market resources through specific customer success management activities that generate and sustain the value from our products by ensuring that customers are using the latest version of our products, that our software is deployed in the most optimal manner in their IT networks, and that our customers are familiar with the latest value enhancing functionality in our products.

Asset Performance Management expansion. In fiscal 2017, we introduced a new suite of products focused on improving the reliability of our customers' assets and equipment using a combination of machine learning, data science and process modeling together with historical and real time asset and equipment data. We have increased our investment in the research and development, sales and marketing, and channel sales functions to build out the capabilities that will enable us to grow this new business area and deliver value for our customers. In addition, we target additional capital-intensive industries with the APM functionality that we refer to as the global economy industries. These include metals and mining, power, pulp and paper, pharmaceutical, and food and beverage.

Build an ecosystem. The relevance of our solutions in the markets we serve means that we have the opportunity to leverage third parties interested in building or expanding their businesses to increase our market penetration. The breadth of relationships that we establish will depend on the profile of the third-party company and the objectives specified to be achieved from the promotion and implementation of our products and solutions.

Pursue acquisitions. As part of our make-vs-buy analyses, we regularly explore and evaluate acquisitions. We have made several acquisitions in recent years and believe the opportunity exists to do more, especially as we seek to evolve our strategy to asset optimization and the maintenance area of the plant.

Expand our total addressable market. Our focus on innovation also means introducing product capabilities or new product categories that create value for our customers and therefore expand our total addressable market.

Products

Our integrated asset optimization software solutions are designed and developed specifically for the process industries. Customers use our solutions to improve their competitiveness and profitability by increasing throughput and productivity, reducing operating costs, enhancing capital efficiency, and decreasing working capital requirements. We have designed and developed our software applications across four principal business areas:

Engineering. Our engineering software applications are used during both the design and the ongoing operation of plant facilities to model and improve the way engineers develop and deploy manufacturing assets. Process manufacturers must address a variety of challenges including design, operational improvement, collaborative engineering and economic evaluation. They must, for example, determine where they should locate facilities, how they can lower capital and manufacturing costs, what they should produce and how they can maximize plant efficiency.

Manufacturing. Our manufacturing software products focus on optimizing day-to-day processing activities, enabling customers to make better, faster decisions that lead to improved plant performance and operating results. These solutions include desktop and server applications that help customers make real-time decisions, which can reduce fixed and variable costs and improve product yields. Process manufacturers must address a wide range of manufacturing challenges such as optimizing execution efficiency, reducing costs, selecting the right raw materials, scheduling and coordinating production processes, and identifying an appropriate balance between turnaround times, delivery schedules, product quality, cost and inventory.

Supply Chain Management. Our supply chain management solutions include desktop and server applications that help customers optimize critical supply chain decisions in order to reduce inventory, increase asset efficiency, and respond more quickly to changing market conditions. Process manufacturers must address numerous challenges as they strive to manage raw materials inventory, production schedules and feedstock purchasing decisions effectively and efficiently. Supply chain managers face these challenges in an environment of ever-changing market prices, supply constraints and customer demands.

Asset Performance Management. Our asset performance management products are used to understand and predict the reliability of a system; be it multiple assets, a single asset, or equipment in a plant. Factors that impact reliability include how operating conditions degrade equipment performance over time, or how process conditions can lead to equipment failure. The APM suite is a comprehensive suite of machine learning and analytics technologies which can be used in a standalone or integrated manner with historical and real time asset and equipment data to help our customers predict when the equipment will fail and prescribe actions to avoid such occurrences, thereby improving return on capital employed.

Our software applications are currently offered in three suites: aspenONE Engineering, aspenONE Manufacturing and Supply Chain, and aspenONE Asset Performance Management. These suites are integrated applications that allow end users to design process manufacturing environments, monitor operational performance, respond and adapt to operational changes, predict asset reliability and equipment failure, and manage planning and scheduling activities as well as collaborate across these functions and activities. The three suites are designed around core modules and applications that allow customers to design, operate and maintain their process manufacturing environments, as shown below:

aspenONE Engineering

Business Area	aspenONE Module	Major Products	Product Description
Engineering	Process Simulation for Energy	Aspen HYSYS	Process modeling software for the design and optimization of hydrocarbon processes, including flow assurance, refinery reactors, acid gas clean-up, and sulfur recovery
		Aspen Operator Training	Solution for developing and deploying dynamic plant simulations for the purpose of training plant operators to respond to operational and safety scenarios in a virtual training environment
	Process Simulation for Chemicals	Aspen Plus	Process modeling software for the design and optimization of chemical processes, including solids and batch processes
	Economic Evaluation	Aspen Economic Evaluation	Economic evaluation software for estimating project capital costs and lifecycle asset economics - from conceptual definition through detailed cost estimation
	Equipment Design & Rating	Aspen Exchanger Design and Rating	Software for the design, simulation and rating of various types of heat exchangers
	Basic Engineering	Aspen Basic Engineering	Collaborative platform for managing process engineering data and producing front-end design deliverables such as multi-disciplinary datasheets, process flow diagrams, piping and instrument diagrams, and equipment lists
	Operation Support	Aspen Online	Solution that connects process models to real-time plant data for expedited decisions, operational guidance, and optimization

aspenONE Manufacturing and Supply Chain

Business Area	aspenONE Module	Major Products	Product Description
Manufacturing	Advanced Process Control	Aspen DMC3	Multi-variable controller software for maintaining processes at their optimal operating point under changing process conditions
		Aspen Watch Performance Monitor	Real-time monitoring and diagnostic information software to help engineers and operators focus on the problems that erode margins
	Dynamic Optimization	Aspen GDOT	Multi-unit dynamic optimization software for alignment of Advanced Process Control (APC) with Planning & Scheduling to enable unified production optimization for refineries and ethylene plants
	Manufacturing Execution Systems	Aspen Info Plus.21	Data historian software for storing, visualizing and analyzing large volumes of data to improve production execution and enhance performance management
		AspenONE Process Explorer	Software for combining process measurements, product characteristics, alarms, events and unstructured data for a complete view of production
		Aspen Production Record Manager	Easy and fast segmentation of production data into batches, campaigns or other logical groupings for easier analysis and production reporting
		Aspen Production Execution Manager	Workflow, order and recipe management software per cGMP guidelines that ensures operational consistency for improved yields, higher quality and lower production costs
Supply Chain	Refinery Planning & Scheduling	Aspen PIMS Advanced Optimization	Refinery planning software for optimizing feedstock selection, product slate and operational execution
		Aspen Petroleum Scheduler	Refinery scheduling software for scheduling and optimization of refinery operations with integration to refinery planning, blending and dock operations
	Supply & Distribution	Aspen Petroleum Supply Chain Planner	Economic planning software for optimizing the profitability of the petroleum distribution network, including transportation, raw materials, sales demands, and processing facilities
		Aspen Fleet Optimizer	Software for inventory management and truck transportation optimization in secondary petroleum distribution
	Supply Chain Management	Aspen Collaborative Demand Manager	Software for forecasting market demand and managing forecast through changes in the business environment by combining historical and real time data
		Aspen Plant Scheduler	Software for generating optimal production schedules to meet total demand
		Aspen Supply Planner	Software for determining the optimal production plan taking into account labor and equipment, feedstock, inbound /outbound transportation, storage capacity, and other variables

aspenONE Asset Performance Management

Business Area	aspenONE Module	Major Products	Product Description
Asset Performance Management	Risk Analysis	Aspen Fidelis Reliability	Software for predicting the future performance of any system and quantifying the change in performance due to changes in design, capacity, operations, maintenance, logistics, market dynamics, and weather
	Process Analytics	Aspen ProMV	Multivariate analysis software for analyzing interrelated process data for continuous and batch processes, to identify the minimum critical set of variables driving product quality and process performance, and identifying optimal set points
		Aspen Asset Analytics	Software for analyzing plant operations in real time to identify causal precursors that can lead to an unplanned downtime event
	Equipment Analytics	Aspen Mtell	Software for recognizing unique data patterns as predictions of future equipment behavior
	Connect	Aspen Edge Connect	Software to collect data from assets, enterprise data sources, and MES systems using Industrial IoT technology, and integrating the data into enterprise systems on-premise or in the cloud
		Aspen Cloud Connect	

Our product development activities are currently focused on strengthening the integration of our applications and adding new capabilities that address specific operational business processes in each industry. As of June 30, 2020, we had a total of 626 employees in our research and development group, which is comprised of product management, software development and quality assurance. Research and development expenses were $92.2 million in fiscal 2020, $83.1 million in fiscal 2019 and $82.1 million in fiscal 2018.

Sales and Marketing

We employ a value-based sales approach, offering our customers a comprehensive suite of software and services that enhance the efficiency and productivity of their engineering, manufacturing and supply chain and maintenance operations. We have increasingly focused on positioning our products as a strategic investment and therefore devote an increasing portion of our sales efforts to our customers' senior management, including senior decision makers in manufacturing, operations, maintenance and technology. Our aspenONE solution strategy supports this value-based approach by broadening the scope of optimization across the entire enterprise over its lifecycle, expanding the use of process models in the operations environment, and enabling the use of analytics and data science to enhance equipment and process reliability. We offer a variety of training programs focused on illustrating the capabilities of our applications as well as online training built into our applications. We have implemented incentive compensation programs for our sales force to reward efforts that increase customer usage of our products. Furthermore, we believe our aspenONE licensing model enables our sales force to develop consultative sales relationships with our customers.

Historically, most of our license sales have been generated through our direct Field Sales organization. In order to market the specific functionality and other technical features of our software, our account managers work with specialized teams of technical sales personnel and product specialists organized for each sales and marketing effort. Our technical sales personnel typically have degrees in chemical engineering or related disciplines and actively consult with a customer's plant engineers. Product specialists share their detailed knowledge of the specific features of our software solutions as they apply to the unique business processes of different vertical industries. In addition to our direct Field Sales organization, we employ an inside sales team that targets customers in certain market segments.

We have established channel relationships with select companies that we believe can help us pursue opportunities in adjacent target markets. We also license our software products to universities that agree to use our products in teaching and research. We believe that students' familiarity with our products will stimulate future demand once the students enter the workplace.

We supplement our sales efforts with a variety of marketing initiatives, including industry analyst and public relations activities, campaigns to promote product usage and adoption, user group meetings and customer relationship programs. Our broad user base spans multiple verticals and geographies and these users possess a variety of skills, experience and business needs. In order to reach each of them in an effective, productive and leveraged manner we will increasingly capitalize on digital customer engagement solutions. Using webinars, digital communities, social media, videos, email and other digital means, we seek to engage our extensive user base with targeted messages intended to address the specific needs of each market, customer and user.

Our overall sales force, which consists of sales account managers, technical sales personnel, indirect-channel personnel, inside sales personnel, and marketing personnel, consisted of 503 employees as of June 30, 2020.

Software Maintenance and Support, Professional Services and Training

Software maintenance and support ("SMS") consists primarily of providing customer technical support and access to software fixes and upgrades. Customer technical support services are provided throughout the world by our three global call centers as well as via email and through our support website. For license term arrangements entered into subsequent to our transition to a subscription-based licensing model, SMS is included with the license arrangement. For license arrangements that do not include SMS, customers can purchase standalone SMS.

We offer professional services focused on implementation of our solutions. Our professional services team primarily consists of project engineers with degrees in chemical engineering or a similar discipline, or who have significant relevant industry experience. Our employees include experts in fields such as thermophysical properties, distillation, adsorption processes, polymer processes, industrial reactor modeling, the identification of empirical models for process control or analysis, large-scale optimization, supply distribution systems modeling and scheduling methods. Our primary focus is the successful implementation and usage of our software, and in many instances, this work can be professionally performed by qualified third parties. As a result, we often compete with third-party consulting firms when bidding for professional services contracts, particularly in developed markets. We offer our services on either a time-and-material or fixed-price basis.

We offer a variety of training solutions ranging from standardized training, which can be delivered in a public forum, on-site at a customer's location or over the Internet, to customized training sessions, which can be tailored to fit customer needs. We have also introduced a wide range of online computer-based training courses offering customers on-demand training in basic and advanced features of our products directly from within the products. As of June 30, 2020, we had a total of 293 employees in our customer support, professional services and training groups.

Business Segments

We have two operating and reportable segments, which are consistent with our reporting units: i) subscription and software and ii) services and other. The subscription and software segment is engaged in the licensing of process optimization and asset performance management software solutions and associated support services, and includes our license and maintenance revenue. The services and other segment includes professional services and training, and includes our services and other revenue.

Competition

Our markets in general are competitive, and we expect the intensity of competition in our markets to increase as existing competitors enhance and expand their product and service offerings and as new participants enter the market. Increased competition may result in price reductions, reduced profitability and loss of market share. We cannot ensure that we will be able to compete successfully against existing or future competitors. Some of our customers and companies with which we have strategic relationships also are, or may become, competitors.

Many of our current and potential competitors have greater financial, technical, marketing, service and other resources than we have. As a result, these companies may be able to offer lower prices, additional products or services, or other incentives that we cannot match or offer. These competitors may be in a stronger position to respond more quickly to new technologies and may be able to undertake more extensive marketing campaigns. We believe they also have adopted and may continue to pursue more aggressive pricing policies and make more attractive offers to potential customers, employees and strategic partners. For example, some competitors may be able to initiate relationships through sales and installations of hardware and then seek to expand their customer relationships by offering asset optimization software at a discount. In addition, competitors with greater financial resources may make strategic acquisitions to increase their ability to gain market share or improve the quality or marketability of their products. Furthermore, we face challenges in selling our solutions to large companies in the process industries that have internally developed their own proprietary software solutions.

We seek to develop and offer integrated suites of targeted, high-value vertical industry solutions that can be implemented with relatively limited service requirements. We believe this approach provides us with an advantage over many of our competitors that offer software products that are point solutions or are more service-based. Our key competitive differentiators include:

- Breadth, depth and integration of our aspenONE software offering;
- Rapid return on investment and increase in profitability;
- Domain expertise of chemical engineering personnel;
- Focus on software for the process industries;
- Flexibility of our usage-based aspenONE licensing model; and
- Consistent global support.

Proprietary Rights

Our software is proprietary and fundamental to our business. To protect our proprietary technology and brand, and prevent unauthorized use of our software, we rely on a combination of copyright, patent, trademark and trade secret laws in the United States and other jurisdictions, license and confidentiality agreements, and technology. We generally seek to protect our trade secrets by entering into non-disclosure agreements with our employees and customers, and historically have restricted access to our software and source code, which we regard as proprietary information. We have obtained or applied for patent protection with respect to some of our intellectual property and have registered or applied to register some of our trademarks in the United States and in selected other countries. We actively monitor use of our intellectual property and have enforced, and will continue to enforce, our intellectual property rights. In the United States, we are generally able to maintain our patents for up to 20 years from the earliest effective filing date, and to maintain our trademark registrations for as long as the trademarks are in use.

The laws of many countries in which our products are licensed may not protect our intellectual property rights to the same extent as the laws of the United States. While we consider our intellectual property rights to be valuable, we do not believe that our competitive position in the industry depends solely on obtaining legal protection for our software products and technology. Instead, we believe that the success of our business also depends on our ability to maintain a leadership position by continuing to develop innovative software products and technology.

Our proprietary rights are subject to risks and uncertainties described under Item 1A. “Risk Factors” below. You should read that discussion, which is incorporated into this section by reference.

Licenses

In connection with our acquisition of Hyprotech Ltd. and related subsidiaries of AEA Technology plc in May 2002 and the consent decree we entered into with the Federal Trade Commission in December 2004 to resolve allegations that the acquisition was improperly anticompetitive, we and certain of our subsidiaries entered into a purchase and sale agreement with Honeywell International Inc. and certain of its subsidiaries, pursuant to which we sold intellectual property and other assets to Honeywell relating to our operator training business and our Hyprotech engineering software products. Under the terms of the transactions, we retained a perpetual, irrevocable, worldwide, royalty-free non-exclusive license to the Hyprotech engineering software and have the right to continue to develop, license and sell the Hyprotech engineering products.

In March 1982, we entered into a System License Agreement with the Massachusetts Institute of Technology, or MIT, granting us a worldwide, perpetual non-exclusive license (with the right to sublicense) to use, reproduce, distribute and create derivative works of the computer program known as "ASPEN" which provides a framework for simulating the steady-state behavior of chemical processes that we utilize in the simulation engine for our Aspen Plus product. MIT agreed that we would own any derivative works and enhancements. MIT has the right to terminate the agreement if: we breach it and do not cure the breach within 90 days after receiving a written notice from MIT; we cease to carry on our business; or certain bankruptcy or insolvency proceedings are commenced and not dismissed. In the event of such termination, sublicenses granted to our customers prior to termination will remain in effect.

Employees

As of June 30, 2020, we had a total of approximately 1,710 full-time employees, of whom 821 were located in the United States. None of our employees in the United States is represented by a labor union; however, in certain foreign subsidiaries labor unions or workers’ councils may represent some of our employees. We have experienced no work stoppages and believe that our employee relations are satisfactory.

Corporate Information

Aspen Technology, Inc. was formed in Massachusetts in 1981 and reincorporated in Delaware in 1998. Our principal executive offices are at 20 Crosby Drive, Bedford, Massachusetts 01730, and our telephone number at that address is (781) 221-6400. Our website address is *http://www.aspentech.com*. The information on our website is not part of this Form 10-K, unless expressly noted.

Available Information

We file reports with the Securities and Exchange Commission, or the SEC, which we make available on our website free of charge. These reports include annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and amendments to such reports, each of which is provided on our website as soon as reasonably practicable after we electronically file such materials with or furnish them to the SEC. You can also read and copy any materials we file with the SEC at the SEC's Public Reference Room at 100 F Street, N.E., Washington, DC 20549. You can obtain additional information about the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. In addition, the SEC maintains a website (*http://www.sec.gov*) that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC, including us.

Item 1A. Risk Factors.

Investing in our common stock involves a high degree of risk. You should carefully consider the risks and uncertainties described below before purchasing our common stock. The risks and uncertainties described below are not the only ones facing our company. Additional risks and uncertainties may also impair our business operations. If any of the following risks actually occurs, our business, financial condition, results of operations or cash flows would likely suffer. In that case, the trading price of our common stock could fall, and you may lose all or part of your investment in our common stock.

Risks Related to Our Business

Our customers' business operations have been, and continue to be, subject to business interruptions arising from the COVID-19 pandemic. We continue to monitor the situation, but there can be no assurance that the pandemic will not result in delays or possibly reductions in demand for our solutions that could have a serious adverse effect on our business.

Many countries have imposed restrictions on travel and public assembly and closed schools and businesses in order to slow the spread of the SARS-CoV-2 virus and associated COVID-19 disease. These governmental restrictions and related private sector responses have adversely affected the business operations of some of our customers and resulted in a slowdown in closing some customer contracts and, to a lesser extent, a delay in customer payments in the last four months of the fiscal year ended June 30, 2020. While the measures instituted in response to COVID-19 are expected to be temporary, the duration of the business disruptions and related operational and financial impact on our customers and us cannot be estimated with certainty at this time. The adverse effects on the economies and financial markets of many countries and markets may result in an economic downturn and changes in global economic policy that could reduce demand for our products and have a material adverse impact on our business, operating results and financial condition, including on our ability to collect accounts receivable. Our business may also be harmed if our employees are not able to perform services for customers on-site due to travel restrictions or facility closings.

If we fail to increase usage and product adoption of our aspenONE engineering and manufacturing and supply chain offerings and grow our aspenONE APM business, or fail to continue to provide innovative, market-leading solutions, we may be unable to implement our growth strategy successfully, and our business could be seriously harmed.

The maintenance and extension of our market leadership and our future growth is largely dependent upon our ability to increase usage and product adoption of our aspenONE engineering and manufacturing and supply chain offerings and grow our aspenONE APM business, and to develop new software products that achieve market acceptance with acceptable operating margins. Enterprises are requiring their application software vendors to provide greater levels of functionality and broader product offerings. We must continue to enhance our current product line and develop and introduce new products and services that keep pace with increasingly sophisticated customer requirements and the technological developments of our competitors. Our business and operating results could suffer if we cannot successfully execute our strategy and drive usage and product adoption.

We have implemented a product strategy that unifies our software solutions under the aspenONE brand with differentiated aspenONE vertical solutions targeted at specific capital-intensive industries. We cannot ensure that our product strategy will result in products that will continue to meet market needs and achieve significant usage and product adoption. If we fail to increase usage and product adoption or fail to develop or acquire new software products that meet the demands of our customers or our target markets, our operating results and cash flows from operations will grow at a slower rate than we anticipate and our financial condition could suffer.

Our business could suffer if we do not grow our aspenONE APM business or if the demand for, or usage of, our other aspenONE software declines for any reason, including declines due to adverse changes in the process and other capital-intensive industries.

We have introduced the aspenONE APM suite, and our aspenONE engineering and manufacturing and supply chain suites account for a significant majority of our revenue and will continue to do so for the foreseeable future. If we do not grow our aspenONE APM business or if demand for, or usage of, our other suites declines for any reason, our operating results, cash flows from operations and financial position would suffer. Our business could be adversely affected by:

- insufficient growth in our aspenONE APM business;
- any decline in demand for or usage of our aspenONE suites;
- the introduction of products and technologies that serve as a replacement or substitute for, or represent an improvement over, our aspenONE suites;
- technological innovations that our aspenONE suites do not address;
- our inability to release enhanced versions of our aspenONE suites on a timely basis; and
- adverse changes in capital intensive industries or otherwise that lead to reductions, postponements or cancellations of customer purchases of our products and services, or delays in the execution of license agreement renewals in the same quarter in which the original agreements expire.

Because of the nature of their products and manufacturing processes and their global operations, companies in the process and other capital-intensive industries are subject to risk of adverse or even catastrophic environmental, safety and health accidents or incidents and are often subject to changing standards and regulations worldwide.

In addition, worldwide economic downturns and pricing pressures experienced by energy, chemical, engineering and construction, and other capital-intensive industries have led to consolidations and reorganizations. In particular, we believe that the drop in demand for oil due to the COVID-19 pandemic, compounded by the excess supply arising from producers' failure to agree on production cuts, impacted and may continue to impact the operating levels and capital spending of certain of our customers. This has resulted in, and could continue to result in, less predictable and lower demand for our products and services. Any such adverse environmental, safety or health incident, change in regulatory standards, or economic downturn that affects the capital-intensive industries, including continued challenges and uncertainty among customers whose business is adversely affected by volatility in oil prices, a shift to a greater percentage of renewable energy sources such as wind and solar, as well as general domestic and foreign economic conditions and other factors that reduce spending by companies in these industries, could harm our operating results in the future.

Unfavorable economic and market conditions or a lessening demand in the market for asset optimization software could adversely affect our operating results.

Our business is influenced by a range of factors that are beyond our control and difficult or impossible to predict. If the market for asset optimization software grows more slowly than we anticipate, demand for our products and services could decline and our operating results could be impaired. Further, the state of the global economy may deteriorate in the future. Our operating results may be adversely affected by unfavorable global economic and market conditions, including the significant drop in oil prices arising from producers' failure to agree on production cuts and a drop in demand due to the COVID-19 pandemic, as well as a lessening demand for asset optimization software generally.

Customer demand for our products is linked to the strength of the global economy. If weakness in the global economy persists, many customers, including those whose businesses are negatively impacted by lower oil prices, or the COVID-19 pandemic generally, may delay or reduce technology purchases. This could result in reductions in sales of our products, longer sales cycles, slower adoption of new technologies, increased price competition or reduced use of our products by our customers. We will lose revenue if demand for our products is reduced because potential customers experience weak or deteriorating economic conditions, catastrophic environmental or other events, and our business, results of operations, financial condition and cash flow from operations would likely be adversely affected.

The majority of our revenue is attributable to operations outside the United States, and our operating results therefore may be materially affected by the economic, political, military, regulatory and other risks of foreign operations or of transacting business with customers outside the United States.

As of June 30, 2020, we operated in 33 countries. We sell our products primarily through a direct sales force located throughout the world. In the event that we are unable to adequately staff and maintain our foreign operations, we could face difficulties managing our international operations.

Customers outside the United States accounted for the majority of our total revenue during the fiscal years ended June 30, 2020, 2019 and 2018. We anticipate that revenue from customers outside the United States will continue to account for a significant portion of our total revenue for the foreseeable future. Our operating results attributable to operations outside the United States are subject to additional risks, including:

- unexpected changes in regulatory or environmental requirements, tariffs and other barriers, including, for example, international trade disputes, changes in climate regulations, sanctions or other regulatory restrictions imposed by the United States or foreign governments; and the effects of the United Kingdom European Union membership referendum in June 2016 and the subsequent withdrawal process initiated in March 2017; pursuant to which the United Kingdom ceases to be a European Union member;

- less effective protection of intellectual property;

- requirements of foreign laws and other governmental controls;

- delays in the execution of license agreement renewals in the same quarter in which the original agreements expire;

- difficulties in collecting trade accounts receivable in other countries;

- adverse tax consequences; and

- the challenges of managing legal disputes in foreign jurisdictions.

Fluctuations in foreign currency exchange rates could result in declines in our reported revenue and operating results.

During fiscal 2020, 2019 and 2018, 6.6%, 10.1% and 9.0% of our total revenue was denominated in a currency other than the U.S. dollar, respectively. In addition, certain of our operating expenses incurred outside the United States are denominated in currencies other than the U.S. dollar. Our reported revenue and operating results are subject to fluctuations in foreign exchange rates. Foreign currency risk arises primarily from the net difference between non-U.S. dollar receipts from customers outside the United States and non-U.S. dollar operating expenses for subsidiaries in foreign countries. Currently, our largest exposures to foreign exchange rates exist primarily with the Euro, Pound Sterling, Canadian Dollar, Japanese Yen, and Russian Ruble against the U.S. dollar. During fiscal 2020, 2019 and 2018, we did not enter into, and were not a party to any, derivative financial instruments, such as forward currency exchange contracts, intended to manage the volatility of these market risks. We cannot predict the impact of foreign currency fluctuations, and foreign currency fluctuations in the future may adversely affect our revenue and operating results. Any hedging policies we may implement in the future may not be successful, and the cost of those hedging techniques may have a significant negative impact on our operating results.

Competition from software offered by current competitors and new market entrants, as well as from internally developed solutions by our customers, could adversely affect our ability to sell our software products and related services and could result in pressure to price our products in a manner that reduces our margins.

Our markets in general are competitive and differ among our principal product areas: engineering, manufacturing, supply chain management and asset performance management. We face challenges in selling our solutions to large companies that have internally developed their own proprietary software solutions, and we face competition from well-established vendors as well as new entrants in our markets. Many of our current and potential competitors have greater financial, technical, marketing, service and other resources than we have. As a result, these companies may be able to offer lower prices, additional products or services, or other incentives that we cannot match or offer. These competitors may be in a stronger position to respond more quickly to new technologies and may be able to undertake more extensive marketing campaigns. We believe they also have adopted and may continue to pursue more aggressive pricing policies and make more attractive offers to potential customers, employees and strategic partners. For example, some competitors may be able to initiate relationships through sales and installations of hardware and then seek to expand their customer relationships by offering asset optimization software at a discount. In addition, many of our competitors have established, and may in the future continue to establish, cooperative relationships with third parties to improve their product offerings and to increase the availability of their products in the marketplace. Competitors with greater financial resources may make strategic acquisitions to increase their ability to gain market share or improve the quality or marketability of their products.

Competition could seriously impede our ability to sell additional software products and related services on terms favorable to us. Businesses may continue to enhance their internally developed solutions, rather than investing in commercial software such as ours. Our current and potential commercial competitors may develop and market new technologies that render our existing or future products obsolete, unmarketable or less competitive. In addition, if these competitors develop products with similar or superior functionality to our products, we may need to decrease the prices for our products in order to remain competitive. If we are unable to maintain our current pricing due to competitive pressures, our margins will be reduced and our operating results will be negatively affected. We cannot ensure that we will be able to compete successfully against current or future competitors or that competitive pressures will not materially adversely affect our business, financial condition and operating results.

Defects or errors in our software products could harm our reputation, impair our ability to sell our products and result in significant costs to us.

Our software products are complex and may contain undetected defects or errors. We have not suffered significant harm from any defects or errors to date, but we have from time to time found defects in our products and we may discover additional defects in the future. We may not be able to detect and correct defects or errors before releasing products. Consequently, we or our customers may discover defects or errors after our products have been implemented. We have in the past issued, and may in the future need to issue, corrective releases of our products to remedy defects or errors. The occurrence of any defects or errors could result in:

- lost or delayed market acceptance and sales of our products;
- delays in payment to us by customers;
- product returns;
- injury to our reputation;
- diversion of our resources;
- increased service and warranty expenses or financial concessions;
- increased insurance costs; and
- legal claims, including product liability claims.

