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 December 31, 2019

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 001-38263

ALTAIR ENGINEERING INC.
(Exact name of registrant as specified in its charter)

Delaware	**38-2591828**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**
1820 East Big Beaver Road, Troy, Michigan	**48083**
(Address of principal executive offices)	**(Zip Code)**

248-614-2400
(Registrant's telephone number, including area code)

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

Title of each class	Trading Symbol	Name of each exchange on which registered
Class A Common Stock $0.0001 par value per share	**ALTR**	**The NASDAQ Stock Market**

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

None
(Title of class)

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

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

Indicate by a 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 such files). Yes ☒ No ☐

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

The aggregate market value of the voting and non-voting common stock held by non-affiliates of the registrant, based upon the closing sale price of a share of the registrant's Class A common stock on June 28, 2019, the last business day of the registrant's most recently completed second fiscal quarter, as reported on the NASDAQ stock market, was $1.6 billion. Shares of the registrant's Class A common stock and Class B common stock held by each executive officer, director, and each other person who may be deemed to be an affiliate of the registrant, have been excluded from this computation. This determination of affiliate status is not necessarily a conclusive determination for other purposes.

On February 15, 2020, there were 41,408,517 shares of the registrant's Class A common stock outstanding and 31,130,732 shares of the registrant's Class B common stock outstanding.

Documents Incorporated By Reference:

Portions of the registrant's Proxy Statement relating to the 2020 Annual Meeting of Stockholders, scheduled to be filed with the Securities and Exchange Commission within 120 days after the end of the registrant's fiscal year ended December 31, 2019, are incorporated by reference into Part III of this Annual Report on Form 10-K.

ALTAIR ENGINEERING INC.
Annual Report on Form 10-K for the Fiscal Year Ended December 31, 2019
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CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This annual report on Form 10-K contains forward-looking statements made pursuant to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995 under Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. Forward-looking statements include statements with respect to our beliefs, plans, objectives, goals, expectations, anticipations, assumptions, estimates, intentions and future performance, and involve known and unknown risks, uncertainties and other factors, which may be beyond our control, and which may cause our actual results, performance or achievements to be materially different from future results, performance or achievements expressed or implied by such forward-looking statements. All statements other than statements of historical fact are statements that could be forward-looking statements. You can identify these forward-looking statements through our use of words such as “may,” “can,” “anticipate,” “assume,” “should,” “indicate,” “would,” “believe,” “contemplate,” “expect,” “seek,” “estimate,” “continue,” “plan,” “point to,” “project,” “predict,” “could,” “intend,” “target,” “potential” and other similar words and expressions of the future.

There are a number of important factors that could cause the actual results to differ materially from those expressed in any forward-looking statement made by us. These factors include, but are not limited to:

- our ability and the time it takes to acquire new customers;
- reduced spending on product design and development activities by our customers;
- our ability to successfully renew our outstanding software licenses;
- our ability to maintain or protect our intellectual property;
- our ability to retain key executive members;
- our ability to internally develop new software products, inventions and intellectual property;
- our ability to successfully integrate and realize the benefits of our past or future strategic acquisitions or investments;
- demand for our software by customers other than simulation engineering specialists and in additional industry verticals;
- acceptance of our business model by investors;
- our susceptibility to factors affecting the automotive, aerospace, and financial services industries where we derive a substantial portion of our revenues;
- the accuracy of our estimates regarding expenses and capital requirements;
- our susceptibility to foreign currency risks that arise because of our substantial international operations; and
- the significant quarterly fluctuations of our results.

The foregoing does not represent an exhaustive list of matters that may be covered by the forward-looking statements contained herein or risk factors that we are faced with that may cause our actual results to differ from those anticipated in our forward-looking statements. Please see “Risk factors” in this Annual Report on Form 10-K under Part I, Item 1A, for additional risks which could adversely impact our business and financial performance.

All forward-looking statements are expressly qualified in their entirety by this cautionary notice. You are cautioned not to place undue reliance on any forward-looking statements, which speak only as of the date of this report or the date of the document incorporated by reference into this report. We have no obligation, and expressly disclaim any obligation, to update, revise or correct any of the forward-looking statements, whether as a result of new information, future events or otherwise. We have expressed our expectations, beliefs and projections in good faith and we believe they have a reasonable basis. However, we cannot assure you that our expectations, beliefs or projections will result or be achieved or accomplished.

PART I

Item 1. Business

General

Altair Engineering Inc. (“Altair,” the “Company,” “we,” “us” or “our”) is a global technology company providing software and cloud solutions in the areas of product design and development, high performance computing, and data analytics. We enable organizations across broad industry segments to compete more effectively in a connected world while creating a more sustainable future.

Our simulation-driven approach to innovation is powered by our broad portfolio of high-fidelity and high-performance physics solvers. Our integrated suite of software optimizes design performance across multiple disciplines encompassing structures, motion, fluids, thermal management, electromagnetics, system modeling, and embedded systems, while also providing data analytics and true-to-life visualization and rendering. Our high performance computing solutions maximize the efficient utilization of complex compute resources and streamline the workflow management of compute-intensive tasks for applications including data analytics, modeling and simulation, and visualization. Our data analytics products include data preparation, data science and visualization solutions that fuel engineering, scientific, and business decisions.

We believe a critical component of our success has been our company culture, based on our core values of innovation, envisioning the future, communicating honestly and broadly, seeking technology and business firsts, and embracing diversity. This culture is important because it helps attract and retain top people, encourages innovation and teamwork, and enhances our focus on achieving Altair’s corporate objectives.

Products

Rising expectations of end-market customers are causing expansion of the application of simulation and data analytics across many industry verticals. Our engineering, simulation, and data analytics software enables customers to enhance product performance, compress development time, and reduce costs. Altair’s thirty-five year heritage is in solving some of the most challenging problems faced by engineers and scientists.

We believe we are unique in the industry for the depth and breadth of our engineering application software offerings combined with our domain expertise and proprietary technology for harnessing high performance computing, or HPC and cloud infrastructures along with data analytics.

Altair is a leading provider of modeling, visualization, and physics solver solutions with