Defects and errors in our software products could result in claims for substantial damages against us.

Potential acquisitions could be difficult to consummate and integrate into our operations, and they and investment transactions could disrupt our business, dilute stockholder value or impair our financial results.

As part of our business strategy, we may continue from time to time to seek to grow our business through acquisitions of or investments in new or complementary businesses, technologies or products that we believe can improve our ability to compete in our existing customer markets or allow us to enter new markets. The potential risks associated with acquisitions and investment transactions include, but are not limited to:

- failure to realize anticipated returns on investment, cost savings and synergies;
- difficulty in assimilating the operations, policies and personnel of the acquired company;

- unanticipated costs associated with acquisitions;
- challenges in combining product offerings and entering into new markets in which we may not have experience;
- distraction of management’s attention from normal business operations;
- potential loss of key employees of the acquired company;
- difficulty implementing effective internal controls over financial reporting and disclosure controls and procedures;
- impairment of relationships with customers or suppliers;
- possibility of incurring impairment losses related to goodwill and intangible assets; and
- other issues not discovered in due diligence, which may include product quality issues or legal or other contingencies

Acquisitions and/or investments may also result in potentially dilutive issuances of equity securities, the incurrence of debt and contingent liabilities, the expenditure of available cash, and amortization expenses or write-downs related to intangible assets such as goodwill, any of which could have a material adverse effect on our operating results or financial condition. Investments in immature businesses with unproven track records and technologies have an especially high degree of risk, with the possibility that we may lose our entire investment or incur unexpected liabilities. We may experience risks relating to the challenges and costs of closing a business combination or investment transaction and the risk that an announced business combination or investment transaction may not close. There can be no assurance that we will be successful in making additional acquisitions in the future or in integrating or executing on our business plan for existing or future acquisitions.

We may be subject to significant expenses and damages because of product-related claims.

In the ordinary course of business, we are, from time to time, involved in lawsuits, claims, investigations, proceedings and threats of litigation. The amount of damages cannot be predicted with certainty, and a successful claim brought against us could materially harm our business and financial condition. Product-related claims, even if not successful, could damage our reputation, cause us to lose existing clients, limit our ability to obtain new clients, divert management's attention from operations, result in significant revenue loss, create potential liabilities for our clients and us, and increase insurance and other operational costs.

Claims that we infringe the intellectual property rights of others may be costly to defend or settle and could damage our business.

We cannot be certain that our software and services do not infringe patents, copyrights, trademarks or other intellectual property rights, so infringement claims might be asserted against us. In addition, we have agreed, and may agree in the future, to indemnify certain of our customers against infringement claims that third parties may assert against our customers based on use of our software or services. Such claims may have a material adverse effect on our business, may be time-consuming and may result in substantial costs and diversion of resources, including our management's attention to our business. Furthermore, a party making an infringement claim could secure a judgment that requires us to pay substantial damages and could also include an injunction or other court order that could prevent us from selling our software or require that we re-engineer some or all of our products. Claims of intellectual property infringement also might require us to enter costly royalty or license agreements. We may be unable to obtain royalty or license agreements on terms acceptable to us or at all. Our business, operating results and financial condition could be harmed significantly if any of these events were to occur, and the price of our common stock could be adversely affected.

We may not be able to protect our intellectual property rights, which could make us less competitive and cause us to lose market share.

Our software is proprietary. Our strategy is to rely on a combination of copyright, patent, trademark and trade secret laws in the United States and other jurisdictions, and to rely on license and confidentiality agreements and software security measures to further protect our proprietary technology and brand. We have obtained or applied for patent protection with respect to some of our intellectual property, but generally do not rely on patents as a principal means of protecting our intellectual property. We have registered or applied to register some of our trademarks in the United States and in selected other countries. We generally enter into non-disclosure agreements with our employees and customers, and historically have restricted third-party access to our software and source code, which we regard as proprietary information. In certain cases, we have provided copies of source code to customers for the purpose of special product customization or have deposited copies of the source code with a third-party escrow agent as security for ongoing service and license obligations. In these cases, we rely on non-disclosure and other contractual provisions to protect our proprietary rights.

The steps we have taken to protect our proprietary rights may not be adequate to deter misappropriation of our technology or independent development by others of technologies that are substantially equivalent or superior to our technology. Our intellectual property rights may expire or be challenged, invalidated or infringed upon by third parties or we may be unable to maintain, renew or enter into new licenses on commercially reasonable terms. Any misappropriation of our technology or development of competitive technologies could harm our business and could diminish or cause us to lose the competitive advantages associated with our proprietary technology, and could subject us to substantial costs in protecting and enforcing our intellectual property rights, and/or temporarily or permanently disrupt our sales and marketing of the affected products or services. The laws of some countries in which our products are licensed do not protect our intellectual property rights to the same extent as the laws of the United States. Moreover, in some non-U.S. countries, laws affecting intellectual property rights are uncertain in their application, which can affect the scope of enforceability of our intellectual property rights.

Our software research and development initiatives and our customer relationships could be compromised if the security of our information technology is breached as a result of a cyber-attack. This could have a material adverse effect on our business, operating results and financial condition, and could harm our competitive position.

We devote significant resources to continually updating our software and developing new products, and our financial performance is dependent in part upon our ability to bring new products and services to market. Our customers use our software to optimize their manufacturing processes and manage asset performance, and they rely on us to provide updates and releases as part of our software maintenance and support services, and to provide remote on-line troubleshooting support. The security of our information technology environment is therefore important to our research and development initiatives, and an important consideration in our customers' purchasing decisions. We maintain cybersecurity policies and procedures, including employee training, to manage risk to our information systems, and we continually evaluate and adapt our systems and processes to mitigate evolving cybersecurity threats. We may incur additional costs to maintain appropriate cybersecurity protections in response to evolving cybersecurity threats, and we may not be able to safeguard against all data security breaches or misuses of data. If the security of our systems is impaired, our development initiatives might be disrupted, and we might be unable to provide service. Our customer relationships might deteriorate, our reputation in the industry could be harmed, and we could be subject to liability claims. This could reduce our revenues, and expose us to significant costs to detect, correct and avoid recurrences of any breach of security and to defend any claims against us. In addition, our insurance coverage may not be adequate to cover all costs related to cybersecurity incidents and the disruptions resulting from such events.

Risks Related to Our Common Stock

Our common stock may experience substantial price and volume fluctuations.

The equity markets have from time to time experienced extreme price and volume fluctuations, particularly in the high technology sector, and those fluctuations often have been unrelated to the operating performance of particular companies. In addition, the market price of our common stock may be affected by other factors, such as: (i) our financial performance; (ii) announcements of technological innovations or new products by us or our competitors; and (iii) market conditions in the computer software or hardware industries.

In the past, following periods of volatility in the market price of a public company's securities, securities class action litigation has often been instituted against that company. This type of litigation against us could result in substantial liability and costs and divert management's attention and resources.

Our corporate documents and provisions of Delaware law may prevent a change in control or management that stockholders may consider desirable.

Section 203 of the Delaware General Corporation Law, our charter and our by-laws contain provisions that might enable our management to resist a takeover of our company. These provisions include:

- limitations on the removal of directors;
- a classified board of directors, so that not all members of the board are elected at one time;
- advance notice requirements for stockholder proposals and nominations;
- the inability of stockholders to act by written consent or to call special meetings;
- the ability of the board to make, alter or repeal our by-laws; and
- the ability of the board to designate the terms of and issue new series of preferred stock without stockholder approval.

These provisions could:

- have the effect of delaying, deferring or preventing a change in control of our company or a change in our management that stockholders may consider favorable or beneficial;
- discourage proxy contests and make it more difficult for stockholders to elect directors and take other corporate actions; and
- limit the price that investors might be willing to pay in the future for shares of our common stock.

Item 1B. Unresolved Staff Comments.

None.

Item 2. Properties.

Our principal executive offices are located in leased facilities in Bedford, Massachusetts, consisting of approximately 143,000 square feet of office space to accommodate our product development, sales, marketing, operations, finance and administrative functions. The lease for our Bedford executive offices commenced in November 2014 and is scheduled to expire March 2025. Subject to the terms and conditions of the lease, we may extend the term of the lease for two successive terms of five years each.

We also lease approximately 69,000 square feet in Houston, Texas to accommodate sales, services and product development functions. In addition to our Bedford and Houston locations, we lease office space in the United Kingdom, Shanghai, Mexico City, Singapore, Beijing, Pune, Moscow, Tokyo, and Bahrain, to accommodate sales, services and product development functions.

In the remainder of our other locations, the majority of our leases have lease terms of one year or less that are generally based on the number of workstations required. We believe this facilities strategy provides us with significant flexibility to adjust to changes in our business environment. We do not own any real property. We believe that our leased facilities are adequate for our anticipated future needs.

Item 3. Legal Proceedings.

None.

Item 4. Mine Safety Disclosures

None.

PART II

Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities.

Market Information

Our common stock currently trades on The NASDAQ Global Select Market under the symbol "AZPN." The closing price of our common stock on June 30, 2020 was $103.61.

Holders

On November 25, 2020, there were 319 holders of record of our common stock. The number of record holders does not include persons who held common stock in nominee or "street name" accounts through brokers.

Dividends

We have never declared or paid cash dividends on our common stock. We do not anticipate paying cash dividends on our common stock in the foreseeable future. In December 2019, we entered into an Amended and Restated Credit Agreement with JPMorgan Chase Bank, N.A., as administrative agent, joint lead arranger and joint bookrunner, Silicon Valley Bank, as joint lead arranger, joint bookrunner and syndication agent, and the lenders and co-documentation agents named therein (the "Amended and Restated Credit Agreement"). The Amended and Restated Credit Agreement, which amends and restates the Credit Agreement we entered into as of February 26, 2016 with the same lenders (the “Prior Credit Agreement”), provides for a $200.0 million secured revolving credit facility and a $320.0 million secured term loan facility. The Amended and Restated Credit Agreement restricts us from declaring or paying dividends in cash on our capital stock if our Leverage Ratio is in excess of 2.75 to 1.00 (refer to “Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations - Liquidity and Capital Resources - Credit Agreement” and Note 12, "Credit Agreement," to our Consolidated Financial Statements for further discussion of the Amended and Restated Credit Agreement). Our Leverage Ratio is below 2.75 to 1.00 as of June 30, 2020. Any future determination relating to our dividend policy will be made at the discretion of the Board of Directors and will depend on a number of factors, including our future earnings, capital requirements, financial condition and future prospects and such other factors as the Board of Directors may deem relevant.

Purchases of Equity Securities by the Issuer

As of June 30, 2020, the total number of shares of common stock repurchased since November 1, 2010 under all programs approved by the Board of Directors was 36,270,015 shares.

On January 22, 2015, our Board of Directors approved a share repurchase program (the "Share Repurchase Program") for up to $450.0 million worth of our common stock. On April 26, 2016, June 8, 2017, April 18, 2018, December 6, 2018, and April 17, 2019, the Board of Directors approved a $400.0 million, $200.0 million, $200.0 million, $100.0 million, and $200.0 million increase in the Share Repurchase Program, respectively. On July 22, 2020, our Board of Directors approved a new share repurchase program (the "New Share Repurchase Program") for up to $200.0 million worth of our common stock, and terminated the Share Repurchase Program. Under the New Share Repurchase Program, purchases can be made from time to time using a variety of methods, which may include open market purchases, accelerated buyback programs, and others. The specific timing, price and size of purchases will depend on prevailing stock prices, general market and economic conditions, and other considerations, including the amount of cash generated in the United States and other potential uses of cash, such as acquisitions. Purchases may be made through a Rule 10b5-1 plan pursuant to predetermined metrics set forth in such plan. The Board of Directors' authorization of the New Share Repurchase Program does not obligate us to acquire any particular amount of common stock, and the program may be suspended or discontinued at any time.

During the first nine months of fiscal 2020, we repurchased 1,252,289 shares of our common stock in the open market for $150.0 million. We did not repurchase shares of our common stock during the fourth quarter of fiscal 2020. During fiscal 2019, we repurchased 3,074,127 shares of our common stock in the open market for $300.0 million. During fiscal 2018, we repurchased 2,797,623 shares of our common stock in the open market for $200.0 million.

As of June 30, 2020, the total remaining value under the Share Repurchase Program was approximately $196.3 million.

Item 6. Selected Financial Data.

The following tables present selected consolidated financial data for Aspen Technology, Inc. The consolidated statements of operations data set forth below for fiscal 2020, 2019 and 2018 and the consolidated balance sheets data as of June 30, 2020 and 2019, are derived from our consolidated financial statements included beginning on page F-1 of this Form 10-K. The consolidated statements of operations data for fiscal 2017 and 2016 and the consolidated balance sheet data as of June 30, 2018, 2017, and 2016 are derived from our consolidated financial statements that are not included in this Form 10-K. The data presented below should be read in conjunction with our consolidated financial statements and accompanying notes beginning on page F-1 and "Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations."

Our historical results should not be viewed as indicative of results expected for any future period.

As a result of the adoption of new guidance related to revenue recognition during fiscal 2019, prior period information for fiscal 2018 and 2017 included below has been restated to reflect the new guidance. Prior period information for fiscal 2016 has not been restated and is, therefore, not comparable to the fiscal 2020, 2019, 2018, and 2017 information. In addition, we have revised the following table for immaterial error corrections discussed in Note 20, "Correction of Immaterial Errors," to our Consolidated Financial Statements.

	Year Ended June 30,				
	2020	2019	2018	2017	2016
		As Adjusted	As Adjusted	As Adjusted	
	(in Thousands, except per share data)				
Consolidated Statements of Operations Data:					
Revenue	$ 598,717	$ 596,682	$ 507,566	$ 483,395	$ 472,344
Gross profit	537,110	538,866	456,922	435,929	423,733
Income from operations	257,359	281,139	207,928	205,687	211,381
Net income	$ 229,671	$ 261,362	$ 281,234	$ 173,063	$ 139,951
Basic income per share	$ 3.38	$ 3.74	$ 3.90	$ 2.26	$ 1.69
Diluted income per share	$ 3.34	$ 3.69	$ 3.85	$ 2.25	$ 1.68
Weighted average shares outstanding—Basic	68,000	69,925	72,140	76,491	82,892
Weighted average shares outstanding—Diluted	68,727	70,787	72,956	76,978	83,309

	Year Ended June 30,				
	2020	2019	2018	2017	2016
		As Adjusted	As Adjusted	As Adjusted	
	(in Thousands)				
Consolidated Balance Sheet Data:					
Cash and cash equivalents	$ 287,796	$ 71,926	$ 96,165	$ 101,954	$ 318,336
Marketable securities	—	—	—	—	3,006
Accounts receivable, net	56,301	47,784	41,810	42,656	20,476
Installments receivable, net	—	—	—	—	267
Contract assets	610,473	582,291	521,627	536,559	—
Total assets	1,223,306	863,013	814,453	816,730	419,738
Borrowings, net	427,532	220,000	170,000	140,000	140,000
Deferred revenue	57,081	44,891	27,504	44,860	282,078
Working capital (deficit)	415,942	105,645	155,389	213,150	(71,300)
Total stockholders' equity (deficit)	466,353	361,960	377,974	268,759	(75,034)

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations.

You should read the following discussion in conjunction with our consolidated financial statements and related notes beginning on page F-1. In addition to historical information, this discussion contains forward-looking statements that involve risks and uncertainties. You should read "Item 1A. Risk Factors" for a discussion of important factors that could cause our actual results to differ materially from our expectations.

Our fiscal year ends on June 30, and references to a specific fiscal year are the twelve months ended June 30 of such year (for example, "fiscal 2020" refers to the year ended June 30, 2020).

Business Overview

We are a global leader in asset optimization software that optimizes asset design, operations and maintenance in complex, industrial environments. We combine decades of process modeling and operations expertise with big data, artificial intelligence, and advanced analytics. Our purpose-built software improves the competitiveness and profitability of our customers by increasing throughput, energy efficiency, and production levels, reducing unplanned downtime, plant emissions, and safety risks, enhancing capital efficiency, and decreasing working capital requirements over the entire asset lifecycle to support operational excellence.

Our software incorporates our proprietary mathematical and empirical models of manufacturing and planning processes and reflects the deep domain expertise we have amassed from focusing on solutions for the process and other capital-intensive industries for over 35 years. We have developed our applications to design and optimize processes across three principal business areas: engineering, manufacturing and supply chain, and asset performance management. We are a recognized market and technology leader in providing process optimization and asset performance management software for each of these business areas.

We have established sustainable competitive advantages based on the following strengths:

- Innovative products that can enhance our customers' profitability and productivity;

- Long-term customer relationships;

- Large installed base of users of our software; and

- Long-term license contracts.

We have approximately 2,400 customers globally. Our customers consist of companies engaged in the process and other capital-intensive industries such as energy, chemicals, engineering and construction, as well as pharmaceuticals, food and beverage, transportation, power, metals and mining, pulp and paper, and consumer packaged goods.

Business Segments

We have two operating and reportable segments, which are consistent with our reporting units: (i) subscription and software and (ii) services and other. The subscription and software segment is engaged in the licensing of process optimization and asset performance management software solutions and associated support services, and includes our license and maintenance revenue. The services and other segment includes professional services and training, and includes our services and other revenue.

Recent Events

In December 2019, the novel SARS-CoV-2 virus and associated COVID 19 disease (“COVID-19”) were reported in China, and in March 2020 the World Health Organization declared a pandemic. Since the beginning of March 2020, the sudden decrease in demand for oil due to the COVID-19 pandemic, compounded by the excess supply arising from producers’ failure to agree on production cuts, resulted in a drop in oil prices. During fiscal 2020, our business was negatively impacted by these factors. Specifically, in the last four months of the fiscal year, we saw a slowdown in closing customer contracts, a slight increase in our customer attrition rate due to non-renewals and renewals at lower entitlement level and, to a lesser extent, a slowdown in customer payments. We are continuing to assess the impact of these items on global markets and the various industries of our customers. The extent of the impact on our operational and financial performance going forward will depend on developments such as the duration and spread of the pandemic and other factors affecting oil prices, the impact of these items on our customers and our sales cycles, as well as on our employees, all of which are uncertain and cannot be predicted. We are continuing to monitor the potential impacts related to the current disruption of COVID-19 and uncertainty in the global markets on the various industries of our customers. These factors could potentially impact the signing of new agreements, as well as the recoverability of assets, including accounts receivable and contract costs.

Key Components of Operations

Revenue

We generate revenue primarily from the following sources:

License Revenue. We sell our software products to end users, primarily under fixed-term licenses, through a subscription offering which we refer to as our aspenONE licensing model. The aspenONE licensing model includes software maintenance and support, known as our Premier Plus SMS offering, for the entire term. Our aspenONE products are organized into three suites: 1) engineering; 2) manufacturing and supply chain; and 3) asset performance management. The aspenONE licensing model provides customers with access to all of the products within the aspenONE suite(s) they license. Customers can change or alternate the use of multiple products in a licensed suite through the use of exchangeable units of measurement, called tokens, licensed in quantities determined by the customer. This licensing system enables customers to use products as needed and to experiment with different products to best solve whatever critical business challenges they face. Customers can increase their usage of our software by purchasing additional tokens as business needs evolve.

We also license our software through point product arrangements with our Premier Plus SMS offering included for the contract term.

Maintenance Revenue. We provide customers technical support, access to software fixes and updates and the right to any new unspecified future software products and updates that may be introduced into the licensed aspenONE software suite. Our technical support services are provided from our customer support centers throughout the world, as well as via email and through our support website.

Services and Other Revenue. We provide training and professional services to our customers. Our professional services are focused on implementing our technology in order to improve customers' plant performance and gain better operational data. Customers who use our professional services typically engage us to provide those services over periods of up to 24 months. We charge customers for professional services on a time-and-materials or fixed-price basis. We provide training services to our customers, including on-site, Internet-based and customized training.

Cost of Revenue

Cost of License. Our cost of license revenue consists of (i) royalties, (ii) amortization of capitalized software and intangibles, and (iii) distribution fees.

Cost of Maintenance. Our cost of maintenance revenue consists primarily of personnel-related costs of providing Premier Plus SMS bundled with our aspenONE licensing and point product arrangements.

Cost of Services and Other. Our cost of services and other revenue consists primarily of personnel-related and external consultant costs associated with providing customers professional services and training.

Operating Expenses

Selling and Marketing Expenses. Selling expenses consist primarily of the personnel and travel expenses related to the effort expended to license our products and services to current and potential customers, as well as for overall management of customer relationships. Marketing expenses include expenses needed to promote our company and our products and to conduct market research to help us better understand our customers and their business needs.

Research and Development Expenses. Research and development expenses consist primarily of personnel expenses related to the creation of new software products, enhancements and engineering changes to existing products.

General and Administrative Expenses. General and administrative expenses include the costs of corporate and support functions, such as executive leadership and administration groups, finance, legal, human resources and corporate communications, and other costs, such as outside professional and consultant fees, amortization of intangibles, and provision for bad debts.

Other Income and Expenses

Interest Income. Interest income is recorded for financing components under Accounting Standards Update ("ASU") No. 2014-09, *Revenue from Contracts with Customers* ("Topic 606"). When a contract includes a significant financing component, we generally receive the majority of the customer consideration after the recognition of a substantial portion of the arrangement fee as license revenue. As a result, we decrease the amount of revenue recognized and increase interest income by a corresponding amount. Interest income also includes the accretion of interest on investments in short-term money market instruments.

Interest Expense. Interest expense is primarily related to our Amended and Restated Credit Agreement.

Other (Expense) Income, Net. Other (expense) income, net is comprised primarily of foreign currency exchange gains (losses) generated from the settlement and remeasurement of transactions denominated in currencies other than the functional currency of our operating units.

Provision for Income Taxes. Provision for income taxes is comprised of domestic and foreign taxes. We record interest and penalties related to income tax matters as a component of income tax expense. Our effective income tax rate may fluctuate between fiscal years and from quarter to quarter due to items arising from discrete events, such as tax benefits from the disposition of employee equity awards, settlements of tax audits and assessments and tax law changes. Our effective income tax rate is also impacted by, and may fluctuate in any given period because of, the composition of income in foreign jurisdictions where tax rates differ.

Key Business Metrics

Background

We utilize key business measures to track and assess the performance of our business. We have identified the following set of appropriate business metrics in the context of our evolving business:

- Annual spend
- Total contract value
- Bookings

We also use the following non-GAAP business metrics in addition to GAAP measures to track our business performance:

- Free cash flow
- Non-GAAP operating income

We make these measures available to investors and none of these metrics should be considered as an alternative to any measure of financial performance calculated in accordance with GAAP.

Annual Spend

Annual spend is an estimate of the annualized value of our portfolio of term license agreements, as of a specific date. Annual spend is calculated by summing the most recent annual invoice value of each of our active term license agreements. Annual spend also includes the annualized value of standalone SMS agreements purchased with certain legacy term license agreements, which have become an immaterial part of our business.

Comparing annual spend for different dates can provide insight into the growth and retention rates of our business, because annual spend represents the estimated annualized billings associated with our active term license agreements. Management utilizes the annual spend business metric to evaluate the growth and performance of our business as well as for planning and forecasting. In addition, our corporate and executive bonus programs are based in part on the company’s success in meeting targets for growth in annual spend that are approved by our board. We believe that annual spend is a useful business metric to investors as it provides insight into the growth component of our term licenses and to how management evaluates and forecasts the business.

Annual spend increases as a result of new term license agreements with new or existing customers, renewals or modifications of existing term license agreements that result in higher license fees due to contractually-agreed price escalation or an increase in the number of tokens (units of software usage) or products licensed, and escalation of annual payments in our active term license agreements.

Annual spend is adversely affected by term license and standalone SMS agreements that are renewed at a lower entitlement level or not renewed and, to a lesser extent, by customer agreements that become inactive during the agreement's term because, in our determination, amounts due (or which will become due) under the agreement are not collectible. Because the annual spend calculation includes all of our active term license agreements, the reported balance may include agreements with customers that are delinquent in paying invoices, that are in bankruptcy proceedings, or where payment is otherwise in doubt.

As of June 30, 2020, approximately 90% of our term license agreements (by value) are denominated in U.S. dollars. For agreements denominated in other currencies, the company uses a fixed historical exchange rate to calculate annual spend in dollars rather than using current exchange rates, so that our calculation of growth in annual spend is not affected by fluctuations in foreign currencies.

Beginning in fiscal 2019 and for all future periods, for term license agreements that contain professional services or other products and services, we have included in the annual spend calculation the portion of the invoice allocable to the term license under Topic 606 rather than the portion of the invoice attributed to the license in the agreement. We believe that methodology more accurately allocates any discounts or premiums to the different elements of the agreement. We have not applied this methodology retroactively for agreements entered into in prior fiscal years.

We estimate that annual spend grew by approximately 9.6% during fiscal 2020, from $541.0 million as of June 30, 2019 to $593.1 million as of June 30, 2020. We estimate that annual spend grew by approximately 10.6% during fiscal 2019, from $489.3 million as of June 30, 2018 to $541.0 million as of June 30, 2019.

Total Contract Value

Total Contract Value ("TCV") is the aggregate value of all payments received or to be received under all active term license agreements, including maintenance and escalation. TCV was $2.8 billion and $2.6 billion as of June 30, 2020 and 2019, respectively.

Bookings

Bookings is the total value of customer term license contracts signed in the current period, less the value of such contracts signed in the current period where the initial licenses are not yet deemed delivered, plus term license contracts signed in a previous period for which the initial licenses are deemed delivered in the current period.

Bookings was $610.1 million during fiscal 2020, compared to $651.8 million and $502.3 million during fiscal 2019 and 2018, respectively. The change in bookings during fiscal 2020, 2019, and 2018 is related to the timing of renewals.

Free Cash Flow

We use a non-GAAP measure of free cash flow to analyze cash flows generated from our operations. Management believes that this financial measure is useful to investors because it permits investors to view our performance using the same tools that management uses to gauge progress in achieving our goals. We believe this measure is also useful to investors because it is an indication of cash flow that may be available to fund investments in future growth initiatives or to repay borrowings under the Amended and Restated Credit Agreement, and it is a basis for comparing our performance with that of our competitors. The presentation of free cash flow is not meant to be considered in isolation or as an alternative to cash flows from operating activities as a measure of liquidity.

Free cash flow is calculated as net cash provided by operating activities adjusted for the net impact of (a) purchases of property, equipment and leasehold improvements, (b) payments for capitalized computer software costs, (c) non-capitalized acquired technology, and (d) other nonrecurring items, such as acquisition and litigation related payments.

The following table provides a reconciliation of GAAP cash flow from operating activities to free cash flow for the indicated periods:

	June 30,		
	2020	2019	2018
	(Dollars in Thousands)		
Net cash provided by operating activities (GAAP)	$ 243,258	$ 238,313	$ 206,936
Purchase of property, equipment, and leasehold improvements	(1,278)	(436)	(331)
Payments for capitalized computer software costs	(141)	(1,131)	(329)
Non-capitalized acquired technology	—	—	75
Litigation related payments	—	—	4,546
Acquisition related payments	1,264	27	1,148
Free cash flow (non-GAAP)	$ 243,103	$ 236,773	$ 212,045

In fiscal 2018 we have excluded litigation related payments of $4.5 million.

Fiscal 2020 Compared to Fiscal 2019

Total free cash flow increased $6.3 million during fiscal 2020 as compared to the prior fiscal year primarily due to changes in working capital. For a more detailed description of these changes refer to "Liquidity and Capital Resources."

Fiscal 2019 Compared to Fiscal 2018

Total free cash flow increased $24.7 million during fiscal 2019 as compared to the prior fiscal year primarily due to changes in working capital. For a more detailed description of these changes refer to "Liquidity and Capital Resources."

Non-GAAP Income from Operations

Non-GAAP income from operations excludes certain non-cash and non-recurring expenses, and is used as a supplement to income from operations presented on a GAAP basis. We believe that non-GAAP income from operations is a useful financial measure because removing certain non-cash and other items provides additional insight into recurring profitability and cash flow from operations.

The following table presents our income from operations, as adjusted for stock-based compensation expense, amortization of intangibles, and other items, such as the impact of litigation judgments and acquisition related fees, for the indicated periods:

	June 30,			2020 Compared to 2019		2019 Compared to 2018	
	2020	2019	2018	$	%	$	%
		As Adjusted	As Adjusted				
GAAP income from operations	$ 257,359	$ 281,139	$ 207,928	$ (23,780)	(8.5)%	$ 73,211	35.2 %
Plus:							
Stock-based compensation	31,548	27,573	22,688	3,975	14.4 %	4,885	21.5 %
Amortization of intangibles	6,572	4,533	2,231	2,039	45.0 %	2,302	103.2 %
Litigation judgment	—	—	1,689	—	— %	(1,689)	(100.0)%
Acquisition related fees	78	1,438	721	(1,360)	(94.6)%	717	99.4 %
Non-GAAP income from operations	$ 295,557	$ 314,683	$ 235,257	$ (19,126)	(6.1)%	$ 79,426	33.8 %

In fiscal 2018, we incurred an expense associated with a litigation judgment in the amount of $1.7 million.

Results of Operations

The following table sets forth the results of operations, percentage of total revenue and the year-over-year percentage change in certain financial data for fiscal 2020, 2019 and 2018:

	Year Ended June 30,							
	2020		2019		2018		2020 Compared to 2019 %	2019 Compared to 2018 %
			As Adjusted		As Adjusted			
	(Dollars in Thousands)							
Revenue:								
License	$ 388,180	64.8 %	$ 404,581	67.8 %	$ 318,442	62.7 %	(4.1)%	27.1 %
Maintenance	178,139	29.8	163,567	27.4	158,838	31.3	8.9	3.0
Services and other	32,398	5.4	28,534	4.8	30,286	6.0	13.5	(5.8)
Total revenue	598,717	100.0	596,682	100.0	507,566	100.0	0.3	17.6
Cost of revenue:								
License	7,241	1.2	7,060	1.2	5,236	1.0	2.6	34.8
Maintenance	19,248	3.2	19,208	3.2	17,408	3.4	0.2	10.3
Services and other	35,118	5.9	31,548	5.3	28,000	5.5	11.3	12.7
Total cost of revenue	61,607	10.3	57,816	9.7	50,644	9.9	6.6	14.2
Gross profit	537,110	89.7	538,866	90.3	456,922	90.1	(0.3)	17.9
Operating expenses:								
Selling and marketing	114,486	19.1	111,374	18.7	99,737	19.7	2.8	11.7
Research and development	92,230	15.4	83,122	13.9	82,076	16.2	11.0	1.3
General and administrative	73,035	12.2	63,231	10.6	67,181	13.2	15.5	(5.9)
Total operating expenses	279,751	46.7	257,727	43.2	248,994	49.1	8.5	3.5
Income from operations	257,359	43.0	281,139	47.1	207,928	41.0	(8.5)	35.2
Interest income	32,658	5.5	28,457	4.8	24,954	4.9	14.8	14.0
Interest (expense)	(11,862)	(2.0)	(8,733)	(1.5)	(5,691)	(1.1)	35.8	53.5
Other income (expense), net	1,202	0.2	664	0.1	(838)	(0.2)	81.0	(179.2)
Income before income taxes	279,357	46.7	301,527	50.5	226,353	44.6	(7.4)	33.2
Provision for (benefit from) income taxes	49,686	8.3	40,165	6.7	(54,881)	(10.8)	23.7	(173.2)
Net income	$ 229,671	38.4 %	$ 261,362	43.8 %	$ 281,234	55.4 %	(12.1)%	(7.1)%

Revenue

Fiscal 2020 Compared to Fiscal 2019

Total revenue increased by $2.0 million during fiscal 2020 as compared to the prior fiscal year. The increase of $2.0 million was due to an increase in maintenance revenue of $14.6 million and an increase in services and other revenue of $3.9 million, partially offset by a decrease in license revenue of $(16.4) million, as compared to the prior fiscal year.

Fiscal 2019 Compared to Fiscal 2018

Total revenue increased by $89.1 million during fiscal 2019 as compared to the prior fiscal year. The increase of $89.1 million was due to an increase in license revenue of $86.1 million and an increase in maintenance revenue of $4.7 million, partially offset by a decrease in services and other revenue of $(1.8) million as compared to the prior fiscal year.

License Revenue

	Year Ended June 30,			2020 Compared to 2019		2019 Compared to 2018	
	2020	2019	2018	$	%	$	%
		As Adjusted	As Adjusted				
	(Dollars in Thousands)						
License revenue	$ 388,180	$ 404,581	$ 318,442	$ (16,401)	(4.1)%	$ 86,139	27.1%
As a percent of total revenue	64.8%	67.8%	62.7%				

Fiscal 2020 Compared to Fiscal 2019

The decrease in license revenue of $(16.4) million during fiscal 2020 as compared to the prior fiscal year was primarily attributable to a decrease in bookings related to the timing of renewals.

Fiscal 2019 Compared to Fiscal 2018

The increase in license revenue of $86.1 million during fiscal 2019 as compared to the prior fiscal year was primarily due to an increase in bookings and the timing of renewals.

Maintenance Revenue

	Year Ended June 30,			2020 Compared to 2019		2019 Compared to 2018	
	2020	2019	2018	$	%	$	%
		As Adjusted	As Adjusted				
	(Dollars in Thousands)						
Maintenance revenue	$ 178,139	$ 163,567	$ 158,838	$ 14,572	8.9%	$ 4,729	3.0%
As a percent of total revenue	29.8%	27.4%	31.3%				

We expect maintenance revenue to increase as a result of: (i) having a larger base of arrangements recognized on a ratable basis; (ii) increased customer usage of our software; (iii) adding new customers; and (iv) escalating annual payments.

Fiscal 2020 Compared to Fiscal 2019

The increase in maintenance revenue of $14.6 million during fiscal 2020 as compared to the prior fiscal year was primarily due to growth of our base of arrangements, which include maintenance, being recognized on a ratable basis.

Fiscal 2019 Compared to Fiscal 2018

The increase in maintenance revenue of $4.7 million during fiscal 2019 as compared to the prior fiscal year was primarily due to growth of our base of arrangements, which include maintenance, being recognized on a ratable basis.

Services and Other Revenue

	Year Ended June 30,			2020 Compared to 2019		2019 Compared to 2018	
	2020	2019	2018	$	%	$	%
		As Adjusted	As Adjusted				
	(Dollars in Thousands)						
Services and other revenue	$ 32,398	$ 28,534	$ 30,286	$ 3,864	13.5%	$ (1,752)	(5.8)%
As a percent of total revenue	5.4%	4.8%	6.0%				

We recognize professional services revenue for our time-and-materials ("T&M") contracts based upon hours worked and contractually agreed-upon hourly rates. Revenue from fixed-price engagements is recognized using the proportional performance method based on the ratio of costs incurred to the total estimated project costs.

Fiscal 2020 Compared to Fiscal 2019

Services and other revenue increased by $3.9 million during fiscal 2020 as compared to the prior fiscal year primarily due to the timing and volume of professional services engagements.

Fiscal 2019 Compared to Fiscal 2018

Services and other revenue decreased by $(1.8) million during fiscal 2019 as compared to the prior fiscal year primarily due to the timing of professional services engagements.

Cost of Revenue

Cost of License Revenue

	Year Ended June 30,			2020 Compared to 2019		2019 Compared to 2018	
	2020	2019	2018	$	%	$	%
	(Dollars in Thousands)						
Cost of license revenue	$ 7,241	$ 7,060	$ 5,236	$ 181	2.6%	$ 1,824	34.8%
As a percent of license revenue	1.9%	1.7%	1.6%				

Fiscal 2020 Compared to Fiscal 2019

Cost of license revenue increased by $0.2 million during fiscal 2020 as compared to the prior fiscal year. The increase in cost of license revenue during fiscal 2020 was primarily due to increased amortization of intangible assets from acquisitions. License gross profit margin was 98.1% in fiscal 2020 and was consistent with 98.3% in fiscal 2019.

Fiscal 2019 Compared to Fiscal 2018

Cost of license revenue increased by $1.8 million during fiscal 2019 as compared to the prior fiscal year. The increase in cost of license revenue during fiscal 2019 was primarily due to increased amortization of intangible assets from acquisitions. License gross profit margin was 98.3% in fiscal 2019 and was consistent with 98.4% in fiscal 2018.

Cost of Maintenance Revenue

	Year Ended June 30,			2020 Compared to 2019		2019 Compared to 2018	
	2020	2019	2018	$	%	$	%
	(Dollars in Thousands)						
Cost of maintenance revenue	$ 19,248	$ 19,208	$ 17,408	$ 40	0.2%	$ 1,800	10.3%
As a percent of maintenance revenue	10.8%	11.7%	11.0%				

Fiscal 2020 Compared to Fiscal 2019

Cost of maintenance revenue was consistent during fiscal 2020 as compared to the prior fiscal year. Maintenance gross profit margin was 89.2% in fiscal 2020 and was consistent with 88.4% in fiscal 2019.

Fiscal 2019 Compared to Fiscal 2018

Cost of maintenance revenue increased by $1.8 million during fiscal 2019 as compared to the prior fiscal year. The increase in cost of maintenance revenue during fiscal 2019 was primarily due to higher headcount related costs. Maintenance gross profit margin was 88.4% in fiscal 2019 and was consistent with 89.1% in fiscal 2018.

Cost of Services and Other Revenue

	Year Ended June 30,			2020 Compared to 2019		2019 Compared to 2018	
	2020	2019	2018	$	%	$	%
	(Dollars in Thousands)						
Cost of services and other revenue	$ 35,118	$ 31,548	$ 28,000	$ 3,570	11.3%	$ 3,548	12.7%
As a percent of services and other revenue	108.4%	110.6%	92.5%				

The timing of revenue and expense recognition on professional service arrangements can impact the comparability of cost and gross profit margin of professional services revenue from year to year. For example, revenue from fixed-price engagements is recognized using the proportional performance method based on the ratio of costs incurred to the total estimated project costs.

Fiscal 2020 Compared to Fiscal 2019

Cost of services and other revenue increased by $3.6 million during fiscal 2020 as compared to the prior fiscal year. The increase in cost of services and other revenue during fiscal 2020 was primarily due to higher cost of delivering professional services to support the corresponding increase in revenue during the period. Services and other gross profit margin was (10.8)% in fiscal 2020, compared to (16.2)% in fiscal 2019.

Fiscal 2019 Compared to Fiscal 2018

Cost of services and other revenue increased by $3.5 million during fiscal 2019 as compared to the prior fiscal year. The increase in cost of services and other revenue during fiscal 2019 was primarily due to higher cost of delivering professional services to support the corresponding increase in revenue during the period. Services and other gross profit margin was (16.2)% in fiscal 2019, compared to 1.0% in fiscal 2018.

Gross Profit

	Year Ended June 30,			2020 Compared to 2019		2019 Compared to 2018	
	2020	2019	2018	$	%	$	%
		As Adjusted	As Adjusted				
	(Dollars in Thousands)						
Gross profit	$ 537,110	$ 538,866	$ 456,922	$ (1,756)	(0.3)%	$ 81,944	17.9%
As a percent of total revenue	89.7%	90.3%	90.1%				

For further discussion of subscription and software gross profit and services and other gross profit, please refer to the “Cost of License Revenue," "Cost of Maintenance Revenue," and “Cost of Services and Other Revenue” sections above.

Fiscal 2020 Compared to Fiscal 2019

Gross profit decreased by $(1.8) million during fiscal 2020 as compared to the prior fiscal year and gross profit margin remained consistent at 89.7% in fiscal 2020 compared to 90.3% in fiscal 2019.

Fiscal 2019 Compared to Fiscal 2018

Gross profit increased by $81.9 million during fiscal 2019 as compared to the prior fiscal year and gross profit margin remained consistent at 90.3% in fiscal 2019 compared to 90.1% in fiscal 2018.

Operating Expenses

Selling and Marketing Expense

	Year Ended June 30,			2020 Compared to 2019		2019 Compared to 2018	
	2020	2019	2018	$	%	$	%
	(Dollars in Thousands)						
Selling and marketing expense	$ 114,486	$ 111,374	$ 99,737	$ 3,112	2.8%	$ 11,637	11.7%
As a percent of total revenue	19.1%	18.7%	19.7%				

Fiscal 2020 Compared to Fiscal 2019

The year-over-year increase of $3.1 million in selling and marketing expense in fiscal 2020 as compared to the prior fiscal year was primarily due to higher compensation costs of $6.9 million related to an increase in headcount and higher stock-based compensation of $1.0 million, partially offset by lower travel-related costs of $1.8 million, lower royalties of $0.9 million, and lower marketing costs of $0.8 million due to our biennial customer conference held in fiscal 2019.

Fiscal 2019 Compared to Fiscal 2018

The year-over-year increase of $11.6 million in selling and marketing expense in fiscal 2019 as compared to the prior fiscal year was primarily due to higher compensation costs of $4.9 million related to an increase in headcount, higher commissions expense of $3.8 million, higher marketing costs of $1.2 million due to our biennial customer conference held in fiscal 2019, and higher stock-based compensation of $1.1 million.

Research and Development Expense

	Year Ended June 30,			2020 Compared to 2019		2019 Compared to 2018	
	2020	2019	2018	$	%	$	%
	(Dollars in Thousands)						
Research and development expense	$ 92,230	$ 83,122	$ 82,076	$ 9,108	11.0%	$ 1,046	1.3%
As a percent of total revenue	15.4%	13.9%	16.2%				

Fiscal 2020 Compared to Fiscal 2019

The year-over-year increase of $9.1 million in research and development expense in fiscal 2020 as compared to the prior fiscal year was primarily due to higher compensation costs of $6.8 million related to an increase in headcount and higher stock-based compensation of $1.7 million.

Fiscal 2019 Compared to Fiscal 2018

The year-over-year increase of $1.0 million in research and development expense in fiscal 2019 was primarily due to higher compensation costs of $1.2 million related to an increase in headcount, partially offset by lower stock-based compensation of $0.7 million.

General and Administrative Expense

	Year Ended June 30,			2020 Compared to 2019		2019 Compared to 2018	
	2020	2019	2018	$	%	$	%
	(Dollars in Thousands)						
General and administrative expense	$ 73,035	$ 63,231	$ 67,181	$ 9,804	15.5%	$ (3,950)	(5.9)%
As a percent of total revenue	12.2%	10.6%	13.2%				

Fiscal 2020 Compared to Fiscal 2019

The year-over-year increase of $9.8 million in general and administrative expense during fiscal 2020 as compared to the prior fiscal year was primarily due to higher professional fees of $3.1 million, higher bad debt expense of $2.0 million, higher compensation costs of $1.7 million related to an increase in headcount, and higher stock-based compensation of $0.7 million.

Fiscal 2019 Compared to Fiscal 2018

The year-over-year decrease of $4.0 million in general and administrative expense during fiscal 2019 as compared to the prior fiscal year was primarily due to lower bad debt expense of $9.3 million and a decrease of $1.5 million associated with a litigation judgment in the prior period, partially offset by higher stock-based compensation of $3.4 million and higher compensation costs of $2.6 million related to an increase in headcount.

Non-Operating Income (Expense)

Interest Income

	Year Ended June 30,			2020 Compared to 2019		2019 Compared to 2018	
	2020	2019	2018	$	%	$	%
	(Dollars in Thousands)						
Interest income	$ 32,658	$ 28,457	$ 24,954	$ 4,201	14.8%	$ 3,503	14.0%
As a percent of total revenue	5.5%	4.8%	4.9%				

Fiscal 2020 Compared to Fiscal 2019

The year-over-year increase of $4.2 million in interest income during fiscal 2020 as compared to the prior fiscal year was a result of: (i) increased customer usage of our software; (ii) adding new customers; and (iii) escalating annual payments.

Fiscal 2019 Compared to Fiscal 2018

The year-over-year increase of $3.5 million in interest income during fiscal 2019 as compared to the prior fiscal year was a result of: (i) increased customer usage of our software; (ii) adding new customers; and (iii) escalating annual payments.

Interest Expense

	Year Ended June 30,			2020 Compared to 2019		2019 Compared to 2018	
	2020	2019	2018	$	%	$	%
	(Dollars in Thousands)						
Interest expense	$ (11,862)	$ (8,733)	$ (5,691)	$ (3,129)	35.8%	$ (3,042)	53.5%
As a percent of total revenue	(2.0)%	(1.5)%	(1.1)%				

Fiscal 2020 Compared to Fiscal 2019

The year-over-year increase of $3.1 million in interest expense during fiscal 2020 as compared to the prior fiscal year was primarily due to interest expenses related to an increase in borrowings under our Amended and Restated Credit Agreement.

Fiscal 2019 Compared to Fiscal 2018

The year-over-year increase of $3.0 million in interest expense during fiscal 2019 as compared to the prior fiscal year was primarily due to interest expenses related to higher interest rates and an increase in borrowings under our Prior Credit Agreement, which was amended and restated pursuant to the Amended and Restated Credit Agreement.

Other Income (Expense), Net

	Year Ended June 30,			2020 Compared to 2019		2019 Compared to 2018	
	2020	2019	2018	$	%	$	%
	(Dollars in Thousands)						
Other income (expense), net	$ 1,202	$ 664	$ (838)	$ 538	81.0%	$ 1,502	(179.2)%
As a percent of total revenue	0.2%	0.1%	(0.2)%				

Other income (expense), net is comprised primarily of unrealized and realized foreign currency exchange gains and losses generated from the settlement and remeasurement of transactions denominated in currencies other than the functional currency of our operating units.

Fiscal 2020 Compared to Fiscal 2019

Other income, net was comprised of $1.2 million and $0.7 million of net foreign currency exchange gains during fiscal 2020 and 2019, respectively.

Fiscal 2019 Compared to Fiscal 2018

Other income (expense), net was comprised of $0.7 million of net foreign currency exchange gains and $(0.8) million of net foreign currency exchange losses during fiscal 2019 and 2018, respectively.

Provision for Income Taxes

	Year Ended June 30,			2020 Compared to 2019		2019 Compared to 2018	
	2020	2019	2018	$	%	$	%
		As Adjusted	As Adjusted				
				(Dollars in Thousands)			
Provision for income taxes	$ 49,686	$ 40,165	$ (54,881)	$ 9,521	23.7%	$ 95,046	(173.2)%
Effective tax rate	17.8%	13.3%	(24.3)%				

Fiscal 2020 Compared to Fiscal 2019

The effective tax rate for the periods presented is primarily the result of income earned in the U.S. taxed at U.S. federal and state statutory income tax rates, income earned in foreign tax jurisdictions taxed at the applicable rates, as well as the impact of permanent differences between book and tax income.

Our effective tax rate was 17.8% and 13.3% during fiscal 2020 and 2019, respectively.

We recognized income tax expense of $49.7 million during fiscal 2020 compared to $40.2 million during fiscal 2019. Fiscal 2020 was unfavorably impacted by the recognition of $6.4 million tax expense due to an accounting method change election when we filed our fiscal 2019 federal tax return as a result of a change in tax regulations during this fiscal year. Fiscal 2020 was favorably impacted by the Foreign-Derived Intangible Income (“FDII”) deduction and tax credits. Assuming certain requirements are met, the FDII deduction is a benefit for US companies that sell their products or services to customers for use outside the US. Fiscal 2019 was also favorably impacted by the FDII deduction and the recognition of excess tax benefits related to stock-based compensation.

As of June 30, 2020, we maintained a valuation allowance in the U.S. primarily for certain deferred tax assets related to the investment in a joint venture and on state research and development (R&D) credits. We also maintain a valuation allowance on certain foreign subsidiary tax attributes, primarily net operating loss carryforwards because it is more likely than not that a benefit will not be realized. As of June 30, 2020 and 2019, our total valuation allowance was $6.2 million and $4.9 million, respectively.

We made cash tax payments totaling $39.5 million during fiscal 2020. We paid $37.1 million for U.S. federal and state income taxes and $2.4 million for foreign tax liabilities.

Fiscal 2019 Compared to Fiscal 2018

The effective tax rate for the periods presented is primarily the result of income earned in the U.S. taxed at U.S. federal and state statutory income tax rates, income earned in foreign tax jurisdictions taxed at the applicable rates, as well as the impact of permanent differences between book and tax income.

On December 22, 2017, the President of the United States signed into law Public Law No. 115-97, commonly referred to as the Tax Cuts and Jobs Act (the “Tax Act”), following its passage by the United States Congress. The Tax Act made significant changes to U.S. federal income tax laws, including reduction of the corporate tax rate from 35.0% to 21.0%, and the implementation of a territorial tax system resulting in a one-time transition tax on the unremitted earnings of our foreign subsidiaries. The Tax Act also contains additional provisions that are effective for us in fiscal year 2019, including a new deduction for FDII, the repeal of the domestic production activity deduction, a new tax on Global Intangible Low-Taxed Income (“GILTI”), and increased limitations on the deductibility of certain executive compensation.

Under U.S. GAAP, we are allowed to make an accounting policy choice to either (i) treat 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 (ii) factor in such amounts into the measurement of our deferred taxes (the "deferred method"). Our selection of an accounting policy related to the GILTI tax provisions depends, in part, on analyzing our global income to determine whether we expect to have future U.S. inclusions in taxable income related to GILTI and, if so, what the impact is expected to be. While our future global operations depend on a number of different factors, we do expect to have future U.S. inclusions in taxable income related to GILTI. Further, we have made a policy decision to record GILTI tax as a current-period expense when incurred. We expect to continue to account for the tax on GILTI as a period cost and therefore has not adjusted any of the deferred tax assets and liabilities of its foreign subsidiaries in connection with the Tax Act.

The Tax Act has several significant changes that impact all taxpayers, including a transition tax, which is a one-time tax charge on accumulated, undistributed foreign earnings. The calculation of accumulated foreign earnings requires an analysis of each foreign entity's financial results going back to 1986. We have concluded that we will not be subject to the transition tax associated with our accumulated, undistributed foreign earnings. We do not provide deferred taxes on unremitted earnings of our foreign subsidiaries as we intend to indefinitely reinvest those earnings.

Our effective tax rate was 13.3% and (24.3)% during fiscal 2019 and 2018, respectively.

We recognized income tax expense of $40.2 million during fiscal 2019 compared to a tax benefit of $(54.9) million during fiscal 2018. Fiscal 2019 was favorably impacted by the FDII deduction, the recognition of excess tax benefits related to stock-based compensation and the lower U.S. statutory tax rate of 21.0% as a result of the enactment of the Tax Act discussed above. Fiscal 2018 was favorably impacted by the revaluation of our deferred income tax liabilities using the reduced corporate income tax rate as the result of the Tax Act, recognition of excess tax benefits related to stock-based compensation and the domestic production activity deduction.

As of June 30, 2019, we maintained a valuation allowance in the U.S. primarily for certain deferred tax assets related to the investment in a joint venture. We also maintain a valuation allowance on certain foreign subsidiary tax attributes, primarily net operating loss carryforwards because it is more likely than not that a benefit will not be realized. During fiscal 2019, we released a valuation allowance for the deferred tax assets related to capital losses that expired unused. As of June 30, 2019 and 2018, our total valuation allowance was $4.9 million and $10.4 million, respectively.

We made cash tax payments totaling $53.2 million during fiscal 2019. We paid $44.5 million for U.S. federal and state income taxes and $8.7 million for foreign tax liabilities.

Liquidity and Capital Resources

Resources

In recent years, we have financed our operations with cash generated from operating activities. As of June 30, 2020 and 2019, our principal sources of liquidity consisted of $287.8 million and $71.9 million in cash and cash equivalents, respectively.

We believe our existing cash and cash equivalents, together with our cash flows from operating activities, will be sufficient to meet our anticipated cash needs for at least the next twelve months. We may need to raise additional funds if we decide to make one or more acquisitions of businesses, technologies or products. If additional funding for such purposes is required beyond existing resources and our Amended and Restated Credit Agreement described below, we may not be able to effect a receivable, equity or debt financing on terms acceptable to us or at all.

In March 2020, we borrowed $100.0 million under the revolving credit facility described below under "Credit Agreement," with the majority of the proceeds held as cash and cash equivalents. We increased our borrowing under the revolving credit facility as a precautionary measure to increase our cash position and preserve financial flexibility in light of disruption and uncertainty in the global markets resulting from the outbreak of the novel SARS-CoV-2 virus and associated COVID-19 disease and its impact on the demand for oil, compounded by the excess supply arising from producers' failure to agree on production cuts.

Credit Agreement

In December 2019, we entered into an Amended and Restated Credit Agreement with JPMorgan Chase Bank, N.A., as administrative agent, joint lead arranger and joint bookrunner, Silicon Valley Bank, as joint lead arranger, joint bookrunner and syndication agent, and the lenders and co-documentation agents named therein (the "Amended and Restated Credit Agreement"). The Amended and Restated Credit Agreement, which amends and restates the Credit Agreement we entered into as of February 26, 2016 with the same lenders (the "Prior Credit Agreement"), provides for a $200.0 million secured revolving credit facility and a $320.0 million secured term loan facility. The indebtedness under the revolving credit facility matures on December 23, 2024. Prior to the maturity of the Amended and Restated Credit Agreement, any amounts borrowed under the revolving credit facility may be repaid and, subject to the terms and conditions of the Amended and Restated Credit Agreement, borrowed again in whole or in part without penalty.

As of June 30, 2020, we had $119.2 million and $312.0 million in outstanding borrowings on our revolving credit facility and term loan facility, respectively. Our current borrowings of $135.2 million consist of $119.2 million of the revolving credit facility and $16.0 million of the term loan facility. Our non-current borrowings of $292.4 million consist of $296.0 million of our term loan facility, net of $3.6 million in debt issuance costs. We had $220.0 million in outstanding current borrowings as of June 30, 2019.

For a more detailed description of the Amended and Restated Credit Agreement, refer to Note 12, "Credit Agreement," to our Consolidated Financial Statements.

Cash Equivalents and Cash Flows

Our cash equivalents of $1.0 million as of June 30, 2020 and 2019, respectively, consisted of money market funds. The objective of our investment policy is to manage our cash and investments to preserve principal and maintain liquidity.

The following table summarizes our cash flow activities for the periods indicated:

	Year Ended June 30,		
	2020	2019	2018
	(Dollars in Thousands)		
Cash flow provided by (used in):			
Operating activities	$ 243,258	$ 238,313	$ 206,936
Investing activities	(76,203)	(7,665)	(34,360)
Financing activities	49,435	(254,527)	(178,479)
Effect of exchange rates on cash and cash equivalents	(620)	(360)	114
Increase (decrease) in cash and cash equivalents	$ 215,870	$ (24,239)	$ (5,789)

Operating Activities

Our primary source of cash is from the annual installments associated with our software license arrangements and related software support services, and to a lesser extent from professional services and training. We believe that cash inflows from our term license business will grow as we benefit from the continued growth of our portfolio of term license contracts.

Fiscal 2020

Cash from operating activities provided $243.3 million during fiscal 2020. This amount resulted from net income of $229.7 million, adjusted for non-cash items of $83.2 million, and net uses of cash of $(69.6) million related to changes in working capital.

Non-cash items within net income consisted primarily of stock-based compensation expense of $31.5 million, deferred income taxes of $28.1 million, depreciation and amortization expense of $9.6 million, reduction in the carrying amount of right-of-use assets of $9.1 million, provision for bad debts of $5.3 million, and net foreign currency gains of $(0.9) million.

Cash used by working capital of $(69.6) million in fiscal 2020 was primarily attributable to cash used by increases in contract assets of $28.1 million, decreases in accounts payable, accrued expenses and other current liabilities of $23.4 million, increases in accounts receivable of $12.9 million, decreases in lease liabilities of $9.5 million, increases in prepaid expenses, prepaid income taxes, and other assets of $5.3 million, and increases in contract costs of $3.6 million, partially offset by cash provided by increases in deferred revenue of $13.0 million.

Fiscal 2019

Cash from operating activities provided $238.3 million during fiscal 2019. This amount resulted from net income of $261.4 million, adjusted for non-cash items of $8.4 million, and net uses of cash of $(31.5) million related to changes in working capital.

Non-cash items within net income consisted primarily of stock-based compensation expense of $27.6 million, depreciation and amortization expense of $8.1 million, deferred income taxes of $(27.1) million, provision for bad debts of $0.6 million, and net foreign currency gains of $(1.3) million.

Cash used by working capital of $(31.5) million was primarily attributable to cash used by increases in contract assets of $57.7 million, increases in accounts receivable of $6.6 million, increases in contract costs of $4.5 million, and increases in prepaid expenses, prepaid income taxes, and other assets of $2.4 million, partially offset by cash provided by increases in accounts payable, accrued expenses and other current liabilities of $21.9 million, and increases in deferred revenue of $17.8 million. The increase in accounts payable, accrued expenses and other current liabilities is primarily due to an increase in income taxes payable as of June 30, 2019 from the tax liability associated with adopting Topic 606. There was a correlating decrease in deferred income taxes during fiscal 2019.

Fiscal 2018

Cash from operating activities provided $206.9 million during fiscal 2018. This amount resulted from net income of $281.2 million, adjusted for non-cash items of $(77.1) million, and net sources of cash of $2.8 million related to changes in working capital.

Non-cash items within net income consisted primarily of stock-based compensation expense of $22.7 million, depreciation and amortization expense of $6.5 million, deferred income taxes of $(109.1) million, provision for bad debts of $1.4 million, and net foreign currency losses of $1.0 million.

Cash provided by working capital of $2.8 million was primarily attributable to cash provided by decreases in contract assets of $14.9 million, decreases in prepaid expenses, prepaid income taxes, and other assets of $3.8 million, increases in accounts payable, accrued expenses and other current liabilities of $1.2 million, and decreases in accounts receivable of $0.8 million, partially offset by cash used by decreases in deferred revenue of $17.4 million and increases in contract costs of $0.6 million.

Investing Activities

Fiscal 2020

During fiscal 2020, we used $76.2 million of cash from investing activities. We used $74.5 million for business acquisitions, $1.3 million for capital expenditures, $0.3 million for equity method investments, and $0.1 million for capitalized computer software development costs.

Fiscal 2019

During fiscal 2019, we used $7.7 million of cash from investing activities. We used $6.1 million for business acquisitions, $1.1 million for capitalized computer software development costs, and $0.4 million for capital expenditures.

Fiscal 2018

During fiscal 2018, we used $34.4 million of cash from investing activities. We used $33.7 million for business acquisitions, $0.3 million for capital expenditures, and $0.3 million for capitalized computer software development costs.

Financing Activities

Fiscal 2020

Cash from financing activities provided $49.4 million during fiscal 2020. Sources of cash in the period included proceeds of $219.2 million from debt and proceeds of $9.0 million from the exercise of employee stock options, partially offset by uses of cash of $152.4 million for repurchases of our common stock, $10.2 million for withholding taxes on vested and settled restricted stock units, $8.0 million for repayments of amounts borrowed, $4.6 million for deferred business acquisition payments, and $3.5 million for debt issuance costs.

Fiscal 2019

During fiscal 2019, we used $254.5 million of cash for financing activities. We used $299.2 million for repurchases of our common stock, $1.7 million for deferred business acquisition payments, and $14.5 million for withholding taxes on vested and settled restricted stock units. Sources of cash in the period included proceeds of $50.0 million from the Prior Credit Agreement and proceeds of $10.9 million from the exercise of employee stock options.

Fiscal 2018

During fiscal 2018, we used $178.5 million of cash for financing activities. We used $205.0 million for repurchases of our common stock,$8.6 million for deferred business acquisition payments, $7.9 million for withholding taxes on vested and settled restricted stock units, and $0.4 million for issuance costs related to our Prior Credit Agreement. Sources of cash in the period included proceeds of $30.0 million from the Prior Credit Agreement and proceeds of $13.5 million from the exercise of employee stock options.

Contractual Obligations and Requirements

Our contractual obligations, which consisted of borrowings, interest, and fees under our Amended and Restated Credit Agreement, operating lease commitments for our headquarters and other facilities, royalty obligations, equity method investments, deferred acquisition payments, and standby letters of credit and other obligations, were as follows as of June 30, 2020:

	Payments due by Period				
	Total	Less than 1 Year	1 to 3 Years	3 to 5 Years	More than 5 Years
Contractual Cash Obligations:					
Credit agreement (1)	$ 456,791	$ 142,698	$ 57,881	$ 256,212	$ —
Operating leases (2)	46,518	8,677	16,965	13,245	7,631
Royalty obligations	2,080	988	1,092	—	—
Equity method investments	3,658	3,658	—	—	—
Deferred acquisition payments	1,479	1,479	—	—	—
Other purchase obligations	23,647	16,904	4,658	1,146	939
Total contractual cash obligations	$ 534,173	$ 174,404	$ 80,596	$ 270,603	$ 8,570
Other Commercial Commitments:					
Standby letters of credit	$ 3,453	$ 1,908	$ —	$ 268	$ 1,277
Total commercial commitments	$ 537,626	$ 176,312	$ 80,596	$ 270,871	$ 9,847

(1) The $456.8 million of contractual obligations related to our Amended and Restated Credit Agreement includes $119.2 million and $312.0 million in outstanding borrowings on our revolving credit facility and term loan facility, respectively, and $25.6 million of interest expense and commitment fees as of June 30, 2020. All contractual obligations related to our revolving credit facility are classified as being due in less than one year.

(2) The $46.5 million of contractual obligations includes rent and fixed fees for all of our operating leases, including those not recognized on the balance sheet.

We are not currently a party to any other material purchase contracts related to future capital expenditures, and we do not expect our future investment in capital expenditures to be materially different from recent levels.

The standby letters of credit were issued by Silicon Valley Bank in the United States and secure our performance on professional services contracts and certain facility leases.

The above table does not reflect a liability for uncertain tax positions of $2.1 million as of June 30, 2020. We estimate that none of this amount will be paid within the next year and we are currently unable to reasonably estimate the timing of payments for the remainder of the liability.

Off-Balance Sheet Arrangements

As of June 30, 2020, we did not have any significant off-balance sheet arrangements, as defined in Item 303(a)(4)(ii) of SEC Regulation S-K.

Critical Accounting Estimates and Judgments

Our consolidated financial statements are prepared in accordance with GAAP. The preparation of our financial statements requires management to make estimates and judgments that affect the reported amounts of assets, liabilities, revenue, expenses and related disclosures. We base our estimates on historical experience and various other assumptions that we believe to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

We believe that the assumptions and estimates associated with revenue recognition policies have the greatest potential impact on our consolidated financial statements.

For further information on our significant accounting policies, refer to Note 2, "Significant Accounting Policies," and Note 3, "Revenue from Contracts with Customers," to our Consolidated Financial Statements.

Revenue Recognition

In accordance with Topic 606, we account for a customer contract when both parties have approved the contract and are committed to perform their respective obligations, each party's rights can be identified, payment terms can be identified, the contract has commercial substance, and it is probable that we will collect substantially all of the consideration to which we are entitled. Revenue is recognized when, or as, performance obligations are satisfied by transferring control of a promised product or service to a customer.

Nature of Products and Services

We generate revenue from the following sources: (1) License revenue; (2) Maintenance revenue; and (3) Services and other revenue. We sell our software products to end users primarily under fixed-term licenses. We license our software products primarily through a subscription offering which we refer to as our aspenONE licensing model, which includes software maintenance and support, known as our Premier Plus SMS offering, for the entire term. Our aspenONE products are organized into three suites: 1) engineering; 2) manufacturing and supply chain; and 3) asset performance management. The aspenONE licensing model provides customers with access to all of the products within the aspenONE suite(s) they license. We refer to these arrangements as token arrangements. Tokens are fixed units of measure. The amount of software usage is limited by the number of tokens purchased by the customer.

We also license our software through point product term arrangements, which include our Premier Plus SMS offering for the entire term.

We determine revenue recognition through the following steps:

- Identification of the contract, or contracts, with a customer;
- Identification of the performance obligations in the contract;
- Determination of the transaction price;
- Allocation of the transaction price to the performance obligations in the contract; and
- Recognition of revenue when, or as, we satisfy a performance obligation.

Term-based Arrangements: Term-based arrangements consist of on-premise term licenses as well as maintenance.

License

License revenue consists primarily of product and related revenue from our aspenONE licensing model and point product arrangements.

When a customer elects to license our products under our aspenONE licensing model, the customer receives, for the term of the arrangement, the right to all software products in the licensed aspenONE software suite. When a customer elects to license point products, the customer receives, for the term of the arrangement, the right to license specified products in the licensed aspenONE software suite. Revenue from initial product licenses is recognized upfront upon delivery.

Maintenance

When a customer elects to license our products under our aspenONE licensing model, our Premier Plus SMS offering is included for the entire term of the arrangement and the customer receives, for the term of the arrangement, the right to any updates that may be introduced into the licensed aspenONE software suite. When a customer elects to license point products, our Premier Plus SMS offering is included for the entire term of the arrangement and the customer receives, for the term of the arrangement, the right to any updates that may be introduced related to the specified products licensed. Maintenance represents a stand-ready obligation and, due to our obligation to provide unspecified future software updates on a when-and-if available basis as well as telephone support services, we are required to recognize revenue ratably over the term of the arrangement.

Services and Other Revenue

Professional Services Revenue

Professional services are provided to customers on a T&M or fixed-price basis. The obligation to provide professional services is generally satisfied over time, with the customer simultaneously receiving and consuming the benefits as we satisfy our performance obligation. For professional services, revenue is recognized by measuring progress toward the completion of our obligations. We recognize professional services fees for our T&M contracts based upon hours worked and contractually agreed-upon hourly rates. Revenue from fixed-price engagements is recognized using the proportional performance method based on the ratio of costs incurred to the total estimated project costs. The use of the proportional performance method is dependent upon our ability to reliably estimate the costs to complete a project. We use historical experience as a basis for future estimates to complete current projects. Additionally, we believe that costs are the best available measure of performance. Out-of-pocket expenses which are reimbursed by customers are recorded as revenue.

Training Revenue

We provide training services to our customers, including on-site, Internet-based, public and customized training. The obligation to provide training services is generally satisfied over time, with the customer simultaneously receiving and consuming the benefits as we satisfy our performance obligation. Revenue is recognized in the period in which the services are performed.

Contracts with Multiple Performance Obligations

Our contracts generally contain more than one of the products and services listed above, each of which is separately accounted for as a distinct performance obligation.

Allocation of consideration: We allocate total contract consideration to each distinct performance obligation in an arrangement on a relative standalone selling price basis. The standalone selling price reflects the price we would charge for a specific product or service if it was sold separately in similar circumstances and to similar customers.

If the arrangement contains professional services and other products or services, we allocate to the professional service obligation a portion of the total contract consideration based on the standalone selling price of professional services that is observed from consistently priced standalone sales.

The standalone selling price for term licenses, which are always sold with maintenance, is the price for the combined license and maintenance bundle. The amount assigned to the license and maintenance bundle is separated into license and maintenance amounts using the respective standalone selling prices represented by the value relationship between the software license and maintenance.

When two or more contracts are entered into at or near the same time with the same customer, we evaluate the facts and circumstances associated with the negotiation of those contracts. Where the contracts are negotiated as a package, we will account for them as a single arrangement and allocate the consideration for the combined contracts among the performance obligations accordingly.

Standalone selling price: When available, we use directly observable transactions to determine the standalone selling prices for performance obligations. Generally, directly observable data is not available for term licenses and maintenance. When term licenses are sold together with maintenance in a bundled arrangement, we estimate a standalone selling price for these distinct performance obligations using relevant information, including our overall pricing objectives and strategies and historical pricing data, and taking into consideration market conditions and other factors.

Other policies and judgments

Payment terms and conditions vary by contract type, although terms generally include a requirement of payment annually over the term of the license arrangement. Therefore, we generally receive payment from a customer after the performance obligation related to the license has been satisfied, and therefore, our contracts generally contain a significant financing component. The significant financing component is calculated utilizing an interest rate that derives the net present value of the performance obligations delivered on an upfront basis based on the allocation of consideration. We have instituted a customer portfolio approach in assigning interest rates. The rates are determined at contract inception and are based on the credit characteristics of the customers within each portfolio.

Contract modifications

We sometimes enter into agreements to modify previously executed contracts, which constitute contract modifications. We assess each of these contract modifications to determine (i) if the additional products and services are distinct from the products and services in the original arrangement; and (ii) if the amount of consideration expected for the added products and services reflects the stand-alone selling price of those products and services, as adjusted for contract-specific circumstances. A contract modification meeting both criteria is accounted for as a separate contract. A contract modification not meeting both criteria is considered a change to the original contract and is accounted for on either (i) a prospective basis as a termination of the existing contract and the creation of a new contract; or (ii) a cumulative catch-up basis. Generally, our contract modifications meet both criteria and are accounted for as a separate contract, as adjusted for contract-specific circumstances.

Contract Costs

We pay commissions for new product sales as well as for renewals of existing contracts. Commissions paid to obtain renewal contracts are not commensurate with the commissions paid for new product sales and therefore, a portion of the commissions paid for new contracts relate to future renewals.

We account for new product sales commissions using a portfolio approach and allocate the cost of commissions in proportion to the allocation of transaction price of license and maintenance performance obligations, including assumed renewals. Commissions allocated to the license and license renewal components are expensed at the time the license revenue is recognized. Commissions allocated to maintenance are capitalized and amortized on a straight-line basis over a period of four to eight years for new contracts, reflecting our estimate of the expected period that we will benefit from those commissions.

Amortization of capitalized contract costs is included in sales and marketing expenses in our Condensed Consolidated Statement of Operations.

Recent Accounting Pronouncements

Refer to Note 2 (o) "New Accounting Pronouncements Adopted in Fiscal 2020" and Note 2 (p) "Recently Issued Accounting Pronouncements," to our Consolidated Financial Statements for information about recent accounting pronouncements.

Item 7A. Quantitative and Qualitative Disclosures about Market Risk.

In the ordinary course of conducting business, we are exposed to certain risks associated with potential changes in market conditions. These market risks include changes in currency exchange rates and interest rates which could affect operating results, financial position and cash flows. We manage our exposure to these market risks through our regular operating and financing activities and, if considered appropriate, we may enter into derivative financial instruments such as forward currency exchange contracts.

Foreign Currency Risk

During fiscal 2020 and 2019, 6.6% and 10.1% of our total revenue was denominated in a currency other than the U.S. dollar. In addition, certain of our operating costs incurred outside the United States are denominated in currencies other than the U.S. dollar. We conduct business on a worldwide basis and as a result, a portion of our revenue, earnings, net assets, and net investments in foreign affiliates is exposed to changes in foreign currency exchange rates. We measure our net exposure for cash balance positions and for cash inflows and outflows in order to evaluate the need to mitigate our foreign exchange risk. We may enter into foreign currency forward contracts to minimize the impact related to unfavorable exchange rate movements, although we have not done so during fiscal 2020 and fiscal 2019. Our largest exposures to foreign currency exchange rates exist primarily with the Euro, Pound Sterling, Canadian Dollar, Japanese Yen, and Russian Ruble.

During fiscal 2020 and fiscal 2019, we recorded net foreign currency gains of $0.9 million and $0.7 million, respectively, related to the settlement and remeasurement of transactions denominated in currencies other than the functional currency of our operating units. Our analysis of operating results transacted in various foreign currencies indicated that a hypothetical 10% change in the foreign currency exchange rates could have increased or decreased the consolidated results of operations by approximately $4.8 million for fiscal 2020 and 2019, respectively.

Interest Rate Risk

We place our investments in money market instruments. Our analysis of our investments and interest rates at June 30, 2020 and 2019 indicated that a hypothetical 100 basis point increase or decrease in interest rates would not have a material impact on the fair value of our investments determined in accordance with an income-based approach utilizing portfolio future cash flows discounted at the appropriate rates.

As of June 30, 2020, we had $119.2 million and $312.0 million in outstanding borrowings on our revolving credit facility and term loan facility, respectively. Our current borrowings of $135.2 million consist of $119.2 million of the revolving credit facility and $16.0 million of the term loan facility. Our non-current borrowings of $292.4 million consist of $296.0 million of our term loan facility, net of $3.6 million in debt issuance costs. A hypothetical 10% increase or decrease in interest rates paid on outstanding borrowings under the Amended and Restated Credit Agreement would not have a material impact on our financial position, results of operations or cash flows.

Investment Risk

During fiscal 2020, we entered into a limited partnership investment fund agreement. The primary objective of this partnership is investing in equity and equity-related securities (including convertible debt) of venture growth- stage businesses. We account for the investment in accordance with Topic 323, *Investments - Equity Method and Joint Ventures*. Our total commitment under this partnership is 5.0 million CAD ($3.5 million). Under the conditions of the equity method investment, unfavorable future changes in market conditions could lead to a potential loss up to the full value of our 5.0 million CAD ($3.5 million) commitment. As of June 30, 2020, the fair value of this investment is 0.5 million CAD ($0.3 million), representing our payments towards the total commitment during fiscal 2020, and is recorded in non-current assets in our consolidated balance sheet.

Item 8. Financial Statements and Supplementary Data.

The following consolidated financial statements specified by this Item, together with the reports thereon of KPMG LLP, are presented following Item 15 of this Form 10-K:

Financial Statements:
- Report of Independent Registered Public Accounting Firm
- Consolidated Statements of Operations for the years ended June 30, 2020, 2019 and 2018
- Consolidated Statements of Comprehensive Income for the years ended June 30, 2020, 2019 and 2018
- Consolidated Balance Sheets as of June 30, 2020 and 2019
- Consolidated Statements of Stockholders' Equity for the years ended June 30, 2020, 2019 and 2018
- Consolidated Statements of Cash Flows for the years ended June 30, 2020, 2019 and 2018
- Notes to Consolidated Financial Statements

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

As required by Rule 13a-15(b) under the Securities Exchange Act of 1934, as amended, or Exchange Act, as of the end of the period covered by this report, we carried out an evaluation under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, of the effectiveness of our disclosure controls and procedures. In designing and evaluating our disclosure controls and procedures, we recognize that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives, and our management necessarily applies its judgment in evaluating and implementing possible controls and procedures. The effectiveness of our disclosure controls and procedures is also necessarily limited by the staff and other resources available to us and the geographic diversity of our operations. Based upon that evaluation, the Chief Executive Officer and Chief Financial Officer concluded that, as of the end of the period covered by this report, our disclosure controls and procedures were not effective due to a material weakness in internal control over financial reporting discussed below in Management’s Annual Report on Internal Control Over Financial Reporting.

Management’s Annual Report on Internal Control Over Financial Reporting

Management of the Company is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) under the Securities Exchange Act of 1934. The Company’s internal control over financial reporting is designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. The Company’s internal control over financial reporting includes those policies and procedures that:

(i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the Company;

(ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the Company are being made only in accordance with authorizations of management and directors of the Company; and

(iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the Company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. A control system, no matter how well designed and operated, can provide only reasonable, not absolute assurance that the control system's objectives will be met.

As of June 30, 2019, we reported the following material weakness in our internal control over financial reporting. We did not effectively design process level control activities over the accuracy of the retrospective restatement of revenue and related contract balances recorded upon the adoption of ASC Topic 606, which also impacted the related deferred tax assets and liabilities on the consolidated balance sheet. The control deficiencies identified resulted from an ineffective risk assessment and the lack of timely creation of relevant reporting tools and complete and accurate information used to support the functioning of internal control. These deficiencies created a reasonable possibility that a material misstatement would not have been prevented or detected on a timely basis and accordingly management concluded that the deficiencies represented a material weakness in our internal control over financial reporting.

Additional deficiencies related to the fiscal 2019 material weakness were identified in fiscal 2020. Consequently, there were control failures in the areas of revenue and contract asset balances, which also impacted the related deferred tax liabilities.

Management, including our Chief Executive Officer and Chief Financial Officer, assessed the effectiveness of the Company's internal control over financial reporting as of June 30, 2020. In making this assessment, management used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in Internal Control-Integrated Framework (2013). Based on this assessment, management has concluded that our internal control over financial reporting was not effective as of June 30, 2020. This material weakness resulted in newly identified immaterial misstatements (i.e. misstatements identified in fiscal 2020) related to contract assets and associated deferred tax liabilities, retained earnings, revenue, and provision for (benefit from) income taxes, which were corrected prior to issuance of the Company's financial statements. Furthermore, a reasonable possibility exists that material misstatements in the Company's financial statements will not be prevented or detected on a timely basis.

The independent registered public accounting firm that audited the Company's consolidated financial statements included elsewhere in this Annual Report on Form 10-K has issued an adverse opinion on the effectiveness of the Company's internal control over financial reporting. That report appears immediately following this report.

Remediation

During fiscal 2020, we implemented a remediation plan to address the material weakness mentioned above. Management enhanced our risk assessment process over the design and implementation of internal controls over new and emerging financial reporting matters such as the adoption of ASC Topic 842. We have also performed an updated risk assessment of revenue and associated contract balances controls and have identified and designed enhanced review controls over the accounting for revenue contracts under ASC Topic 606, including the use of additional reporting tools and additional reconciliation controls. The COVID-19 pandemic and resulting remote working environment made timely completion of these remediation procedures more challenging, and all remediation efforts were not fully completed as of June 30, 2020. As a result, management concluded that the prior year's material weakness in our internal control over the financial reporting had not been fully remediated as of June 30, 2020. The weakness will be considered remediated when the applicable controls operate for a sufficient period of time and management has concluded, through testing, that these controls are operating effectively. We expect that the remediation of this material weakness will be completed prior to the end of fiscal 2021.

Changes in Internal Control Over Financial Reporting

There was no change in our internal control over financial reporting that occurred during the quarter ended June 30, 2020 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

We performed an updated risk assessment to determine if new controls were needed due to the outbreak of the novel SARS-CoV-2 virus and associated COVID-19 disease. As a result, we enhanced internal controls to include more frequent reviews and incorporate new review criteria.

We will continue to review and document our disclosure controls and procedures, including our internal control over financial reporting, and may from time to time make changes aimed at enhancing their effectiveness and to ensure that our systems evolve with our business.

Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors
Aspen Technology, Inc.:

Opinion on Internal Control Over Financial Reporting

We have audited Aspen Technology, Inc. and subsidiaries' (the Company) internal control over financial reporting as of June 30, 2020, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission. In our opinion, because of the effect of the material weakness, described below, on the achievement of the objectives of the control criteria, the Company has not maintained effective internal control over financial reporting as of June 30, 2020, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of June 30, 2020 and 2019, the related consolidated statements of operations, comprehensive income, stockholders' equity, and cash flows for each of the years in the three-year period ended June 30, 2020, and the related notes and financial statement Schedule II - Valuation and Qualifying Accounts (collectively, the consolidated financial statements), and our report dated December 9, 2020, expressed an unqualified opinion on those consolidated financial statements.

A material weakness is a deficiency, or combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of the company's annual or interim financial statements will not be prevented or detected on a timely basis. The following material weakness has been identified and included in management's assessment:

> The Company did not effectively design process level control activities over the accuracy of the retrospective restatement of revenue and related contract balances recorded upon the adoption of ASC Topic 606, which also impacted the related deferred tax liabilities on the consolidated balance sheet. The control deficiencies identified resulted from an ineffective risk assessment and the lack of timely creation of relevant reporting tools and complete and accurate information used to support the functioning of internal control.
>
> Consequently, there were control failures in the areas of revenue and contract asset balances, which also impacted the related deferred tax liabilities. The material weakness was considered in determining the nature, timing, and extent of audit tests applied in our audit of the fiscal 2020 consolidated financial statements, and this report does not affect our report on those consolidated financial statements.

Basis for Opinion

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

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

Definition and Limitations of Internal Control Over Financial Reporting

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

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

/s/ KPMG LLP

Boston, Massachusetts

December 9, 2020

Item 9B. Other Information.

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

Certain information required under this Item 10 will appear under the sections entitled “Executive Officers of the Registrant,” “Election of Directors,” “Information Regarding our Board of Directors and Corporate Governance,” “Code of Business Conduct and Ethics,” and “Section 16(a) Beneficial Ownership Reporting Compliance” in our definitive proxy statement for our 2020 annual meeting of stockholders, and is incorporated herein by reference.

Item 11. Executive Compensation.

Certain information required under this Item 11 will appear under the sections entitled “Director Compensation,” “Compensation Discussion and Analysis,” “Executive Compensation” and “Employment and Change in Control Agreements” in our definitive proxy statement for our 2020 annual meeting of stockholders, and is incorporated herein by reference.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.

Certain information required under this Item 12 will appear under the sections entitled “Stock Owned by Directors, Executive Officers and Greater-than 5% Stockholders” and “Securities Authorized for Issuance Under Equity Compensation Plans” in our definitive proxy statement for our 2020 annual meeting of stockholders, and is incorporated herein by reference.

Item 13. Certain Relationships and Related Transactions, and Director Independence.

Certain information required under this Item 13 will appear under the sections entitled “Information Regarding the Board of Directors and Corporate Governance” and “Related Party Transactions” in our definitive proxy statement for our 2020 annual meeting of stockholders, and is incorporated herein by reference.

Item 14. Principal Accounting Fees and Services.

Certain information required under this Item 14 will appear under the section entitled “Independent Registered Public Accountants” in our definitive proxy statement for our 2020 annual meeting of stockholders, and is incorporated herein by reference.

PART IV

Item 15. Exhibits and Financial Statement Schedules.

(a)(1) Financial Statements

(a)(2) Financial Statement Schedules

Schedule II-Valuation and Qualifying Accounts for the years ended June 30, 2020, 2019 and 2018 appears immediately following the financial statements. All other schedules are omitted because they are not required or the required information is shown in the consolidated financial statements or notes thereto.

(a)(3) Exhibits

The exhibits listed in the accompanying exhibit index are filed or incorporated by reference as part of this Form 10-K.

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors
Aspen Technology, Inc.:

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of Aspen Technology, Inc. and subsidiaries (the Company) as of June 30, 2020 and 2019, the related consolidated statements of operations, comprehensive income, stockholders' equity, and cash flows for each of the years in the three-year period ended June 30, 2020, and the related notes and financial statement Schedule II - Valuation and Qualifying Accounts, (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of June 30, 2020 and 2019, and the results of its operations and its cash flows for each of the years in the three-year period ended June 30, 2020, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of June 30, 2020, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission, and our report dated December 9, 2020 expressed an adverse opinion on the effectiveness of the Company's internal control over financial reporting.

Change in Accounting Principle

As discussed in Note 2(o) to the consolidated financial statements, the Company has changed its method of accounting for leases as of July 1, 2019 due to the adoption of Accounting Standards Codification (ASC) Topic 842, *Leases.*

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audits. We are a public accounting firm registered with the 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 consolidated financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the consolidated 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 consolidated 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 consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current period audit of the consolidated financial statements that were communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing a separate opinion on the critical audit matters or on the accounts or disclosures to which they relate.

Determination of Standalone Selling Prices for Term License and Maintenance Performance Obligations

As discussed in Note 3 to the consolidated financial statements, the Company recognized term license revenue and maintenance revenue of $388.2 million and $178.1 million, respectively, for the year ended June 30, 2020. The Company allocates the transaction price to each distinct performance obligation on a relative standalone selling price basis. For term license and maintenance performance obligations, directly observable data is generally not available, which requires the Company to make significant assumptions regarding the relative fair value of the related performance obligations.

We identified the determination of standalone selling prices for term license and maintenance performance obligations as a critical audit matter. There is a high degree of subjective auditor judgment involved in performing procedures on the Company's assumptions, since there is no direct observable data available.

The primary procedures we performed to address this critical audit matter included the following. We tested certain internal controls over the Company's revenue process, including the control over the development of standalone selling prices. We evaluated the information used by the Company to determine standalone selling prices by comparing it to external sources, such as available information regarding industry pricing practices, and internal data, including the Company's pricing practices.

Sufficiency of audit evidence over incomplete revenue contracts at the adoption date of Topic 606 that were modified prior to the adoption date of Topic 606

As discussed in Note 3 to the consolidated financial statements, the Company accounts for revenue in accordance with Topic 606, *Revenue from Contracts with Customers* (Topic 606). The Company enters into agreements to modify previously executed contracts, which constitute contract modifications. They assess each of these contract modifications to determine (i) if the additional products and services are distinct from the products and services in the original arrangement; and (ii) if the amount of consideration expected for the added products and services reflects the stand-alone selling price of those products and services, as adjusted for contract-specific circumstances.

We identified the evaluation of the sufficiency of audit evidence over incomplete revenue contracts at the adoption date of Topic 606 that were modified prior to the adoption of Topic 606 as a critical audit matter. Subjective auditor judgment was required because of the nature and extent of customer contract modifications and the material weakness in internal control over financial reporting identified.

The following are the primary procedures we performed to address this critical audit matter. We applied auditor judgment to determine the nature and extent of procedures to be performed over incomplete revenue contracts at the adoption date of Topic 606 that were modified prior to the adoption of Topic 606. We performed procedures to test the completeness and accuracy of the population of incomplete contracts that were modified prior to the adoption of Topic 606. Specifically, we agreed information from certain underlying contracts to reports used in management's analysis of contract assets and tested the reconciliation of those contract assets to future revenues and billings. For a selection of contracts modified prior to the adoption of Topic 606 from management's analysis, we inspected the related revenue contract and supporting documentation and compared the related contract asset balance to future contractual billings and future revenue amounts to be recognized under the customer arrangement. For each item selected, we also assessed the (1) current year revenue, (2) historical revenue, (3) contract asset, and (4) deferred revenue balance. Additionally, to ensure the customer invoices related to our selections were accounted for with the appropriate contract, we inspected the related invoicing data and revenue contracts and agreed them to the calculations underlying the amounts recorded by the Company. For a sample of current year revenue transactions, contract asset balances, and deferred revenue balances, we obtained and inspected the related revenue contracts and supporting documents and compared them to the revenue, contract asset balances, and deferred revenue balances that were recorded as of and for the fiscal year ended June 30, 2020. In addition, we evaluated the overall sufficiency of audit evidence obtained over incomplete revenue contracts at the adoption date of Topic 606 that were modified prior to the adoption date of Topic 606 by assessing the results of the procedures performed.

/s/ KPMG LLP

We have served as the Company's auditor since 2008.

Boston, Massachusetts

December 9, 2020

ASPEN TECHNOLOGY, INC. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF OPERATIONS

	Year Ended June 30,		
	2020	2019	2018
		As Adjusted	As Adjusted
	(Dollars in Thousands, Except per Share Data)		
Revenue:			
License	$ 388,180	$ 404,581	$ 318,442
Maintenance	178,139	163,567	158,838
Services and other	32,398	28,534	30,286
Total revenue	598,717	596,682	507,566
Cost of revenue:			
License	7,241	7,060	5,236
Maintenance	19,248	19,208	17,408
Services and other	35,118	31,548	28,000
Total cost of revenue	61,607	57,816	50,644
Gross profit	537,110	538,866	456,922
Operating expenses:			
Selling and marketing	114,486	111,374	99,737
Research and development	92,230	83,122	82,076
General and administrative	73,035	63,231	67,181
Total operating expenses	279,751	257,727	248,994
Income from operations	257,359	281,139	207,928
Interest income	32,658	28,457	24,954
Interest (expense)	(11,862)	(8,733)	(5,691)
Other income (expense), net	1,202	664	(838)
Income before income taxes	279,357	301,527	226,353
Provision for (benefit from) income taxes	49,686	40,165	(54,881)
Net income	$ 229,671	$ 261,362	$ 281,234
Net income per common share:			
Basic	$ 3.38	$ 3.74	$ 3.90
Diluted	$ 3.34	$ 3.69	$ 3.85
Weighted average shares outstanding:			
Basic	68,000	69,925	72,140
Diluted	68,727	70,787	72,956

See accompanying notes to these consolidated financial statements.

ASPEN TECHNOLOGY, INC. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

	Year Ended June 30,		
	2020	2019	2018
		As Adjusted	As Adjusted
		(Dollars in Thousands)	
Net income	$ 229,671	$ 261,362	$ 281,234
Other comprehensive loss:			
Foreign currency translation adjustments	(5,624)	(1,052)	(71)
Total other comprehensive loss	(5,624)	(1,052)	(71)
Comprehensive income	$ 224,047	$ 260,310	$ 281,163

See accompanying notes to these consolidated financial statements.

ASPEN TECHNOLOGY, INC. AND SUBSIDIARIES

CONSOLIDATED BALANCE SHEETS

	June 30, 2020	June 30, 2019
		As Adjusted
	(Dollars in Thousands, Except Share and Per Share Data)	
ASSETS		
Current assets:		
Cash and cash equivalents	$ 287,796	$ 71,926
Accounts receivable, net	56,301	47,784
Current contract assets	291,497	294,193
Prepaid expenses and other current assets	10,884	9,988
Prepaid income taxes	3,962	2,509
Total current assets	650,440	426,400
Property, equipment and leasehold improvements, net	5,963	7,234
Computer software development costs, net	928	1,306
Goodwill	137,055	78,383
Intangible assets, net	42,851	33,607
Non-current contract assets	318,976	288,098
Contract costs	28,614	24,982
Operating lease right-of-use assets	34,905	—
Deferred tax assets	1,735	1,669
Other non-current assets	1,839	1,334
Total assets	$ 1,223,306	$ 863,013
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 3,988	$ 5,891
Accrued expenses and other current liabilities	43,556	54,594
Current operating lease liabilities	6,824	—
Income taxes payable	1,799	14,952
Current borrowings	135,163	220,000
Current deferred revenue	43,168	25,318
Total current liabilities	234,498	320,755
Non-current deferred revenue	13,913	19,573
Deferred income taxes	179,978	150,344
Non-current operating lease liabilities	33,088	—
Non-current borrowings, net	292,369	—
Other non-current liabilities	3,107	10,381
Commitments and contingencies (Note 17)		
Series D redeemable convertible preferred stock, $0.10 par value—Authorized—3,636 shares as of June 30, 2020 and 2019 Issued and outstanding—none as of June 30, 2020 and 2019	—	—
Stockholders' equity:		
Common stock, $0.10 par value—Authorized—210,000,000 shares Issued—103,988,707 shares at June 30, 2020 and 103,642,292 shares at June 30, 2019 Outstanding—67,718,692 shares at June 30, 2020 and 68,624,566 shares at June 30, 2019	10,399	10,365
Additional paid-in capital	769,411	739,099
Retained earnings	1,458,330	1,228,659
Accumulated other comprehensive income	(5,288)	336

Treasury stock, at cost— 36,270,015 shares of common stock at June 30, 2020 and 35,017,726 shares at June 30, 2019	(1,766,499)	(1,616,499)
Total stockholders' equity	466,353	361,960
Total liabilities and stockholders' equity	$ 1,223,306	$ 863,013

See accompanying notes to these consolidated financial statements.

ASPEN TECHNOLOGY, INC. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY

	Common Stock		Additional Paid-in Capital	Retained Earnings	Accumulated Other Comprehensive Income (Loss)	Treasury Stock		Total Stockholders' Equity
	Number of Shares	$0.10 Par Value				Number of Shares	Cost	
	(Dollars in Thousands, Except Share Data)							
June 30, 2017, As Adjusted	102,567,129	$ 10,257	$ 687,479	$ 686,063	$ 1,459	29,145,976	$ (1,116,499)	$ 268,759
Comprehensive income:								
Net income	—	—	—	281,234	—	—	—	281,234
Other comprehensive loss	—	—	—	—	(71)			(71)
Issuance of shares of common stock	362,515	36	13,395	—	—	—		13,431
Issuance of restricted stock units and net share settlement related to withholding taxes	200,656	20	(8,087)	—	—	—	—	(8,067)
Repurchase of common stock	—	—	—	—	—	2,797,623	(200,000)	(200,000)
Stock-based compensation	—	—	22,688	—	—	—	—	22,688
June 30, 2018, As Adjusted	103,130,300	$ 10,313	$ 715,475	$ 967,297	$ 1,388	31,943,599	$ (1,316,499)	$ 377,974
Comprehensive income:								
Net income	—	—	—	261,362	—	—	—	261,362
Other comprehensive loss	—	—	—	—	(1,052)			(1,052)
Issuance of shares of common stock	266,014	27	10,803	—	—	—		10,830
Issuance of restricted stock units and net share settlement related to withholding taxes	245,978	25	(14,752)	—	—	—	—	(14,727)
Repurchase of common stock	—	—	—	—	—	3,074,127	(300,000)	(300,000)
Stock-based compensation	—	—	27,573	—	—	—	—	27,573
June 30, 2019, As Adjusted	103,642,292	$ 10,365	$ 739,099	$ 1,228,659	$ 336	35,017,726	$ (1,616,499)	$ 361,960
Comprehensive income:								
Net income	—	—	—	229,671	—	—	—	229,671
Other comprehensive loss	—	—	—	—	(5,624)			(5,624)
Issuance of shares of common stock	173,390	17	8,921	—	—	—		8,938
Issuance of restricted stock units and net share settlement related to withholding taxes	173,025	17	(10,157)	—	—	—	—	(10,140)
Repurchase of common stock	—	—	—	—	—	1,252,289	(150,000)	(150,000)
Stock-based compensation	—	—	31,548	—	—	—	—	31,548
June 30, 2020	103,988,707	$ 10,399	$ 769,411	$ 1,458,330	$ (5,288)	36,270,015	$ (1,766,499)	$ 466,353

See accompanying notes to these consolidated financial statements.

ASPEN TECHNOLOGY, INC. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF CASH FLOWS

	Year Ended June 30,		
	2020	2019	2018
		As Adjusted	As Adjusted
		(Dollars in Thousands)	
Cash flows from operating activities:			
Net income	$ 229,671	$ 261,362	$ 281,234
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization	9,550	8,143	6,544
Reduction in the carrying amount of right-of-use assets	9,094	—	—
Net foreign currency (gains) losses	(945)	(1,251)	980
Stock-based compensation	31,548	27,573	22,688
Deferred income taxes	28,101	(27,129)	(109,131)
Provision for bad debts	5,255	645	1,418
Other non-cash operating activities	625	429	421
Changes in assets and liabilities:			
Accounts receivable	(12,875)	(6,626)	846
Contract assets	(28,084)	(57,660)	14,932
Contract costs	(3,570)	(4,482)	(617)
Lease liabilities	(9,508)	—	—
Prepaid expenses, prepaid income taxes, and other assets	(5,288)	(2,411)	3,821
Accounts payable, accrued expenses, income taxes payable and other liabilities	(23,360)	21,921	1,156
Deferred revenue	13,044	17,799	(17,356)
Net cash provided by operating activities	243,258	238,313	206,936
Cash flows from investing activities:			
Purchase of property, equipment and leasehold improvements	(1,278)	(436)	(331)
Payments for business acquisitions, net of cash acquired	(74,460)	(6,098)	(33,700)
Payments for equity method investments	(324)	—	—
Payments for capitalized computer software costs	(141)	(1,131)	(329)
Net cash used in investing activities	(76,203)	(7,665)	(34,360)
Cash flows from financing activities:			
Issuance of shares of common stock	9,004	10,864	13,466
Repurchases of common stock	(152,432)	(299,214)	(205,049)
Payment of tax withholding obligations related to restricted stock	(10,167)	(14,477)	(7,896)
Deferred business acquisition payments	(4,600)	(1,700)	(8,649)
Proceeds from borrowings, net of repayments	219,163	50,000	30,000
Repayments of amounts borrowed	(8,000)	—	—
Payments of debt issuance costs	(3,533)	—	(351)
Net cash provided by (used in) financing activities	49,435	(254,527)	(178,479)
Effect of exchange rate changes on cash and cash equivalents	(620)	(360)	114
Increase (decrease) in cash and cash equivalents	215,870	(24,239)	(5,789)

Cash and cash equivalents, beginning of year	71,926	96,165	101,954
Cash and cash equivalents, end of year	$ 287,796	$ 71,926	$ 96,165
Supplemental disclosure of cash flow information:			
Income taxes paid, net	$ 39,533	$ 53,153	$ 50,557
Interest paid	12,444	8,121	5,038
Supplemental disclosure of non-cash activities:			
Change in purchases of property, equipment and leasehold improvements included in accounts payable and accrued expenses	$ (99)	$ 104	$ (61)
Change in repurchases of common stock included in accounts payable and accrued expenses	(2,432)	786	(5,049)
Lease liabilities arising from obtaining right-of-use assets	14,013	—	—

See accompanying notes to these consolidated financial statements.

(1) Operations

Aspen Technology, Inc., together with its subsidiaries, is a global leader in asset optimization software that optimizes asset design, operations and maintenance in complex, industrial environments. Our aspenONE software and related services have been developed specifically for companies engaged in the process and other capital-intensive industries such as energy, chemicals, engineering and construction, as well as pharmaceuticals, food and beverage, transportation, power, metals and mining, pulp and paper, and consumer packaged goods. Customers use our solutions to improve their competitiveness and profitability by increasing throughput, energy efficiency, and production levels, reducing unplanned downtime, plant emissions, and safety risks, enhancing capital efficiency, and decreasing working capital requirements over the entire asset lifecycle to support operational excellence. We operate globally in 33 countries as of June 30, 2020.

(2) Significant Accounting Policies

(a) Principles of Consolidation

The accompanying consolidated financial statements include the accounts of Aspen Technology, Inc. and our wholly owned subsidiaries. All intercompany balances and transactions have been eliminated in consolidation.

(b) Correction of Errors

As discussed in further detail in Note 20, "Immaterial Correction to Prior Period Financial Statements," to our Consolidated Financial Statements, the Company has revised its prior period financial statements to correct immaterial misstatements related to the adoption of, and ongoing accounting under, ASU No. 2014-09, *Revenue from Contracts with Customers* ("Topic 606").

(c) Management Estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions. These estimates and assumptions affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenue and expenses during the reporting period. Actual results could differ from those estimates.

(d) Cash and Cash Equivalents

Cash and cash equivalents consist of short-term money market instruments.

(e) Computer Software Development Costs

Certain computer software development costs are capitalized in the accompanying consolidated balance sheets. Capitalization of computer software development costs begins upon establishing technological feasibility defined as meeting specifications determined by the program design. Amortization of capitalized computer software development costs is provided on a product-by-product basis using the greater of (a) the amount computed using the ratio that current gross revenue for a product bears to total of current and anticipated future gross revenue for that product or (b) the straight-line method, beginning upon commercial release of the product, and continuing over the remaining estimated economic life of the product, not to exceed three years.

Total computer software costs capitalized were $0.2 million, $1.1 million and $0.4 million during the years ended June 30, 2020, 2019 and 2018, respectively. Total amortization expense charged to operations was approximately $0.6 million, $0.5 million and $0.4 million for the years ended June 30, 2020, 2019 and 2018, respectively. Computer software development accumulated amortization totaled $75.7 million and $75.1 million as of June 30, 2020 and 2019, respectively. Weighted average remaining useful life of computer software development costs was 2.0 years and 2.5 years at June 30, 2020 and 2019, respectively.

At each balance sheet date, we evaluate the unamortized capitalized software costs for potential impairment by comparing the balance to the net realizable value of the products. During the years ended June 30, 2020, 2019 and 2018, our computer software development costs were not considered impaired and as such, we did not recognize impairment losses during the periods then ended.

(f) Foreign Currency Translation

The determination of the functional currency of subsidiaries is based on the subsidiaries' financial and operational environment. Gains and losses from foreign currency translation related to entities whose functional currency is not our reporting currency are credited or charged to accumulated other comprehensive income included in stockholders' equity in the consolidated balance sheets. In all instances, foreign currency transaction and remeasurement gains or losses are credited or charged to the consolidated statements of operations as incurred as a component of other income (expense), net. Net foreign currency transaction and remeasurement gains were $0.9 million and $0.7 million in fiscal 2020 and 2019, respectively, and losses were $(0.8) million in fiscal 2018.

(g) Concentration of Credit Risk

Financial instruments that potentially subject us to concentrations of credit risk are principally cash and cash equivalents, contract assets, and accounts receivable. Our cash is held in financial institutions and our cash equivalents are invested in money market mutual funds that we believe to be of high credit quality.

Concentration of credit risk with respect to contract assets and receivables is limited to certain customers to which we make substantial sales. To reduce risk, we assess the financial strength of our customers. We do not require collateral or other security in support of our contact assets and receivables. As of June 30, 2020 and 2019, we had no customer receivable balance that represented approximately 10% or more of our total receivables.

(h) Computer Software Developed for Internal Use and Long-Lived Assets

Computer Software Developed for Internal Use:

Computer software developed for internal use is capitalized in accordance with ASC Topic 350-40, *Intangibles Goodwill and Other—Internal Use Software*. We capitalize costs incurred to develop internal-use software during the application development stage after determining software technological requirements and obtaining management approval for funding projects probable of completion.

In fiscal 2020, 2019 and 2018, there were no capitalized direct labor costs associated with our development of software for internal use.

Impairment of Long-Lived Assets:

We evaluate our long-lived assets, which include finite-lived intangible assets, property and leasehold improvements for impairment as events and circumstances indicate that the carrying amount of an asset or a group of assets may not be recoverable. We assess the recoverability of the asset or a group of assets based on the undiscounted future cash flows the asset is expected to generate, and recognize an impairment loss when estimated undiscounted future cash flows expected to result from the use of the asset are less than its carrying value. If an asset or a group of assets are deemed to be impaired, the amount of the impairment loss, if any, represents the excess of the asset's or a group of assets' carrying value compared to their estimated fair values.

(i) Comprehensive Income

Comprehensive income is defined as the change in equity of a business enterprise during a period from transactions and other events and circumstances from non-owner sources. Comprehensive income and its components for fiscal 2020, 2019 and 2018 are disclosed in the accompanying consolidated statements of comprehensive income.

As of June 30, 2020 and 2019, accumulated other comprehensive income is comprised of foreign translation adjustments of $(5.3) million and $0.3 million, respectively.

(j) Accounting for Stock-Based Compensation

Substantially all stock-based compensation cost is measured at the grant date based on the fair value of the award and is recognized as expense over the vesting period.

(k) Income Taxes

Deferred income taxes are recognized based on temporary differences between the financial statement and tax bases of assets and liabilities. Deferred tax assets and liabilities are measured using the statutory tax rates and laws expected to apply to taxable income in the years in which the temporary differences are expected to reverse. Valuation allowances are provided against net deferred tax assets if, based upon the available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income and the timing of the temporary differences becoming deductible. Management considers, among other available information, scheduled reversals of deferred tax liabilities, projected future taxable income, limitations of availability of net operating loss carryforwards, and other matters in making this assessment.

We do not provide deferred taxes on unremitted earnings of foreign subsidiaries since we intend to indefinitely reinvest either currently or sometime in the foreseeable future. Unrecognized provisions for taxes on undistributed earnings of foreign subsidiaries, which are considered indefinitely reinvested, are not material to our consolidated financial position or results of operations. We are continuously subject to examination by the IRS, as well as various state and foreign jurisdictions. The IRS and other taxing authorities may challenge certain deductions and credits reported by us on our income tax returns. In accordance with provisions of ASC Topic 740, *Income Taxes* (ASC 740), an entity should recognize a tax benefit when it is more-likely-than-not, based on the technical merits, that the position would be sustained upon examination by a taxing authority. The amount to be recognized, if the more-likely-than-not threshold was passed, should be measured as the largest amount of tax benefit that is greater than 50 percent likely of being realized upon ultimate settlement with a taxing authority that has full knowledge of all relevant information. Furthermore, any change in the recognition, de-recognition or measurement of a tax position should be recorded in the period in which the change occurs. We account for interest and penalties related to uncertain tax positions as part of the provision for income taxes.

(l) Loss Contingencies

We accrue estimated liabilities for loss contingencies arising from claims, assessments, litigation and other sources when it is probable that a liability has been incurred and the amount of the claim assessment or damages can be reasonably estimated. We believe that we have sufficient accruals to cover any obligations resulting from claims, assessments or litigation that have met these criteria.

(m) Advertising Costs

Advertising costs are expensed as incurred and are classified as sales and marketing expenses. We incurred advertising expenses of $3.5 million, $4.4 million and $3.2 million during fiscal 2020, 2019 and 2018, respectively.

(n) Research and Development Expense

We charge research and development expenditures to expense as the costs are incurred. Research and development expenses consist primarily of personnel expenses related to the creation of new products, enhancements and engineering changes to existing products and costs of acquired technology prior to establishing technological feasibility.

(o) Equity Method Investments

During fiscal 2020, we entered into a limited partnership investment fund agreement. The primary objective of this partnership is investing in equity and equity-related securities (including convertible debt) of venture growth- stage businesses. We account for the investment in accordance with Topic 323, *Investments - Equity Method and Joint Ventures*. Our total commitment under this partnership is 5.0 million CAD ($3.5 million). Under the conditions of the equity method investment, unfavorable future changes in market conditions could lead to a potential loss up to the full value of our 5.0 million CAD ($3.5 million) commitment. As of June 30, 2020, the fair value of this investment is 0.5 million CAD ($0.3 million), representing our payments towards the total commitment during fiscal 2020, and is recorded in non-current assets in our consolidated balance sheet.

(p) New Accounting Pronouncements Adopted in Fiscal 2020

In February 2016, the FASB issued Accounting Standards Update ("ASU") No. 2016-02, *Leases* ("Topic 842"). Under the amendment, lessees are required to recognize virtually all of their leases on the balance sheet, by recording a right-of-use asset and lease liability. The ASU is effective for annual periods, including interim periods within those annual periods, beginning after December 15, 2018. We adopted Topic 842 effective July 1, 2019 using the effective date method with a modified retrospective transition approach. Results for reporting periods beginning on or after July 1, 2019 are presented under Topic 842, while prior period amounts were not adjusted and continue to be reported in accordance with the Company's historic accounting under Topic 840 "Leases." We elected the package of practical expedients permitted under the transition guidance within the new standard, which allowed the carry forward of historical assessments of whether a contract contains a lease, lease classification and initial direct costs. The most significant impact of the adoption of Topic 842 was the recognition of operating lease right-of-use assets of $28.5 million and current and non-current operating lease liabilities of $7.4 million and $26.5 million, respectively, and the reversal of deferred rent of $6.5 million as of July 1, 2019. The adoption of Topic 842 did not have a material impact on our operating results or cash flows, and there was no impact on our debt covenants. See Note 4, "Leases," to our Consolidated Financial Statements for more information on the impact of adopting Topic 842.

(q) Recently Issued Accounting Pronouncements

In June 2016, the FASB issued ASU No. 2016-13, *Financial Instruments - Credit Losses ("Topic 326")*. The amendment changes the impairment model for most financial assets and certain other instruments. Entities will be required to use a model that will result in the earlier recognition of allowances for losses for trade and other receivables, contract assets, held-to-maturity debt securities, loans, and other instruments. Topic 326 is effective for annual periods, including interim periods within those annual periods, beginning after December 15, 2019. Early adoption is permitted. We are currently evaluating the impact of Topic 326 on our consolidated financial statements. Based upon the work performed to date, we do not expect the adoption of Topic 326 will result in a material impact to our consolidated financial statements.

In December 2019, the FASB issued ASU No. 2019-12, *Income Taxes ("Topic 740") - Simplifying the Accounting for Income Taxes*. ASU 2019-12 is intended to simplify accounting for income taxes. It removes certain exceptions to the general principles in Topic 740 and amends existing guidance to improve consistent application. ASU 2019-12 is effective for annual periods, including interim periods within those annual periods, beginning after December 15, 2020. Early adoption is permitted. We are currently evaluating the impact of ASU 2019-12 on our consolidated financial statements.

In March 2020, the FASB issued ASU 2020-04, *Facilitation of the Effects of Reference Rate Reform on Financial Reporting ("Topic 848")*. ASU 2020-04 provides practical expedients and exceptions for applying U.S. GAAP to contracts, hedging relationships, and other transactions affected by reference rate reform if certain criteria are met. The expedients and exceptions provided by ASU 2020-04 apply only to contracts, hedging relationships, and other transactions that reference the London Interbank Offered Rate ("LIBOR") or another reference rate expected to be discontinued as a result of reference rate reform. These amendments are not applicable to contract modifications made and hedging relationships entered into or evaluated after December 31, 2022. ASU No. 2020-04 is effective as of March 12, 2020 through December 31, 2022, and may be applied to contract modifications and hedging relationships from the beginning of an interim period that includes or is subsequent to March 12, 2020. We are currently evaluating the impact of ASU 2020-04 on our consolidated financial statements.

(3) Revenue from Contracts with Customers

In accordance with Topic 606, we account for a customer contract when both parties have approved the contract and are committed to perform their respective obligations, each party's rights can be identified, payment terms can be identified, the contract has commercial substance, and it is probable that we will collect substantially all of the consideration to which we are entitled. Revenue is recognized when, or as, performance obligations are satisfied by transferring control of a promised product or service to a customer.

Nature of Products and Services

We generate revenue from the following sources: (1) License revenue; (2) Maintenance revenue; and (3) Services and other revenue. We sell our software products to end users primarily under fixed-term licenses. We license our software products primarily through a subscription offering which we refer to as our aspenONE licensing model, which includes software maintenance and support, known as our Premier Plus SMS offering, for the entire term. Our aspenONE products are organized into three suites: 1) engineering; 2) manufacturing and supply chain; and 3) asset performance management. The aspenONE licensing model provides customers with access to all of the products within the aspenONE suite(s) they license. We refer to these arrangements as token arrangements. Tokens are fixed units of measure. The amount of software usage is limited by the number of tokens purchased by the customer.

We also license our software through point product term arrangements, which include our Premier Plus SMS offering for the entire term.

We determine revenue recognition through the following steps:

- Identification of the contract, or contracts, with a customer;
- Identification of the performance obligations in the contract;
- Determination of the transaction price;
- Allocation of the transaction price to the performance obligations in the contract; and
- Recognition of revenue when, or as, we satisfy a performance obligation.

Term-based Arrangements: Term-based arrangements consist of on-premise term licenses as well as maintenance.

License

License revenue consists primarily of product and related revenue from our aspenONE licensing model and point product arrangements.

When a customer elects to license our products under our aspenONE licensing model, the customer receives, for the term of the arrangement, the right to all software products in the licensed aspenONE software suite. When a customer elects to license point products, the customer receives, for the term of the arrangement, the right to license specified products in the licensed aspenONE software suite. Revenue from initial product licenses is recognized upfront upon delivery.

Maintenance

When a customer elects to license our products under our aspenONE licensing model, our Premier Plus SMS offering is included for the entire term of the arrangement and the customer receives, for the term of the arrangement, the right to any updates that may be introduced into the licensed aspenONE software suite. When a customer elects to license point products, our Premier Plus SMS offering is included for the entire term of the arrangement and the customer receives, for the term of the arrangement, the right to any updates that may be introduced related to the specified products licensed. Maintenance represents a stand-ready obligation and, due to our obligation to provide unspecified future software updates on a when-and-if available basis as well as telephone support services, we are required to recognize revenue ratably over the term of the arrangement.

Services and Other Revenue

Professional Services Revenue

Professional services are provided to customers on a time-and-materials ("T&M") or fixed-price basis. The obligation to provide professional services is generally satisfied over time, with the customer simultaneously receiving and consuming the benefits as we satisfy our performance obligation. For professional services, revenue is recognized by measuring progress toward the completion of our obligations. We recognize professional services fees for our T&M contracts based upon hours worked and contractually agreed-upon hourly rates. Revenue from fixed-price engagements is recognized using the proportional performance method based on the ratio of costs incurred to the total estimated project costs. The use of the proportional performance method is dependent upon our ability to reliably estimate the costs to complete a project. We use historical experience as a basis for future estimates to complete current projects. Additionally, we believe that costs are the best available measure of performance. Out-of-pocket expenses which are reimbursed by customers are recorded as revenue.

Training Revenue

We provide training services to our customers, including on-site, Internet-based, public and customized training. The obligation to provide training services is generally satisfied over time, with the customer simultaneously receiving and consuming the benefits as we satisfy our performance obligation. Revenue is recognized in the period in which the services are performed.

Contracts with Multiple Performance Obligations

Our contracts generally contain more than one of the products and services listed above, each of which is separately accounted for as a distinct performance obligation.

Allocation of consideration: We allocate total contract consideration to each distinct performance obligation in an arrangement on a relative standalone selling price basis. The standalone selling price reflects the price we would charge for a specific product or service if it was sold separately in similar circumstances and to similar customers.

If the arrangement contains professional services and other products or services, we allocate to the professional service obligation a portion of the total contract consideration based on the standalone selling price of professional services that is observed from consistently priced standalone sales.

The standalone selling price for term arrangements, which always include maintenance for the full term of the arrangement, is the price for the combined license and maintenance bundle. The amount assigned to the license and maintenance bundle is separated into license and maintenance amounts using the respective standalone selling prices represented by the value relationship between the software license and maintenance.

When two or more contracts are entered into at or near the same time with the same customer, we evaluate the facts and circumstances associated with the negotiation of those contracts. Where the contracts are negotiated as a package, we will account for them as a single arrangement and allocate the consideration for the combined contracts among the performance obligations accordingly.

Standalone selling price: When available, we use directly observable transactions to determine the standalone selling prices for performance obligations. Generally, directly observable data is not available for term licenses and maintenance. When term licenses are sold together with maintenance in a bundled arrangement, we estimate a standalone selling price for these distinct performance obligations using relevant information, including our overall pricing objectives and strategies and historical pricing data, and taking into consideration market conditions and other factors.

Other policies and judgments

Payment terms and conditions vary by contract type, although terms generally include a requirement of payment annually over the term of the license arrangement. Therefore, we generally receive payment from a customer after the performance obligation related to the license has been satisfied, and therefore, our contracts generally contain a significant financing component. The significant financing component is calculated utilizing an interest rate that derives the net present value of the performance obligations delivered on an upfront basis based on the allocation of consideration. We have instituted a customer portfolio approach in assigning interest rates. The rates are determined at contract inception and are based on the credit characteristics of the customers within each portfolio.

Contract modifications

We sometimes enter into agreements to modify previously executed contracts, which constitute contract modifications. We assess each of these contract modifications to determine (i) if the additional products and services are distinct from the products and services in the original arrangement; and (ii) if the amount of consideration expected for the added products and services reflects the stand-alone selling price of those products and services, as adjusted for contract-specific circumstances. A contract modification meeting both criteria is accounted for as a separate contract. A contract modification not meeting both criteria is considered a change to the original contract and is accounted for on either (i) a prospective basis as a termination of the existing contract and the creation of a new contract; or (ii) a cumulative catch-up basis. Generally, our contract modifications meet both criteria and are accounted for as a separate contract, as adjusted for contract-specific circumstances.

Disaggregation of Revenue

We disaggregate our revenue by region, type of performance obligation, timing of revenue recognition, and segment as follows:

	Year Ended June 30,		
	2020	2019	2018
		As Adjusted	As Adjusted
	(Dollars in Thousands)		
Revenue by region:			
North America	$ 264,134	$ 254,428	$ 235,430
Europe	148,774	153,284	115,990
Other (1)	185,809	188,970	156,146
	$ 598,717	$ 596,682	$ 507,566
Revenue by type of performance obligation:			
Term licenses	$ 388,180	$ 404,581	$ 318,442
Maintenance	178,139	163,567	158,838
Professional services and other	32,398	28,534	30,286
	$ 598,717	$ 596,682	$ 507,566
Revenue by segment:			
Subscription and software	$ 566,319	$ 568,148	$ 477,280
Services and other	32,398	28,534	30,286
	$ 598,717	$ 596,682	$ 507,566

(1) Other consists primarily of Asia Pacific, Latin America and the Middle East.

Contract Assets and Deferred Revenue

The difference in the opening and closing balances of our contract assets and deferred revenue primarily results from the timing difference between our performance and the customer's payment. We fulfill our obligations under a contract with a customer by transferring products and services in exchange for consideration from the customer. We recognize a contract asset when we transfer products or services to a customer and the right to consideration is conditional on something other than the passage of time. Accounts receivable are recorded when the customer has been billed or the right to consideration is unconditional. We recognize deferred revenue when we have received consideration or an amount of consideration is due from the customer and we have a future obligation to transfer products or services.

Payment terms and conditions vary by contract type. Terms generally include a requirement of payment annually over the term of the license arrangement. During the majority of each customer contract term, the amount invoiced is generally less than the amount of revenue recognized to date, primarily because we transfer control of the performance obligation related to the software license at the inception of the contract term, and the allocation of contract consideration to the license performance obligation is a significant portion of the total contract consideration. Therefore, our contracts often result in the recording of a contract asset throughout the majority of the contract term. We record a contract asset when revenue recognized on a contract exceeds the billings. We recognize an impairment on contract assets if subsequent to contract inception it becomes probable payment is not collectible. We review contract assets for impairment at each reporting date using the same methodology used in determining the allowance for doubtful accounts under Topic 310, *Receivables*. We review customer receivables and contract assets on an individual basis, and we impair receivables and the associated contract assets if it is probable that some or all of the asset is not collectible, taking into account historical losses, economic conditions and customer-specific factors.

Our contract assets and deferred revenue were as follows as of June 30, 2020 and 2019:

	June 30, 2020	June 30, 2019 As Adjusted
	(Dollars in Thousands)	
Contract assets	$ 610,473	$ 582,291
Deferred revenue	(57,081)	(44,891)
	$ 553,392	$ 537,400

Contract assets and deferred revenue are presented net at the contract level for each reporting period.

The change in deferred revenue during fiscal 2020 was primarily due to an increase in new billings in advance of revenue recognition, partially offset by $34.1 million of revenue recognized that was included in deferred revenue at June 30, 2019.

Contract Costs

We pay commissions for new product sales as well as for renewals of existing contracts. Commissions paid to obtain renewal contracts are not commensurate with the commissions paid for new product sales and therefore, a portion of the commissions paid for new contracts relate to future renewals.

We account for new product sales commissions using a portfolio approach and allocate the cost of commissions in proportion to the allocation of transaction price of license and maintenance performance obligations, including assumed renewals. Commissions allocated to the license and license renewal components are expensed at the time the license revenue is recognized. Commissions allocated to maintenance are capitalized and amortized on a straight-line basis over a period of four years to eight years for new contracts, reflecting our estimate of the expected period that we will benefit from those commissions.

Amortization of capitalized contract costs is included in selling and marketing expenses in our statement of operations.

Transaction Price Allocated to Remaining Performance Obligations

The following table includes the aggregate amount of the transaction price allocated as of June 30, 2020 to the performance obligations that are unsatisfied (or partially unsatisfied) at the end of the reporting period:

	Year Ended June 30,					
	2021	2022	2023	2024	2025	Thereafter
	(Dollars in Thousands)					
License	$ 74,685	$ 17,937	$ 5,299	$ 2,924	$ 1,493	$ 66
Maintenance	170,465	129,353	94,647	64,913	37,153	9,690
Services and other	50,589	901	650	313	172	141

(4) Leases

We have operating leases primarily for corporate offices, and other operating leases for data centers and certain equipment. We determine whether an arrangement is or contains a lease based on facts and circumstances present at the inception of the arrangement. We recognize lease expense on a straight-line basis over the lease term. Our leases have remaining lease terms of less than one year to approximately ten years, some of which include options to extend the leases for up to five years, and some of which include the option to terminate the leases upon advanced notice of 30 days or more. If we are reasonably certain we will exercise an option to extend or terminate the lease, the time period covered by the extension or termination option is included in the lease term.

Operating lease liabilities and their corresponding right-of-use assets are recorded based on the present value of lease payments over the expected lease term. The interest rate implicit in the lease contracts is typically not readily determinable. As such, we utilize the appropriate incremental borrowing rate, which is the rate incurred to borrow on a collateralized basis over a similar term at an amount equal to the lease payments in a similar economic environment. Certain adjustments to the right-of-use asset may be required for items such as incentives received. We have lease agreements with lease and non-lease components, which are accounted for separately.

Operating lease costs are recognized on a straight-line basis over the term of the lease. The components of lease expenses for the twelve months ended June 30, 2020 were as follows:

	Twelve Months Ended June 30, 2020
	(Dollars in Thousands)
Operating lease costs (1)	$ 9,230
Total lease costs	$ 9,230

(1) Operating lease costs include rent and fixed fees

The following table represents the weighted-average remaining lease term and discount rate information related to our operating leases:

	June 30, 2020
Weighted average remaining lease term	5.7 years
Weighted average discount rate	4.4%

The following table represents the maturities of our operating lease liabilities as of June 30, 2020:

	June 30, 2020
	(Dollars in Thousands)
Year Ending June 30,	
2021	$ 8,477
2022	8,784
2023	8,167
2024	7,516
2025	5,481
Thereafter	7,370
Total lease payments	45,795
Less: imputed interest	(5,883)
	$ 39,912

The following table represents the contractual obligations for our operating leases as of June 30, 2019:

	June 30, 2019 (1)
	(Dollars in Thousands)
Year Ending June 30,	
2020	$ 8,399
2021	7,820
2022	6,514
2023	5,862
2024	4,932
Thereafter	3,307
	$ 36,834

(1) As previously disclosed in our 2019 Annual Report on Form 10-K under the previous lease accounting standard, Topic 840, Leases.

(5) Fair Value

We determine fair value by utilizing a fair value hierarchy that ranks the quality and reliability of the information used in its determination. Fair values determined using “Level 1 inputs” utilize unadjusted quoted prices in active markets for identical assets or liabilities that we have the ability to access. Fair values determined using “Level 2 inputs” utilize data points that are observable, such as quoted prices, interest rates and yield curves for similar assets and liabilities.

Cash equivalents are reported at fair value utilizing quoted market prices in identical markets, or "Level 1 Inputs." Our cash equivalents consist of short-term money market instruments.

Equity method investments are reported at fair value calculated in accordance with the market approach, utilizing market consensus pricing models with quoted prices that are directly or indirectly observable, or "Level 2 Inputs."

The following table summarizes financial assets and liabilities measured and recorded at fair value on a recurring basis in the accompanying consolidated balance sheets as of June 30, 2020 and 2019, segregated by the level of the valuation inputs within the fair value hierarchy utilized to measure fair value:

	Fair Value Measurements at Reporting Date Using,	
	Quoted Prices in Active Markets for Identical Assets (Level 1 Inputs)	Significant Other Observable Inputs (Level 2 Inputs)
	(Dollars in Thousands)	
June 30, 2020:		
Cash equivalents	$ 1,020	$ —
Equity method investments	—	342
June 30, 2019:		
Cash equivalents	$ 1,007	$ —

Financial instruments not measured or recorded at fair value in the accompanying consolidated financial statements consist of accounts receivable, accounts payable and accrued liabilities. The estimated fair value of these financial instruments approximates their carrying value. The estimated fair value of the borrowings under the Amended and Restated Credit Agreement (described below in Note 12, "Credit Agreement") approximates its carrying value due to the floating interest rate.

(6) Accounts Receivable

Our accounts receivable, net of the related allowance for doubtful accounts, were as follows as of June 30, 2020 and 2019:

	June 30, 2020	June 30, 2019
	(Dollars in Thousands)	
Accounts receivable, gross	$ 62,925	$ 51,133
Allowance for doubtful accounts	(6,624)	(3,349)
Accounts receivable, net	$ 56,301	$ 47,784

As of June 30, 2020 and 2019, we had no customer receivable balance that represented approximately 10% or more of our total receivables.

(7) Property and Equipment

Property, equipment and leasehold improvements in the accompanying consolidated balance sheets consist of the following:

	Year Ended June 30,	
	2020	2019
	(Dollars in Thousands)	
Property, equipment and leasehold improvements, at cost:		
Computer equipment	$ 6,958	$ 6,642
Purchased software	22,534	22,793
Furniture & fixtures	6,971	6,794
Leasehold improvements	12,424	12,232
Property, equipment and leasehold improvements, at cost	48,887	48,461
Accumulated depreciation	(42,924)	(41,227)
Property, equipment and leasehold improvements, net	$ 5,963	$ 7,234

Property and equipment are stated at cost. We record depreciation using the straight-line method over their estimated useful lives, as follows:

Asset Classification	Estimated Useful Life
Computer equipment	3 years
Purchased software	3 - 5 years
Furniture and fixtures	3 - 10 years
Leasehold improvements	Life of lease or asset, whichever is shorter

During fiscal 2020 and 2019, we wrote off fully depreciated property, equipment and leasehold improvements that were no longer in use with gross book values of $0.9 million and $3.5 million, respectively.

Depreciation expense was $2.4 million, $3.1 million and $3.9 million for fiscal 2020, 2019 and 2018, respectively.

We account for asset retirement obligations in accordance with ASC Topic 410, *Asset Retirement and Environmental Obligations*. Our asset retirement obligations relate to leasehold improvements for leased properties. The balance of our asset retirement obligations was $0.9 million as of June 30, 2020 and 2019, respectively.

(8) Acquisitions

Sabisu Ltd.

On June 12, 2019, we completed the acquisition of all the outstanding shares of Argent & Waugh Limited and Sabisu Ltd. (“Sabisu”), a provider of a flexible enterprise visualization and workflow solution to deliver real-time decision support, for a total cash consideration of £6.2 million ($7.9 million). The purchase price consisted of £4.8 million ($6.1 million) of cash paid at closing, a subsequent working capital adjustment of £0.2 million ($0.3 million), and an additional £1.2 million ($1.5 million) to be held back until June 2021 as security for certain representations, warranties, and obligations of the sellers. The holdback is recorded in other non-current liabilities in our consolidated balance sheet.

An allocation of the purchase price is as follows:

	Amount (Dollars in Thousands)
Tangible assets acquired, net	$ 706
Identifiable intangible assets:	
Technology-related	1,966
Customer relationships	1,180
Goodwill	4,576
Deferred tax liabilities	(564)
Total assets acquired, net	$ 7,864

The goodwill reflects the value of the assembled workforce and the company-specific synergies we expect to realize by selling Sabisu products and services to our existing customers. The results of operations of Sabisu have been included prospectively in our results of operations since the date of acquisition

Mnubo, Inc.

On July 12, 2019, we completed the acquisition of all the outstanding shares of Mnubo Inc. (“Mnubo”), a Canada-based provider of purpose-built artificial intelligence and analytics infrastructure for the Internet of things, for a total cash consideration of $78.3 million (102.3 million CAD). The purchase price of $78.3 million includes $7.9 million (10.3 million CAD) paid into an escrow account as security for certain representations, warranties, and obligations of the sellers, which was released from the escrow account in July 2020.

An allocation of the purchase price is as follows:

	Amount (Dollars in Thousands)
Tangible assets acquired, net	$ 512
Identifiable intangible assets:	
Technology-related	13,660
Customer relationships	2,990
Goodwill	62,485
Deferred tax liabilities	(1,347)
Total assets acquired, net	$ 78,300

The goodwill reflects the value of the assembled workforce and the company-specific synergies we expect to realize by selling Mnubo products and services to our existing customers. The results of operations of Mnubo have been included prospectively in our results of operations since the date of acquisition.

(9) Intangible Assets

We include in our amortizable intangible assets those intangible assets acquired in our business and asset acquisitions. We amortize acquired intangible assets with finite lives over their estimated economic lives, generally using the straight-line method. Each period, we evaluate the estimated remaining useful lives of acquired intangible assets to determine whether events or changes in circumstances warrant a revision to the remaining period of amortization. Acquired intangibles are removed from the accounts when fully amortized and no longer in use.

Intangible assets consist of the following as of June 30, 2020 and 2019:

	Gross Carrying Amount	Accumulated Amortization	Effect of Currency Translation	Net Carrying Amount
	(Dollars in Thousands)			
June 30, 2020:				
Technology	$ 51,269	$ (13,245)	$ (842)	$ 37,182
Customer relationships	9,148	(3,171)	(308)	5,669
Non-compete agreements	553	(553)	—	—
Total	$ 60,970	$ (16,969)	$ (1,150)	$ 42,851
June 30, 2019:				
Technology	$ 37,168	$ (8,868)	$ (118)	$ 28,182
Customer relationships	6,503	(1,039)	(100)	5,364
Non-compete agreements	553	(492)	—	61
Total	$ 44,224	$ (10,399)	$ (218)	$ 33,607

Total amortization expense related to intangible assets amounted to $6.6 million, $4.5 million and $2.2 million in fiscal 2020, 2019 and 2018, respectively.

Future amortization expense as of June 30, 2020 is expected to be as follows:

Year Ended June 30,	Amortization Expense
	(Dollars in Thousands)
2021	$ 6,842
2022	6,867
2023	6,843
2024	6,288
2025	6,197
Thereafter	9,814
Total	$ 42,851

(10) Goodwill

The changes in the carrying amount of goodwill for our subscription and software reporting segment during the fiscal years ended June 30, 2020 and 2019 were as follows:

	Gross Carrying Amount	Accumulated Impairment Losses	Effect of Currency Translation	Net Carrying Amount
June 30, 2019:	$ 145,572	$ (65,569)	$ (1,620)	$ 78,383
Goodwill from acquisitions, net of adjustments	62,278	—	—	62,278
Foreign currency translation	—	—	(3,606)	(3,606)
June 30, 2020:	$ 207,850	$ (65,569)	$ (5,226)	$ 137,055

	Gross Carrying Amount	Accumulated Impairment Losses	Effect of Currency Translation	Net Carrying Amount
June 30, 2018:	$ 142,316	$ (65,569)	$ (1,157)	$ 75,590
Goodwill from acquisitions, net of adjustments	3,256	—	—	3,256
Foreign currency translation	—	—	(463)	(463)
June 30, 2019:	$ 145,572	$ (65,569)	$ (1,620)	$ 78,383

We test goodwill for impairment annually (or more often if impairment indicators arise), at the reporting unit level. We first assess qualitative factors to determine whether the existence of events or circumstances indicates that it is more likely than not that the fair value of a reporting unit is less than its carrying amount. If we determine based on this assessment that it is more likely than not that the fair value of a reporting unit is less than its carrying amount, we perform the goodwill impairment test. The first step requires us to determine the fair value of the reporting unit and compare it to the carrying amount, including goodwill, of such reporting unit. If the fair value exceeds the carrying amount, no impairment loss is recognized. However, if the carrying amount of the reporting unit exceeds its fair value, the goodwill of the unit is impaired.

Fair value of a reporting unit is determined using a combined weighted average of a market-based approach (utilizing fair value multiples of comparable publicly traded companies) and an income-based approach (utilizing discounted projected cash flows). In applying the income-based approach, we would be required to make assumptions about the amount and timing of future expected cash flows, growth rates and appropriate discount rates. The amount and timing of future cash flows would be based on our most recent long-term financial projections. The discount rate we would utilize would be determined using estimates of market participant risk-adjusted weighted-average costs of capital and reflect the risks associated with achieving future cash flows.

We have elected December 31st as the annual impairment assessment date. We performed our annual impairment test for the subscription and software reporting unit as of December 31, 2019 and, based upon the results of our qualitative assessment, determined that it was not likely that its fair value was less than its carrying amount. As such, we did not recognize impairment losses as a result of our analysis. There were also no impairment losses recognized during fiscal 2019 and 2018. If an event occurs or circumstances change that would more likely than not reduce the fair value of a reporting unit below its carrying value, goodwill will be evaluated for impairment between annual tests.

(11) Accrued Expenses and Other Liabilities

Accrued expenses and other current liabilities in the accompanying consolidated balance sheets consist of the following:

	June 30, 2020	June 30, 2019
	(Dollars in Thousands)	
Compensation-related	$ 27,591	$ 27,147
Deferred acquisition payments	1,479	4,600
Uncertain tax positions	318	3,751
Royalties and external commissions	3,359	3,665
Share repurchases	—	2,432
Professional fees	2,115	3,053
Deferred rent	—	1,331
Other	8,694	8,615
Total accrued expenses and other current liabilities	$ 43,556	$ 54,594

Other non-current liabilities in the accompanying consolidated balance sheets consist of the following:

	June 30, 2020	June 30, 2019
	(Dollars in Thousands)	
Deferred rent	$ —	$ 5,187
Uncertain tax positions	2,027	2,274
Deferred acquisition payments	—	1,524
Asset retirement obligations	920	914
Other	160	482
Total other non-current liabilities	$ 3,107	$ 10,381

(12) Credit Agreement

In December 2019, we entered into an Amended and Restated Credit Agreement with JPMorgan Chase Bank, N.A., as administrative agent, joint lead arranger and joint bookrunner, Silicon Valley Bank, as joint lead arranger, joint bookrunner and syndication agent, and the lenders and co-documentation agents named therein (the "Amended and Restated Credit Agreement"). The Amended and Restated Credit Agreement, which amends and restates the Credit Agreement we entered into as of February 26, 2016, provides for a $200.0 million secured revolving credit facility and a $320.0 million secured term loan facility.

Principal outstanding under the Amended and Restated Credit Agreement bears interest at a rate per annum equal to, at our option, either: (1) the sum of (a) the highest of (i) the rate of interest last quoted by The Wall Street Journal in the United States as the prime rate in effect, (ii) the NYFRB Rate plus 0.5%, and (iii) the LIBO rate multiplied by the Statutory Reserve Rate plus 1.0%, plus (b) a margin initially of 0.5% for the first full fiscal quarter ending after the date of the Amended and Restated Credit Agreement and thereafter based on our leverage ratio (as defined in the Amended and Restated Credit Agreement); or (2) the sum of (a) the LIBO rate multiplied by the Statutory Reserve Rate, plus (b) a margin initially of 1.5% for the first full fiscal quarter ending after the date of the Amended and Restated Credit Agreement and thereafter based on our leverage ratio. The interest rates as of June 30, 2020 were 1.68% on $312.0 million in outstanding borrowings on our term loan facility and 1.69% and 1.68% on $100.0 million and $19.2 million, respectively, in outstanding borrowings on our revolving credit facility.

All borrowings under the Amended and Restated Credit Agreement are secured by liens on substantially all of our assets and the assets of our subsidiary AspenTech Canada Holdings, LLC, which has guaranteed our obligations under the Amended and Restated Credit Agreement. Additional significant subsidiaries (as determined in the Amended and Restated Credit Agreement) may be required to guarantee our obligations and to grant liens on their assets in favor of the lenders.

As of June 30, 2020, we had $119.2 million and $312.0 million in outstanding borrowings on our revolving credit facility and term loan facility, respectively. Our current borrowings of $135.2 million consist of $119.2 million of the revolving credit facility and $16.0 million of the term loan facility. Our non-current borrowings of $292.4 million consist of $296.0 million of our term loan facility, net of $3.6 million in debt issuance costs. We had $220.0 million in outstanding current borrowings as of June 30, 2019.

The indebtedness under the revolving credit facility matures on December 23, 2024. The following table summarizes the maturities of the term loan facility:

Year Ended June 30,	Amount (Dollars in Thousands)
2021	$ 16,000
2022	20,000
2023	28,000
2024	36,000
2025	212,000
Total	$ 312,000

The Amended and Restated Credit Agreement contains affirmative and negative covenants customary for facilities of this type, including restrictions on incurrence of additional debt, liens, fundamental changes, asset sales, restricted payments and transactions with affiliates. There are also financial covenants regarding maintenance as of the end of each fiscal quarter, commencing with the quarter ending March 31, 2020, of a maximum leverage ratio of 3.50 to 1.00 and a minimum interest coverage ratio of 2.50 to 1.00. As of June 30, 2020, we were in compliance with these covenants.

(13) Stock-Based Compensation

Stock Compensation Plans

In December 2016, the shareholders approved the establishment of the 2016 Omnibus Incentive Plan (the 2016 Plan), which provides for the issuance of a maximum of 6,000,000 shares of common stock. The 2016 Plan provides for the grant of incentive and nonqualified stock options, stock appreciation rights, restricted stock, restricted stock units, other stock-related awards, and performance awards that may be settled in cash, stock, or other property. As of June 30, 2020, there were 5,999,368 shares of common stock available for issuance subject to awards under the 2016 Plan.

In April 2010, the shareholders approved the establishment of the 2010 Equity Incentive Plan (the 2010 Plan), which provides for the issuance of a maximum of 7,000,000 shares of common stock. The 2010 Plan provides for the grant of incentive and nonqualified stock options, stock appreciation rights, restricted stock, restricted stock units, other stock-related awards, and performance awards that may be settled in cash, stock, or other property. The 2010 Plan expired in March 2020.

Employee Stock Purchase Plan

On July 26, 2018, our Board of Directors approved the Aspen Technology, Inc. 2018 Employee Stock Purchase Plan (the "ESPP"), which provides for the issuance of up to 250,000 shares of common stock to participating employees. The ESPP is intended to be a qualified employee stock purchase plan under Section 423 of the Internal Revenue Code of 1986, or the IRC. The ESPP was approved at our Annual Meeting of Stockholders on December 7, 2018. The ESPP currently provides for a purchase price equal to 85% of the lower of (a) the fair market value of the common stock on the first trading day of each ESPP offering period and (b) the fair market value of the common stock on the last day of the offering period. Our initial offering period was January 1, 2019 through June 30, 2019. Our current offering period is July 1, 2020 through December 31, 2020.

We recorded stock-based compensation expense associated with the ESPP of approximately $0.5 million and $0.3 million during fiscal 2020 and 2019, respectively. As a result of employee stock purchases, we issued 19,222 shares and 13,039 shares of common stock during fiscal 2020 and 2019, respectively. The aggregate intrinsic value of shares issued under the ESPP was $1.8 million and $0.9 million during fiscal 2020 and 2019, respectively. As of June 30, 2020, there were 217,739 shares of common stock available for issuance under the ESPP.

General Award Terms

We issue stock options and restricted stock units (RSUs) to our employees and outside directors, pursuant to shareholder-approved equity compensation plans. Option awards are granted with an exercise price equal to the market closing price of our stock on the trading day prior to the grant date. Those options generally vest over four years and expire within 7 or 10 years of grant. RSUs generally vest over four years. Historically, our practice has been to settle stock option exercises and RSU vesting through newly-issued shares.

Stock Compensation Accounting

Our stock-based compensation is accounted for as awards of equity instruments. Our policy is to issue new shares upon the exercise of stock awards.

We utilize the Black-Scholes option valuation model for estimating the fair value of options granted. The Black-Scholes option valuation model incorporates assumptions regarding expected stock price volatility, the expected life of the option, the risk-free interest rate, dividend yield and the market value of our common stock. The expected stock price volatility is determined based on our stock's historic prices over a period commensurate with the expected life of the award. The expected life of an option represents the period for which options are expected to be outstanding as determined by historic option exercises and cancellations. The risk-free interest rate is based on the U.S. Treasury yield curve for notes with terms approximating the expected life of the options granted. The expected dividend yield is zero, based on our history and expectation of not paying dividends on common shares. We recognize compensation costs on a straight-line basis, net of forfeitures, over the requisite service period for time-vested awards.

The weighted average estimated fair value of option awards granted during fiscal 2020, 2019 and 2018 was $33.13, $31.25, and $17.07, respectively.

We utilized the Black-Scholes option valuation model with the following weighted average assumptions:

	Year Ended June 30,		
	2020	**2019**	**2018**
Risk-free interest rate	1.5%	2.8%	1.7%
Expected dividend yield	None	None	None
Expected life (in years)	4.5	4.6	4.6
Expected volatility factor	26.8%	26.6%	28.0%

The stock-based compensation expense and its classification in the accompanying consolidated statements of operations for fiscal 2020, 2019 and 2018 was as follows:

	Year Ended June 30,		
	2020	2019	2018
	(Dollars in Thousands)		
Recorded as expenses:			
Cost of maintenance	$ 1,441	$ 1,282	$ 559
Cost of service and other	1,961	1,420	920
Selling and marketing	5,656	4,849	3,862
Research and development	8,306	6,923	7,617
General and administrative	14,184	13,099	9,730
Total stock-based compensation	$ 31,548	$ 27,573	$ 22,688

A summary of stock option and RSU activity under all equity plans in fiscal 2020 is as follows:

	Stock Options				Restricted Stock Units	
	Shares	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term	Aggregate Intrinsic Value (in 000's)	Shares	Weighted Average Grant Date Fair Value
Outstanding at June 30, 2019	1,304,017	$ 60.33	6.94	$ 83,388	793,718	$ 98.38
Granted	297,859	133.00			266,514	133.35
Settled (RSUs)					(263,136)	84.30
Exercised	(154,168)	46.31				
Cancelled / Forfeited	(37,569)	99.00			(444,175)	116.46
Outstanding at June 30, 2020	1,410,139	$ 76.19	6.67	$ 49,705	352,921	$ 112.45
Exercisable at June 30, 2020	977,190	$ 59.86	5.87	$ 45,976		
Vested and expected to vest at June 30, 2020	1,364,448	$ 74.94	6.61	$ 49,308	291,775	$ 112.33

During fiscal 2020, 2019 and 2018, the weighted average grant-date fair value of RSUs granted was $133.35, $114.72 and $64.32, respectively. During fiscal 2020, 2019 and 2018 the total fair value of vested shares from RSU grants amounted to $29.7 million, $39.9 million and $23.0 million, respectively.

As of June 30, 2020, the total future unrecognized compensation cost related to stock options and RSUs was $10.0 million and $20.1 million, respectively, and are expected to be recorded over a weighted average period of 2.42 years and 2.09 years, respectively.

During fiscal 2020, 2019 and 2018 the weighted average exercise price of stock options granted was $133.00, $113.88 and $64.30. The total intrinsic value of options exercised during fiscal 2020, 2019 and 2018 was $9.9 million, $18.2 million and $15.1 million, respectively. We received $9.0 million, $10.9 million and $13.5 million in cash proceeds from issuances of shares of common stock during fiscal 2020, 2019 and 2018, respectively. We paid $10.2 million, $14.7 million and $8.1 million for withholding taxes on vested RSUs during fiscal 2020, 2019 and 2018, respectively.

At June 30, 2020, common stock reserved for future issuance under equity compensation plans was 6.0 million shares.

Performance Awards

Beginning in fiscal 2019, we granted performance-based long-term incentive awards (“performance awards”) to certain of our executives, including our named executive officers. The performance period for each performance award is either of the following two-year periods: (i) fiscal 2019 - fiscal 2020, or (ii) fiscal 2020 - fiscal 2021. Participants receive RSUs on the grant date associated with achievement of all performance targets. The performance targets for the performance awards are based on meeting at least ten percent growth in annual spend for each fiscal year, defined as an estimate of the annualized value of our portfolio of term license arrangements, as of a specific date, and the performance goals set out in the executive bonus plan for each fiscal year, such as free cash flow. If the performance targets are met during one of the two performance periods and the participant remains actively employed by us, the RSUs convert to time-based vesting wherein fifty percent of the awards immediately vest, and the remaining fifty percent are subject to additional service vesting over a three-year period. If the performance targets are not met, the participant is no longer actively employed by us prior to the performance targets being met, or the participant is otherwise determined to be ineligible, the participant forfeits all of the RSUs.

We record compensation expense for the performance awards based on the fair value of the awards, in an amount proportionate to the service time rendered by the participant, when it is probable that the achievement of the goals will be met. The total fair value of the performance awards was estimated using the closing price on the date of grant as well as the estimated probable achievement levels of the performance metrics. If the performance-based conditions are not met, no compensation cost is recognized and any recognized compensation cost is reversed.

We granted 418,886 RSUs in connection with the performance awards. As of June 30, 2020, all of the RSUs issued in connection with the performance awards were forfeited, due to the performance-based conditions not being met in fiscal 2020. No compensation expense was recognized during fiscal 2020 and 2019.

(14) Common Stock

On January 22, 2015, our Board of Directors approved a share repurchase program (the "Share Repurchase Program") for up to $450.0 million of our common stock. The Share Repurchase Program was announced on January 28, 2015, and expires at the end of each fiscal year unless extended. On April 26, 2016, June 8, 2017, April 18, 2018, December 6, 2018, and April 17, 2019, the Board of Directors approved a $400.0 million, $200.0 million, $200.0 million, $100.0 million, and $200.0 million increase in the Share Repurchase Program, respectively. On July 22, 2020, our Board of Directors approved a new share repurchase program (the "New Share Repurchase Program") for up to $200.0 million of our common stock, and terminated the Share Repurchase Program. The timing and amount of any shares repurchased are based on market conditions and other factors. All shares of our common stock repurchased have been recorded as treasury stock under the cost method.

During fiscal 2020, we repurchased 1,252,289 shares of our common stock in the open market for $150.0 million. During fiscal 2019, we repurchased 3,074,127 shares of our common stock in the open market for $300.0 million. During fiscal 2018, we repurchased 2,797,623 shares of our common stock in the open market for $200.0 million.

As of June 30, 2020, the remaining dollar value under the Share Repurchase Program was $196.3 million.

(15) Net Income Per Share

Basic income per share is determined by dividing net income by the weighted average common shares outstanding during the period. Diluted income per share is determined by dividing net income by diluted weighted average shares outstanding during the period. Diluted weighted average shares reflect the dilutive effect, if any, of potential common shares. To the extent their effect is dilutive, employee equity awards and other commitments to be settled in common stock are included in the calculation of diluted net income per share based on the treasury stock method.

The calculations of basic and diluted net income per share and basic and dilutive weighted average shares outstanding for the years ended June 30, 2020, 2019 and 2018 are as follows:

	Year Ended June 30,		
	2020	2019	2018
		As Adjusted	As Adjusted
	(Dollars and Shares in Thousands, Except per Share Data)		
Net income	$ 229,671	$ 261,362	$ 281,234
Weighted average shares outstanding	68,000	69,925	72,140
Dilutive impact from:			
Employee equity awards	727	862	816
Dilutive weighted average shares outstanding	68,727	70,787	72,956
Income per share			
Basic	$ 3.38	$ 3.74	$ 3.90
Dilutive	$ 3.34	$ 3.69	$ 3.85

For the years ended June 30, 2020, 2019 and 2018, certain employee equity awards were anti-dilutive based on the treasury stock method. The following employee equity awards were excluded from the calculation of dilutive weighted average shares outstanding because their effect would be anti-dilutive as of the balance sheet date:

	Year Ended June 30,		
	2020	2019	2018
	(Shares in Thousands)		
Employee equity awards	670	784	419

Included in the table above are options to purchase 287,809 shares of our common stock as of June 30, 2020 which were not included in the computation of dilutive weighted average shares outstanding, because their exercise prices ranged from $116.90 per share to $138.14 per share and were greater than the average market price of our common stock during the period then ended. These options were outstanding as of June 30, 2020 and expire at various dates through February 17, 2030.

(16) Income Taxes

Income before provision for income taxes consists of the following:

	Year Ended June 30,		
	2020	2019	2018
		As Adjusted	As Adjusted
		(Dollars in Thousands)	
Domestic	$ 274,066	$ 297,002	$ 218,452
Foreign	5,291	4,525	7,901
Income before provision for income taxes	$ 279,357	$ 301,527	$ 226,353

The provision for income taxes shown in the accompanying consolidated statements of operations is composed of the following:

	Year Ended June 30,		
	2020	2019	2018
		As Adjusted (Dollars in Thousands)	As Adjusted
Federal—			
Current	$ 17,048	$ 64,194	$ 47,734
Deferred	28,101	(27,267)	(107,588)
State—			
Current	1,367	3,246	1,471
Deferred	500	(1,033)	939
Foreign—			
Current	2,797	1,549	2,296
Deferred	(127)	(524)	267
	$ 49,686	$ 40,165	$ (54,881)

Our tax expense for fiscal 2020 was unfavorably impacted by the recognition of $6.4 million tax expense due to an accounting method change election when we filed our fiscal 2019 federal tax return as a result of a change in tax regulations during this fiscal year, to defer the acceleration of income for tax purposes as a result of adopting Topic 606. Fiscal 2020 was favorably impacted by the FDII deduction and tax credits.

The provision for income taxes differs from that based on the federal statutory rate due to the following:

	Year Ended June 30,		
	2020	2019	2018
		As Adjusted (Dollars in Thousands)	As Adjusted
Federal tax provision at statutory rate	$ 58,665	$ 63,321	$ 63,515
State income taxes	1,225	1,533	1,411
Remeasurement of deferred taxes	—	—	(110,986)
Foreign-derived intangible income (FDII)	(13,581)	(20,326)	—
Global intangible low-taxed income (GILTI)	404	797	—
Effect of foreign operations	6,148	7,395	4,700
Impact of tax accounting method change	6,433	—	—
Foreign taxes and rate differences	404	514	(164)
Stock-based compensation	33	(3,774)	(2,951)
Tax credits	(7,969)	(9,677)	(7,913)
Uncertain tax positions	(3,236)	1,055	(185)
Domestic production activity deduction	—	—	(4,869)
Valuation allowance	504	(550)	2,326
Other, net	656	(123)	235
Provision for income taxes	$ 49,686	$ 40,165	$ (54,881)

Net deferred tax liabilities consist of the following at June 30, 2020 and 2019:

	Year Ended June 30,	
	2020	2019
		As Adjusted
	(Dollars in Thousands)	
Deferred tax assets:		
State and foreign credits	$ 4,922	$ 4,055
Net operating loss carryforwards	1,200	906
Deferred revenue	4,596	5,252
Other reserves and accruals	7,465	6,082
Intangible assets	982	1,020
Property, leasehold improvements, and other basis differences	5,514	1,433
Other temporary differences	925	453
	25,604	19,201
Deferred tax liabilities:		
Contract assets and costs	(158,538)	(147,619)
Deferred revenue	(27,066)	(8,610)
Intangible assets	(6,815)	(5,635)
Property, leasehold improvements, and other basis differences	(5,223)	(1,146)
	(197,642)	(163,010)
Valuation allowance	(6,205)	(4,866)
Net deferred tax liabilities	$ (178,243)	$ (148,675)

Reflected in the deferred tax assets above at June 30, 2020, we have foreign net operating loss carryforwards of $1.2 million, with unlimited carryforwards, and state and foreign research and development credits of $5.4 million which begin to expire in 2025.

Our valuation allowance for deferred tax assets was $6.2 million and $4.9 million as of June 30, 2020 and 2019, respectively. The most significant portion of the valuation allowance as of June 30, 2020 is attributable to a reserve against state R&D tax credits of $4.8 million.

For fiscal 2020, our income tax provision included amounts determined under the provisions of ASC 740 intended to satisfy additional income tax assessments, including interest and penalties, that could result from any tax return positions for which the likelihood of sustaining the position on audit does not meet a threshold of "more likely than not." Tax liabilities were recorded as a component of our income taxes payable and other non-current liabilities. The ultimate amount of taxes due will not be known until examinations are completed and settled or the audit periods are closed by statutes.

A reconciliation of the reserve for uncertain tax positions is as follows:

	Year Ended June 30,		
	2020	2019	2018
	(Dollars in Thousands)		
Uncertain tax positions, beginning of year	$ 5,380	$ 3,931	$ 3,921
Gross increases (decreases) —tax positions in prior period	(2,216)	407	544
Gross increases—tax positions in current period	—	1,789	—
Gross decreases—lapse of statutes	(1,032)	(740)	(637)
Currency translation adjustment	(26)	(7)	103
Uncertain tax positions, end of year	$ 2,106	$ 5,380	$ 3,931

At June 30, 2020, the total amount of unrecognized tax benefits is $2.1 million. Upon being recognized, $1.9 million would reduce the effective tax rate. Our policy is to recognize interest and penalties related to income tax matters as provision for (benefit from) income taxes. At June 30, 2020, we had approximately $0.3 million of accrued interest and $0.1 million of penalties related to uncertain tax positions. We recorded a benefit for interest and penalties of approximately $0.3 million during fiscal 2020.

We are subject to income tax in many jurisdictions outside the U.S. Our operations in certain jurisdictions remain subject to examination for tax years 2009 to 2019, some of which are currently under audit by local tax authorities. The resolutions of these audits are not expected to be material to our consolidated financial statements.

(17) Commitments and Contingencies

Standby letters of credit for $3.5 million and $3.9 million secured our performance on professional services contracts, certain facility leases and potential liabilities as of June 30, 2020 and 2019, respectively. The letters of credit as of June 30, 2020 expire at various dates through fiscal 2026.

(18) Retirement Plans

We maintain a defined contribution retirement plan under Section 401(k) of the Internal Revenue Code (IRC) covering all eligible employees, as defined. Under the plan, a participant may elect to defer receipt of a stated percentage of his or her compensation, subject to limitation under the IRC, which would otherwise be payable to the participant for any plan year. We may make discretionary contributions to this plan, including making matching contributions of 50%, up to a maximum of 6% of an employee's pretax contribution. We made matching contributions of approximately $2.8 million, $2.6 million and $2.7 million in fiscal 2020, 2019 and 2018, respectively. Additionally, we participate in certain government mandated and defined contribution plans throughout the world for which we comply with all funding requirements.

(19) Segment and Geographic Information

Operating segments are defined as components of an enterprise that engage in business activities for which discrete financial information is available and regularly reviewed by the chief operating decision maker in deciding how to allocate resources and to assess performance. Our chief operating decision maker is our President and Chief Executive Officer.

We have two operating and reportable segments, which are consistent with our reporting units: i) subscription and software and ii) services and other. The subscription and software segment is engaged in the licensing of process optimization and asset performance management software solutions and associated support services, and includes our license and maintenance revenue. The services and other segment includes professional services and training, and includes our services and other revenue. We do not track assets or capital expenditures by operating segments. Consequently, it is not practical to present assets, capital expenditures, depreciation or amortization by operating segments.

The following table presents a summary of our reportable segments' profits:

	Subscription and Software	Services and Other	Total
		(Dollars in Thousands)	
Year Ended June 30, 2020:			
Segment revenue	$ 566,319	$ 32,398	$ 598,717
Segment expenses (1)	(233,205)	(35,118)	(268,323)
Segment profit	$ 333,114	$ (2,720)	$ 330,394
Year Ended June 30, 2019, As Adjusted:			
Segment revenue	$ 568,148	$ 28,534	$ 596,682
Segment expenses (1)	(220,764)	(31,548)	(252,312)
Segment profit	$ 347,384	$ (3,014)	$ 344,370
Year Ended June 30, 2018, As Adjusted:			
Segment revenue	$ 477,280	$ 30,286	$ 507,566
Segment expenses (1)	(204,457)	(28,000)	(232,457)
Segment profit	$ 272,823	$ 2,286	$ 275,109

(1) Our reportable segments' operating expenses include expenses directly attributable to the segments. Segment expenses include selling and marketing and research and development expenses. Segment expenses do not include allocations of general and administrative expense; interest income; interest expense; and other (expense) income, net.

Reconciliation to Income Before Income Taxes

The following table presents a reconciliation of total segment operating profit to income before provision for income taxes:

	Year Ended June 30,		
	2020	2019	2018
		As Adjusted	As Adjusted
		(Dollars in Thousands)	
Total segment profit for reportable segments	$ 330,394	$ 344,370	$ 275,109
General and administrative	(73,035)	(63,231)	(67,181)
Interest income	32,658	28,457	24,954
Interest (expense)	(11,862)	(8,733)	(5,691)
Other (expense) income, net	1,202	664	(838)
Income before income taxes	$ 279,357	$ 301,527	$ 226,353

Geographic Information:

We have long-lived assets of approximately $92.9 million that are located domestically and $132.4 million that reside in other geographic locations as of June 30, 2020. We had long-lived assets of approximately $79.0 million that were located domestically and $44.5 million that reside in other geographic locations as of June 30, 2019.

(20) Immaterial Correction to Prior Period Financial Statements

In the fourth quarter of fiscal 2020, we identified errors affecting the transition adjustment recorded upon the adoption of Topic 606 as well as errors in the determination of revenue balances in the periods post-adoption of Topic 606, and as a consequence, we have corrected the impact of the previously reported transition adjustment related to contract assets to reflect a lower contract asset balance and related deferred income taxes balance, in addition to reductions in revenue and net income for the fiscal years ended June 30, 2019 and 2018. The Company considered both the quantitative and qualitative factors within the provisions of SEC Staff Accounting Bulletin No. 99, *Materiality*, and Staff Accounting Bulletin No. 108, *Considering the Effect of Prior Year Misstatements when Quantifying Misstatements in Current Year Financial Statements*. Based on evaluation of the misstatements on an individual and aggregate basis, the Company concluded the prior period errors were immaterial to the previously issued consolidated financial statements. As such, the Company has elected to correct the identified error in the prior periods within the current Consolidated Financial Statements. Future filings that include prior periods will be corrected, as needed, when filed. The following presents the effect of recording the immaterial correction in the consolidated financial statements as of and for the fiscal years ended June 30, 2019 and 2018:

	Year Ended June 30, 2019		
	As Previously Reported	Adjustments	As Adjusted
	(Dollars in Thousands, Except per Share Data)		
Consolidated Statements of Operations			
Revenue:			
License	$ 404,122	$ 459	$ 404,581
Maintenance	165,436	(1,869)	163,567
Services and other	28,787	(253)	28,534
Total revenue	598,345	(1,663)	596,682
Gross profit	540,529	(1,663)	538,866
Income from operations	282,802	(1,663)	281,139
Income before income taxes	303,190	(1,663)	301,527
Provision for (benefit from) income taxes	40,456	(291)	40,165
Net income	$ 262,734	$ (1,372)	$ 261,362
Net income per common share:			
Basic	$ 3.76	$ (0.02)	$ 3.74
Diluted	$ 3.71	$ (0.02)	$ 3.69

	Year Ended June 30, 2018		
	As Previously Reported	Adjustments	As Adjusted
	(Dollars in Thousands, Except per Share Data)		
Consolidated Statements of Operations			
Revenue:			
License	$ 326,549	$ (8,107)	$ 318,442
Maintenance	161,065	(2,227)	158,838
Services and other	31,245	(959)	30,286
Total revenue	518,859	(11,293)	507,566
Gross profit	468,215	(11,293)	456,922
Income from operations	219,221	(11,293)	207,928
Income before income taxes	237,646	(11,293)	226,353
Provision for (benefit from) income taxes	(56,057)	1,176	(54,881)
Net income	$ 293,703	$ (12,469)	$ 281,234
Net income per common share:			
Basic	$ 4.07	$ (0.17)	$ 3.90
Diluted	$ 4.03	$ (0.18)	$ 3.85

	June 30, 2019		
	As Previously Reported	Adjustments	As Adjusted
	(Dollars in Thousands)		
Consolidated Balance Sheets			
Prepaid expenses and other current assets	$ 12,628	$ (2,640)	$ 9,988
Non-current contract assets	325,510	(37,412)	288,098
Total assets	903,065	(40,052)	863,013
Deferred income taxes	159,071	(8,727)	150,344
Retained earnings	1,259,984	(31,325)	1,228,659
Total stockholders' equity	393,285	(31,325)	361,960
Total liabilities and stockholders' equity	$ 903,065	$ (40,052)	$ 863,013

	June 30, 2019		
	As Previously Reported	Adjustments	As Adjusted
	(Dollars in Thousands)		
Consolidated Statements of Stockholders' Equity			
Retained earnings, beginning of year	$ 997,250	$ (29,953)	$ 967,297
Retained earnings, end of year	1,259,984	(31,325)	1,228,659

	June 30, 2018		
	As Previously Reported	Adjustments	As Adjusted
	(Dollars in Thousands)		
Consolidated Statements of Stockholders' Equity			
Retained earnings, beginning of year	$ 703,547	$ (17,484)	$ 686,063
Retained earnings, end of year	997,250	(29,953)	967,297

	Year Ended June 30, 2019		
	As Previously Reported	Adjustments	As Adjusted
	(Dollars in Thousands)		
Consolidated Statements of Cash Flows			
Cash flows from operating activities:			
Net income	$ 262,734	$ (1,372)	$ 261,362
Adjustments to reconcile net income to net cash provided by operating activities:			
Deferred income taxes	(26,839)	(290)	(27,129)
Changes in assets and liabilities:			
Contract assets	(59,322)	1,662	(57,660)
Net cash provided by operating activities	238,313	—	238,313

ASPEN TECHNOLOGY, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

	Year Ended June 30, 2018		
	As Previously Reported	Adjustments	As Adjusted
	(Dollars in Thousands)		
Consolidated Statements of Cash Flows			
Cash flows from operating activities:			
Net income	$ 293,703	$ (12,469)	$ 281,234
Adjustments to reconcile net income to net cash provided by operating activities:			
Deferred income taxes	(110,308)	1,177	(109,131)
Changes in assets and liabilities:			
Contract assets	3,640	11,292	14,932
Net cash provided by operating activities	206,936	—	206,936

(21) Quarterly Financial Data (Unaudited)

The following tables present quarterly consolidated statement of operations data for fiscal 2020 and 2019. The below data is unaudited but, in our opinion, reflects all adjustments necessary for a fair presentation of this data in accordance with GAAP. Selected quarterly data provided below has been revised, as compared to the selected quarterly financial data presented in the Company’s Quarterly Reports on Form 10-Q for the immaterial correction discussed within Note 20, "Immaterial Correction to Prior Period Financial Statements."

The following presents results of operations for the fourth quarter of fiscal 2020, and also presents the effect of recording the immaterial correction in the consolidated quarterly financial data for the first three quarters of fiscal 2020 and the four quarters of fiscal 2019:

	Three Months Ended
	June 30, 2020
	(Dollars in Thousands, Except per Share Data)
Total revenue	$ 201,940
Gross profit	186,782
Income from operations	116,296
Net income	94,530
Net income per common share:	
Basic	$ 1.40
Diluted	$ 1.39
Weighted average shares outstanding:	
Basic	67,634
Diluted	68,176

ASPEN TECHNOLOGY, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

	Three Months Ended March 31, 2020		
	As Previously Reported	Adjustments	As Adjusted
	(Dollars in Thousands, Except per Share Data)		
Total revenue	$ 132,027	$ (1,439)	$ 130,588
Gross profit	116,322	(1,439)	114,883
Income from operations	46,173	(1,439)	44,734
Net income	43,521	(1,695)	41,826
Net income per common share:			
Basic	$ 0.64	$ (0.02)	$ 0.62
Diluted	$ 0.64	$ (0.03)	$ 0.61
Weighted average shares outstanding:			
Basic	67,806	—	67,806
Diluted	68,482	—	68,482

	Three Months Ended December 31, 2019		
	As Previously Reported	Adjustments	As Adjusted
	(Dollars in Thousands, Except per Share Data)		
Total revenue	$ 124,732	$ 1,280	$ 126,012
Gross profit	109,206	1,280	110,486
Income from operations	41,659	1,280	42,939
Net income	38,275	1,526	39,801
Net income per common share:			
Basic	$ 0.56	$ 0.02	$ 0.58
Diluted	$ 0.56	$ 0.02	$ 0.58
Weighted average shares outstanding:			
Basic	68,114	—	68,114
Diluted	68,844	—	68,844

	Three Months Ended September 30, 2019		
	As Previously Reported	Adjustments	As Adjusted
	(Dollars in Thousands, Except per Share Data)		
Total revenue	$ 134,091	$ 6,086	$ 140,177
Gross profit	118,873	6,086	124,959
Income from operations	47,304	6,086	53,390
Net income	46,284	7,230	53,514
Net income per common share:			
Basic	$ 0.68	$ 0.10	$ 0.78
Diluted	$ 0.67	$ 0.10	$ 0.77
Weighted average shares outstanding:			
Basic	68,441	—	68,441
Diluted	69,317	—	69,317

	Three Months Ended June 30, 2019		
	As Previously Reported	Adjustments	As Adjusted
	(Dollars in Thousands, Except per Share Data)		
Total revenue	$ 195,769	$ 1,388	$ 197,157
Gross profit	180,279	1,388	181,667
Income from operations	111,223	1,388	112,611
Net income	103,865	2,129	105,994
Net income per common share:			
Basic	$ 1.51	$ 0.03	$ 1.54
Diluted	$ 1.49	$ 0.03	$ 1.52
Weighted average shares outstanding:			
Basic	68,839	—	68,839
Diluted	69,638	—	69,638

	Three Months Ended March 31, 2019		
	As Previously Reported	Adjustments	As Adjusted
	(Dollars in Thousands, Except per Share Data)		
Total revenue	$ 147,984	$ 312	$ 148,296
Gross profit	133,624	312	133,936
Income from operations	70,831	312	71,143
Net income	61,587	364	61,951
Net income per common share:			
Basic	$ 0.89	$ —	$ 0.89
Diluted	$ 0.88	$ —	$ 0.88
Weighted average shares outstanding:			
Basic	69,423	—	69,423
Diluted	70,160	—	70,160

	Three Months Ended December 31, 2018		
	As Previously Reported	Adjustments	As Adjusted
	(Dollars in Thousands, Except per Share Data)		
Total revenue	$ 140,423	$ (2,400)	$ 138,023
Gross profit	125,684	(2,400)	123,284
Income from operations	63,758	(2,400)	61,358
Net income	59,217	(2,763)	56,454
Net income per common share:			
Basic	$ 0.84	$ (0.04)	$ 0.80
Diluted	$ 0.83	$ (0.04)	$ 0.79
Weighted average shares outstanding:			
Basic	70,428	—	70,428
Diluted	71,148	—	71,148

ASPEN TECHNOLOGY, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

	Three Months Ended September 30, 2018		
	As Previously Reported	Adjustments	As Adjusted
	(Dollars in Thousands, Except per Share Data)		
Total revenue	$ 114,169	$ (963)	$ 113,206
Gross profit	100,942	(963)	99,979
Income from operations	36,990	(963)	36,027
Net income	38,066	(1,100)	36,966
Net income per common share:			
Basic	$ 0.54	$ (0.02)	$ 0.52
Diluted	$ 0.53	$ (0.02)	$ 0.51
Weighted average shares outstanding:			
Basic	70,988	—	70,988
Diluted	72,015	—	72,015

ASPEN TECHNOLOGY, INC. AND SUBSIDIARIES

SCHEDULE II - VALUATION AND QUALIFYING ACCOUNTS

Schedule II - Valuation and Qualifying Accounts

Description	Balance at Beginning of Year	Additions: Charges to Costs and Expenses	Deductions: Returns and Write-Offs	Balance at End of Year
	(Dollars in Thousands)			
Year ended June 30, 2020 Allowance for doubtful accounts	$ (3,349)	$ (5,255)	$ 1,980	$ (6,624)
Year ended June 30, 2019 Allowance for doubtful accounts	(2,703)	(1,621)	975	(3,349)
Year ended June 30, 2018 Allowance for doubtful accounts	(1,285)	(2,463)	1,045	(2,703)

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EXHIBIT INDEX

Exhibit Number	Description	Filed with this Form 10-K
3.1	Certificate of Incorporation of Aspen Technology, Inc., as amended	
3.2	Amended and Restated By-laws of Aspen Technology, Inc., adopted on May 19, 2020	
4.1	Specimen certificate for common stock, $.10 par value, of Aspen Technology, Inc.	
4.2	Description of Securities	X
10.1	Lease Agreement dated January 27, 2014 between RAR2-Crosby Corporate Center QRS, Inc. and Aspen Technology, Inc. regarding 20, 22 and 28 Crosby Drive, Bedford, Massachusetts	
10.2	System License Agreement dated March 30, 1982 between Aspen Technology, Inc. and the Massachusetts Institute of Technology	
10.3	Amendment dated March 30, 1982 to System License Agreement dated March 30, 1982 between Aspen Technology, Inc. and the Massachusetts Institute of Technology	
10.4	Rule 2.7 Announcement, dated January 12, 2016	
10.5	364-Day Bridge Credit Agreement, dated as of January 12, 2016, among Aspen Technology, Inc., as borrower, the lenders party thereto, JPMorgan Chase Bank, N.A., as administrative agent, and J.P. Morgan Securities LLC, as sole lead arranger and sole bookrunner	
10.6	Credit Agreement, dated as of February 26, 2016, among Aspen Technology, Inc., as borrower, the lenders, co-documentation agents and issuing banks party thereto, JPMorgan Chase Bank, N.A., as administrative agent, joint lead arranger and joint bookrunner, and Silicon Valley Bank, as syndication agent, joint lead arranger and joint bookrunner	
10.7	Incremental Facility Amendment, dated as of August 9, 2017, to the Credit Agreement dated as of February 26, 2016 among Aspen Technology, Inc. as borrower, the lenders, JPMorgan Chase Bank, N.A. as administrative agent and issuing bank, and certain other Lenders acting in such capacity from time to time, as issuing banks	
10.8	Amended and Restated Credit Agreement dated as of December 23, 2019, among Aspen Technology, Inc., as borrower, the lenders party thereto, JPMorgan Chase Bank, N.A., as administrative agent, joint lead arranger and joint bookrunner, Silicon Valley Bank, as joint lead arranger, joint bookrunner and syndication agent, and Citibank N.A., Citizens Bank, N.A., TD Bank, N.A. and Wells Fargo Bank, N.A., as co-documentation agents	
10.9	First Amendment to Amended and Restated Credit Agreement dated as of August 5, 2020, among Aspen Technology, Inc., as borrower, the lenders party thereto, JPMorgan Chase Bank, N.A., as administrative agent, joint lead arranger and joint bookrunner, Silicon Valley Bank, as joint lead arranger, joint bookrunner and syndication agent, and Citibank N.A., Citizens Bank, N.A., TD Bank, N.A. and Wells Fargo Bank, N.A., as co-documentation agents	X
10.10	Master Confirmation-Accelerated Share Repurchase Dated August 29, 2016, with J.P. Morgan Securities, as agent for JP Morgan Chase Bank	
10.11	Stock Purchase Agreement dated October 26, 2016 by and among AspenTech Holding Corporation, Mtelligence Corporation, each of the stockholders and key sellers of Mtelligence Corporation, and Cito Capital Corporation	

Exhibit Number	Description	Filed with this Form 10-K
10.12^	Aspen Technology, Inc. 2010 Equity Incentive Plan	
10.13^	Form of Terms and Conditions of Restricted Stock Unit Agreement granted under Aspen Technology, Inc. 2010 Equity Incentive Plan	
10.14^	Form of Terms and Conditions of Stock Option Agreement Granted under Aspen Technology, Inc. 2010 Equity Incentive Plan	
10.15^	Aspen Technology, Inc. 2016 Omnibus Incentive Plan	
10.16^	Form of Terms and Conditions of Restricted Stock Unit Agreement Granted Under Aspen Technology Inc. 2016 Omnibus Incentive Plan	
10.17^	Form of Terms and Conditions of Stock Option Agreement Granted Under Aspen Technology Inc. 2016 Omnibus Incentive Plan	
10.18^	Aspen Technology, Inc. Executive Annual Incentive Bonus Plan (Fiscal Year 2016)	
10.19^	Aspen Technology, Inc. Executive Annual Bonus Plan (Fiscal Year 2017)	
10.20^	Aspen Technology, Inc. Executive Annual Bonus Plan (Fiscal Year 2017)(Correction of the exhibit filed as Exhibit 10.1 of the 8-K filed on July 22, 2016, in which Growth in Annual Spend was referred to as Growth in License Annual Spend)	
10.21^	Aspen Technology, Inc. Executive Annual Incentive Bonus Plan (Fiscal Year 2018)	
10.22^	Aspen Technology, Inc. Executive Annual Incentive Bonus Plan (Fiscal Year 2019)	
10.23^	Aspen Technology, Inc. FY20 Executive Bonus Plan	
10.24^	Aspen Technology, Inc. FY21 Executive Bonus Plan	
10.25^	Letter agreement dated August 2, 2019 between Aspen Technology, Inc. and Gary M. Weiss	
10.26^	Amended and Restated Executive Retention Agreement dated January 31, 2019 entered into by Aspen Technology, Inc. and Antonio J. Pietri	
10.27^	Form of Amended and Restated Executive Retention Agreement dated January 31, 2019 entered into between Aspen Technology, Inc. and each of Gary M. Weiss, Karl E. Johnsen and Frederic G. Hammond	
10.28^	Form of Confidentiality and Non-Competition Agreement of Aspen Technology, Inc.	
10.29^	Non-Competition and Non-Solicitation Agreement dated July 1, 2013 entered into by Aspen Technology, Inc. and Antonio J. Pietri	
21.1	Subsidiaries of Aspen Technology, Inc.	X
23.1	Consent of KPMG LLP	X
31.1	Certification of Principal Executive Officer Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002	X
31.2	Certification of Principal Financial Officer Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002	X
32.1*	Certification Pursuant to 18 U.S.C. Section 1350, As Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002	X
101.INS	Inline Instance Document	X
101.SCH	Inline XBRL Taxonomy Extension Schema Document	X
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document	X
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document	X

Exhibit Number	Description	Filed with this Form 10-K
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document	X
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document	X
104	Cover Page Interactive Data File (formatted as Inline XBRL with applicable taxonomy extension information contained in Exhibits 101)	X

(1) The SEC File No. is 000-24786 for Exhibits 3.1, 4.1, 10.2, 10.3, and 10.28, inclusive. The SEC File No. for all other exhibits is 001-34630.

^ Management contract or compensatory plan or arrangement

* The certification attached as Exhibit 32.1 that accompanies this Form 10-K is not deemed filed with the SEC and is not to be incorporated by reference into any filing of Aspen Technology, Inc. under the Securities Act of 1933 or the Securities Exchange Act of 1934, whether made before or after the date of this Form 10-K, irrespective of any general incorporation language contained in such filing.

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.

	ASPEN TECHNOLOGY, INC.	
Date: December 9, 2020	By:	/s/ ANTONIO J. PIETRI
		Antonio J. Pietri *President and Chief Executive Officer*
Date: December 9, 2020	By:	/s/ KARL E. JOHNSEN
		Karl E. Johnsen *Senior Vice President and* *Chief Financial Officer*

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.

Signature	Title	Date
/s/ ANTONIO J. PIETRI Antonio J. Pietri	President and Chief Executive Officer and Director (Principal Executive Officer)	December 9, 2020
/s/ KARL E. JOHNSEN Karl E. Johnsen	Senior Vice President and Chief Financial Officer (Principal Financial Officer)	December 9, 2020
/s/ CHRISTOPHER J. STAGNO Christopher J. Stagno	Senior Vice President and Chief Accounting Officer (Principal Accounting Officer)	December 9, 2020
/s/ ROBERT M. WHELAN, JR. Robert M. Whelan, Jr.	Chairman of the Board of Directors	December 9, 2020
/s/ DR. THOMAS BRADICICH Dr. Thomas Bradicich	Director	December 9, 2020
/s/ DONALD P. CASEY Donald P. Casey	Director	December 9, 2020
/s/ AMAR HANSPAL Amar Hanspal	Director	December 9, 2020
/s/ GARY E. HAROIAN Gary E. Haroian	Director	December 9, 2020
/s/ ADRIANA KARABOUTIS Adriana Karaboutis	Director	December 9, 2020
/s/ GEORGIA KERESTY Georgia Keresty	Director	December 9, 2020
/s/ JOAN C. MCARDLE Joan C. McArdle	Director	December 9, 2020
/s/ SIMON OREBI GANN Simon Orebi Gann	Director	December 9, 2020
/s/ R. HALSEY WISE R. Halsey Wise	Director	December 9, 2020

Exhibit 4.2

Description of Aspen Technology, Inc. Capital Stock

The following information constitutes the “Description of Securities” required by Item 202(a) of Regulation S-K. References herein to “we,” “our,” “us,” or "our company” refer to Aspen Technology, Inc., a Delaware corporation. The following information summarizes the material terms of our common and preferred stock, as well as relevant provisions of our charter, which includes certificates of designations relating to each series of our preferred stock, and bylaws and the Delaware General Corporation Law. For a complete description of the terms of our common and preferred stock, please refer to our charter and bylaws. While the terms summarized below will apply generally to any shares of common or preferred stock that we may offer in the future, we will describe the particular terms of any series of these securities in more detail in the applicable prospectus relating to the offering of these securities. The terms of any common or preferred stock that we offer pursuant to a prospectus may differ from the terms described below, and any such additional or different terms will be set forth in that prospectus.

Our authorized capital stock consists of 220,000,000 shares. These shares consist of 210,00,000 shares of common stock, $0.10 par value per share, and 10,000,000 shares of preferred stock, $0.10 par value per share, of which 3,636 shares have been designated as Series D redeemable convertible preferred stock.

Common Stock

Voting. Each holder of common stock is entitled to one vote on all matters to be voted upon by stockholders for each share held on the record date for such vote.

Dividends. Subject to any preference rights of holders of preferred stock, holders of common stock are entitled to receive dividends, when, as and if declared by the board of directors, out of funds legally available for dividends.

Liquidation. Upon liquidation, dissolution or winding up, holders of common stock are entitled to share ratably in all of our assets available for distribution to stockholders in proportion to the amount of common stock they own. The amount available for common stockholders is calculated after our payment of liabilities. Holders of preferred stock will receive their preferential share of our assets before the holders of common stock receive any assets.

Other Rights. Holders of common stock have no right to:

- convert the common stock into any other security,
- have the common stock redeemed or
- purchase additional shares of common stock to maintain their proportionate ownership interest.

The common stock does not have any cumulative voting rights, which means that the holders of a majority of the shares can elect all the directors to be elected by common stockholders and that the holders of the remaining shares will not be able to elect any of those directors. All outstanding shares of common stock are validly issued, fully paid and non-assessable. The rights, preferences and privileges of holders of common stock are subject to, and may be adversely affected by, the rights of the holders of shares of any series of preferred stock that we have designated and issued or may designate and issue in the future.

Preferred Stock

Our charter authorizes the board of directors to issue, without any further action by the stockholders, preferred stock in one or more series, to establish from time to time the number of shares to be included in each series, and to fix the designation, powers, preferences and rights of the shares of each series and the qualifications, limitations or restrictions thereof, including voting rights, dividend rights, conversion rights, liquidation preferences, redemption privileges and sinking fund terms. The rights, preferences and restrictions of the preferred stock of each series are or will be fixed by the certificate of designations relating to that series. Any or all of the rights of a series of preferred stock may be greater than the rights of the common stock. In addition, a series of preferred stock may have other rights, including economic rights senior to our common stock, so that the issuance of such preferred stock would adversely affect the market value of our common stock. The issuance of preferred stock may also have the effect of delaying, deferring or preventing a change in control of our company without any action by the stockholders.

Our charter authorizes two series of Series D preferred: Series D-1 convertible preferred stock and Series D-2 preferred, which we collectively refer to as the Series D preferred. All of the previously authorized and outstanding shares of Series D preferred were surrendered for conversion into common stock and, upon such conversion, (a) all rights with respect to such shares of Series D preferred ceased and terminated and (b) all of such shares of Series D preferred were retired and canceled and could not be reissued. We may, without the need for action by any stockholders, take such appropriate action as may be necessary to eliminate the authorized number of shares of Series D preferred and thereby return such number of shares to the status of additional shares of authorized undesignated preferred stock.

Certain Effects of Authorized but Unissued Stock

We have granted our board of directors the authority to issue preferred stock and to determine its rights and preferences in order to eliminate delays associated with a stockholder vote on specific issuances. The issuance of preferred stock, while providing desirable flexibility in connection with possible acquisitions and other corporate purposes, could have the effect of making it more difficult for a third party to acquire, or of discouraging a third party from acquiring, a majority of our outstanding voting stock.

Certain Provisions of Our Charter and By-Laws

We must comply with Section 203 of the Delaware General Corporation Law, an anti-takeover law. In general, Section 203 prohibits a publicly held Delaware corporation from engaging in a "business combination" with an "interested stockholder" for a period of three years following the date the person became an interested stockholder, unless the business combination is approved in a prescribed manner. Generally, a "business combination" includes mergers, asset sales and other transactions resulting in a financial benefit to the interested stockholder. Generally, an "interested stockholder" includes a person who, together with affiliates and associates, owns, or within three years did own, 15% or more of the corporation's outstanding voting stock. The existence of this provision generally will have an anti-takeover effect for a transaction not approved in advance by the board of directors, including discouraging attempts that might result in a premium over the market price for the shares of common stock held by stockholders.

Our charter provides for the division of the board of directors into three classes as nearly equal in size as possible with staggered three-year terms. In addition, our charter provides that directors may be removed only for cause by the affirmative vote of the holders of two-thirds of the shares of capital stock of the corporation entitled to vote. Under our charter, any vacancy on the board of directors, however occurring, including a vacancy resulting from an enlargement of the board, may only be filled by vote of a majority of the directors then in office. The classification of the board and the limitations on the removal of directors and filling of vacancies could have the effect of making it more difficult for a third party to acquire, or of discouraging a third party from acquiring, control of us.

Our charter also provides that any action required or permitted to be taken by our stockholders at any annual meeting or special meeting of stockholders may only be taken if it is properly brought before such meeting and may not be taken by written consent in lieu of a meeting. Our charter further provides that special meetings of the stockholders may only be called by our chairman of the board of directors, our chief executive officer or, if none, our president, or by the board of directors. Under our bylaws, in order for any matter to be considered properly brought before a meeting, a stockholder must comply with certain requirements regarding advance notice to us. The foregoing provisions could have the effect of delaying until the next stockholders' meeting stockholder actions that are favored by the holders of a majority of our outstanding voting securities. These provisions may also discourage another person from making a tender offer for our common stock, because such person, even if it acquired a majority of our outstanding voting securities, would be able to take action as a stockholder (such as electing new directors or approving a merger) only at a duly called stockholders' meeting, and not by written consent.

The Delaware General Corporation Law provides generally that the affirmative vote of a majority of the shares entitled to vote on any matter is required to amend a corporation's charter or by-laws, unless a corporation's charter or bylaws, as the case may be, requires a greater percentage. Our charter and bylaws require the affirmative vote of the holders of at least 75% of the voting power of all the shares of our capital stock issued, outstanding and entitled to vote to amend or repeal any of the provisions described in the prior two paragraphs.

Our charter contains certain provisions permitted under the Delaware General Corporation Law relating to the liability of directors. The provisions eliminate a director's liability for monetary damages for a breach of fiduciary duty, except in certain circumstances involving wrongful acts, such as the breach of a director's duty of loyalty or acts or omissions that involve intentional misconduct or a knowing violation of law. Further, our charter contains provisions to indemnify our directors and officers to the fullest extent permitted by the Delaware General Corporation Law.

Transfer Agent and Registrar

The transfer agent and registrar for the common stock is American Stock Transfer & Trust Company.

NASDAQ Global Select Market Listing

The common stock has been approved for trading and quotation on the NASDAQ Global Select Market under the symbol "AZPN."

Exhibit 10.9

Execution Version

FIRST AMENDMENT TO AMENDED AND RESTATED CREDIT AGREEMENT

FIRST AMENDMENT TO AMENDED AND RESTATED CREDIT AGREEMENT, dated as of August 5, 2020 (this "Agreement"), among Aspen Technology, Inc. (the "Borrower") and JPMorgan Chase Bank, N.A., as administrative agent (the "Administrative Agent"), which shall amend that certain Amended and Restated Credit Agreement, dated as of December 23, 2019 (as amended, restated, supplemented or otherwise modified as of the date hereof, the "Credit Agreement") among the Borrower, the Lenders party thereto and JPMorgan Chase Bank, N.A., as Administrative Agent. Each capitalized term used but not defined herein shall have the meaning specified in the Credit Agreement.

W I T N E S S E T H:

WHEREAS, the Borrower, the Lenders and the Administrative Agent are parties to the Credit Agreement;

WHEREAS, pursuant to Section 9.02(b) of the Credit Agreement, any provision of the Credit Agreement or any other Loan Document may be amended by an agreement in writing entered into by the Borrower and the Administrative Agent to cure any ambiguity, omission, defect or inconsistency so long as, in each case, (A) such amendment does not adversely affect in any material respect the rights of any Lender or (B) the Lenders shall have received at least five Business Days' prior written notice thereof and the Administrative Agent shall not have received, within five Business Days of the date of such notice to the Lenders, a written notice from the Required Lenders stating that the Required Lenders object to such amendment;

WHEREAS, each of the Borrower and the Administrative Agent have jointly identified an ambiguity, omission, defect or inconsistency in Section 6.01(g) of the Credit Agreement, which provides that Indebtedness may be incurred by the Borrower or a Subsidiary so long as, at the time of incurrence of such Indebtedness, the Leverage Ratio, calculated on a Pro Forma Basis as of the date of incurrence thereof, is not in excess of 3.00 to 1.00, whereas such Leverage Ratio is intended to match the Leverage Ratio set forth in Section 6.13 of the Credit Agreement;

WHEREAS, the Administrative Agent and the Borrower are entering into this amendment to cure such ambiguity, omission, defect or inconsistency, and that sure cure is consistent with the organizational materials prepared for the Lenders on October 22, 2019 and therefore does not adversely affect in any material respect the rights of any Lender;

NOW, THEREFORE, the parties hereto hereby agree as follows:

SECTION 1. Amendment to Credit Agreement. Effective as of the Amendment Effective Date (as defined below), Section 6.01(g) of the Credit Agreement is hereby amended by replacing the reference therein to "3.00 to 1.00" with the following: "3.5 to 1.0 (or, during a Leverage Specified Period, 4.00 to 1.0)".

SECTION 2. Conditions to Effectiveness. This Agreement shall become effective on the first date on which each of the following conditions has been satisfied or waived (the date on which such conditions shall have been so satisfied or waived, the "Amendment Effective Date"):

(a) The Administrative Agent (or its counsel) shall have received from the Borrower either (i) a counterpart of this Agreement duly executed by such party or (ii) written evidence reasonably satisfactory to the Administrative Agent (which may include telecopy or other electronic transmission (e.g., "pdf" or "tif" via electronic mail) of a signed signature page (whether signed manually or electronically) of this Agreement) that such party has signed a counterpart of this Agreement; and

(b) The Lenders shall have received at least five Business Days' prior written notice of this Agreement and the Administrative Agent shall not have received, within five Business Days of the date of such notice to the Lenders, a written notice from the Required Lenders stating that the Required Lenders object to this Agreement.

SECTION 3. Representations and Warranties. The Borrower hereby represents to the Administrative Agent and each Lender, as follows:

(a) the representations and warranties contained in the Loan Documents are true and correct in all material respects (except for representations and warranties qualified as to materiality and Material Adverse Effect, which shall be true and correct in all respects) on the date hereof and as of the Amendment Effective Date, after giving effect to this Agreement, as though made on and as of such dates (except to the extent any such representation or warranty specifically relates to an earlier date in which case such representation and warranty shall be accurate in all material respects as of such earlier date);

(b) on the date hereof and as of the Amendment Effective Date, no event has occurred and is continuing, or would result therefrom, that constitutes a Default or an Event of Default.

SECTION 4. Effect on the Loan Documents.

(a) Except as specifically amended herein, all Loan Documents shall continue to be in full force and effect and are hereby in all respects ratified and confirmed. The Borrower hereby agrees, with respect to each Loan Document to which it is a party, that all of its obligations, liabilities and indebtedness under such Loan Document shall remain in full force and effect on a continuous basis after giving effect to this Agreement.

(b) Upon the Amendment Effective Date, each reference in the Credit Agreement to "this Agreement," "herein," "hereto," "hereunder," "hereof," or in the other Loan Documents to the "Credit Agreement", or, in each case, words of like import shall mean and be a reference to the Credit Agreement, as amended and modified by this Agreement.

(c) Except as expressly set forth in this Agreement, the execution, delivery and effectiveness of this Agreement shall not operate as a waiver of any right, power or remedy of any Lender or the Administrative Agent under any of the Loan Documents, nor constitute a waiver of any provision of any of the Loan Documents.

(d) The Borrower and the other parties hereto acknowledge and agree that this Agreement shall constitute a Loan Document.

SECTION 5. GOVERNING LAW; WAIVER OF JURY TRIAL; SUBMISSION TO JURISDICTION.

(a) This Agreement and any claim, controversy, dispute or cause of action (whether in contract or tort or otherwise) based upon, arising out of or relating to this Agreement and the transactions contemplated hereby shall be governed by, and construed in accordance with, the law of the State of New York.

(b) The Borrower irrevocably and unconditionally agrees that it will not commence any action, litigation or proceeding of any kind or description, whether in law or equity, whether in contract or in tort or otherwise, against the Administrative Agent, any Lender or any Related Party of any of the foregoing in any way relating to this Agreement or any other Loan Document or the transactions relating hereto or thereto, in any forum other than the United States District Court for the Southern District of New York sitting in the Borough of Manhattan (or if such court lacks subject matter jurisdiction, the Supreme Court of the State of New York sitting in the Borough of Manhattan), and any appellate court from any thereof, and each of the parties hereto irrevocably and unconditionally submits, for itself and its property, to the jurisdiction of such courts and agrees that all claims in respect of any action, litigation or proceeding may be heard and determined in such Federal (to the extent permitted by law) or New York State court. Each party hereto agrees that a final judgment in any such action, litigation or proceeding shall be conclusive and may be enforced in other jurisdictions by suit on the judgment or in any other manner provided by law. Nothing in this Agreement shall affect any right that the Administrative Agent or any Lender may otherwise have to bring any action, litigation or proceeding relating to this Agreement or any other Loan Document against any Loan Party or any of its properties in the courts of any jurisdiction. The Borrower hereby irrevocably and unconditionally waives, to the fullest extent permitted by applicable law, any objection that it may now or hereafter have to the laying of venue of any action, litigation or proceeding arising out of or relating to this Agreement or any other Loan Document in any court referred to in this paragraph. Each of the parties hereto hereby irrevocably waives, to the fullest extent permitted by law, the defense of an inconvenient forum to the maintenance of such action or proceeding in any such court. Each party to this Agreement irrevocably consents to service of process in the manner provided for notices in <u>Section 9.01</u> of the Credit Agreement. Nothing in this Agreement or any other Loan Document will affect the right of any party to this Agreement to serve process in any other manner permitted by law.

(c) EACH PARTY HERETO HEREBY IRREVOCABLY WAIVES, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, ANY RIGHT IT MAY HAVE TO A TRIAL BY JURY IN ANY LEGAL PROCEEDING DIRECTLY OR INDIRECTLY ARISING OUT OF OR RELATING TO THIS AGREEMENT OR ANY OTHER LOAN DOCUMENT OR THE TRANSACTIONS CONTEMPLATED HEREBY OR THEREBY (WHETHER BASED ON CONTRACT, TORT OR ANY OTHER THEORY). EACH PARTY HERETO (A) CERTIFIES THAT NO REPRESENTATIVE, AGENT OR ATTORNEY OF ANY OTHER PARTY HAS REPRESENTED, EXPRESSLY OR OTHERWISE, THAT SUCH OTHER PARTY WOULD NOT, IN THE EVENT OF LITIGATION, SEEK TO ENFORCE THE FOREGOING WAIVER AND (B) ACKNOWLEDGES THAT IT AND THE OTHER PARTIES HERETO HAVE BEEN INDUCED TO ENTER INTO THIS AGREEMENT AND THE OTHER LOAN DOCUMENTS BY, AMONG OTHER THINGS, THE MUTUAL WAIVERS AND CERTIFICATIONS IN THIS SECTION 5.

SECTION 6. <u>Amendments; Execution in Counterparts; Electronic Signatures</u>.

(a) This Agreement may be executed by one or more of the parties to this Agreement on any number of separate counterparts, and all of said counterparts taken together shall be deemed to constitute one and the same instrument. Delivery of an executed signature page of this Agreement by email or facsimile transmission shall be effective as delivery of a manually executed counterpart hereof.

(b) The words "delivery", "execute," "execution," "signed," "signature," and words of like import in this Amendment and any document executed in connection herewith shall be deemed to include electronic signatures or the keeping of records in electronic form, each of which shall be of the same legal effect, validity or enforceability as a manually executed signature, physical delivery thereof or the use of a paper-based recordkeeping system, as the case may be, to the extent and as provided for in any applicable law, including the Federal Electronic Signatures in Global and National Commerce Act, the New York State Electronic Signatures and Records Act, or any other similar state laws based on the Uniform Electronic Transactions Act; provided that notwithstanding anything contained herein to the contrary neither the Administrative Agent nor any Lender is under any obligation to agree to accept electronic signatures in any form or in any format unless expressly agreed to by the Administrative Agent or such Lender pursuant to procedures approved by it and provided further without limiting the foregoing, upon the request of any party, any electronic signature shall be promptly followed by such manually executed counterpart.

[Remainder of page intentionally left blank.]

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be duly executed and delivered by their respective proper and duly authorized officers as of the day and year first above written.

ASPEN TECHNOLOGY, INC.

DocuSigned by:

By: Karl Johnsen

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Name: Karl E. Johnsen

Title: Senior Vice President and Chief Financial Officer

JPMORGAN CHASE BANK, N.A.,
as Administrative Agent and Lender

Maria R

By: ______________________________
Name: MARIA RIAZ
Title: VICE PRESIDENT

Exhibit 21.1

ASPEN TECHNOLOGY, INC.
List of Subsidiaries as of June 30, 2020

	Name of Subsidiary	State or Country of Incorporation
1	Apex Optimisation Technologies B.V.	Netherlands
2	Apex Optimisation UK Ltd.	United Kingdom
3	Apex Optimisation Ltd.	United Kingdom
4	Apex Optimisation Inc.	Delaware
5	Apex Optimisation SRO	Czech Republic
6	Aspen Tech de Mexico, S. de R.L. de C.V.	Mexico
7	Aspen Tech India Private Ltd.	India
8	Aspen Technology (Asia), Inc.	Delaware
9	Aspen Technology Australia Pty. Ltd.	Australia
10	Aspen Technology International, Inc.	Delaware
11	Aspen Technology LLC	Russia
12	Aspen Technology S.A.S.	Colombia
13	Aspen Technology S.L.	Spain
14	Aspen Technology Services Corporation	Delaware
15	AspenTech (Beijing) Ltd.	PRC
16	AspenTech (Shanghai) Ltd.	PRC
17	AspenTech (Thailand) Ltd.	Thailand
18	AspenTech Africa (Pty.) Ltd.	South Africa
19	AspenTech Argentina S.R.L.	Argentina
20	AspenTech Canada Corporation	Canada
21	AspenTech Canada Holdings, LLC	Delaware
22	AspenTech Europe B.V.	Netherlands
23	AspenTech Europe, S.A./N.V.	Belgium
24	AspenTech Holding Corporation	Delaware
25	AspenTech Japan Co. Ltd.	Japan
26	AspenTech Ltd.	United Kingdom
27	AspenTech Pte. Ltd.	Singapore
28	AspenTech S.r.l.	Italy
29	AspenTech Software Brasil Ltda.	Brazil
30	AspenTech Software Corporation	Delaware
31	AspenTech Solutions Sdn. Bhd.	Malaysia
32	AspenTech Venezuela C.A.	Venezuela
33	Hyprotech UK Ltd.	United Kingdom
34	Mnubo Solutions Inc. d/b/a Mnubo Inc.	Canada
35	Mtelligence Corporation	Delaware
36	The Fidelis Group, LLC	Texas
37	Argent & Waugh Ltd.	United Kingdom
38	Sabisu Ltd.	United Kingdom

Exhibit 23.1

Consent of Independent Registered Public Accounting Firm

To the Board of Directors

Aspen Technology, Inc.

We consent to the incorporation by reference in the registration statements (No. 333-128423, 333-169657, 333-215818, and 333-228978) on Form S-8 of Aspen Technology, Inc. (the Company) of our reports dated December 9, 2020, with respect to the consolidated balance sheets of Aspen Technology, Inc. as of June 30, 2020 and 2019, the related consolidated statements of operations, comprehensive income, stockholders' equity, and cash flows for each of the years in the three-year period ended June 30, 2020, and the related notes and financial statement Schedule II-Valuation and Qualifying Accounts (collectively, the consolidated financial statements), and the effectiveness of internal control over financial reporting as of June 30, 2020, which reports appear in the June 30, 2020 annual report on Form 10-K of Aspen Technology, Inc.

As discussed in Note 3(o) to the consolidated financial statements, the Company has changed its method of accounting for leases as of July 1, 2019 due to the adoption of Accounting Standards Codification (ASC) Topic 842, *Leases*.

Our report dated December 9, 2020, on the effectiveness of internal control over financial reporting as of June 30, 2020, expresses our opinion that the Company did not maintain effective internal control over financial reporting as of June 30, 2020 because of the effect of a material weakness on the achievement of the objectives of the control criteria and contains an explanatory paragraph that states that the following material weakness has been identified:

> The Company did not effectively design process level control activities over the accuracy of the retrospective restatement of revenue and related contract balances recorded upon the adoption of ASC Topic 606, which also impacted the related deferred tax liabilities on the consolidated balance sheet. The control deficiencies identified resulted from an ineffective risk assessment and the lack of timely creation of relevant reporting tools and complete and accurate information used to support the functioning of internal control.

Consequently, there were control failures in the areas of revenue and contract asset balances, which also impacted the related deferred tax liabilities.

/s/ KPMG LLP

Boston, Massachusetts
December 9, 2020

Exhibit 31.1

CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER
PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Antonio J. Pietri, certify that:

1. I have reviewed this Annual Report on Form 10-K of Aspen Technology, 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(s) 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(s) 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: December 9, 2020

/s/ ANTONIO. J. PIETRI
Antonio J. Pietri
President and Chief Executive Officer
(*Principal Executive Officer)*

Exhibit 31.2

CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER
PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Karl E. Johnsen, certify that:

1. I have reviewed this Annual Report on Form 10-K of Aspen Technology, 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(s) 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(s) 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: December 9, 2020

/s/ KARL E. JOHNSEN
Karl E. Johnsen
Senior Vice President and Chief Financial Officer
(Principal Financial Officer)

Exhibit 32.1

**CERTIFICATION PURSUANT TO 18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the Annual Report on Form 10-K of Aspen Technology, Inc. (the "Company") for the year ended June 30, 2020, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), each of the undersigned hereby certifies in his capacity as an officer of the Company, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to his knowledge:

1. The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: December 9, 2020	**/s/ ANTONIO J. PIETRI**
	Antonio J. Pietri
	President and Chief Executive Officer
Date: December 9, 2020	**/s/ KARL E. JOHNSEN**
	Karl E. Johnsen
	Senior Vice President and Chief Financial Officer

A signed original of this written statement required by Section 906 has been provided to Aspen Technology, Inc. and will be retained by Aspen Technology, Inc. and furnished to the Securities and Exchange Commission or its staff upon request.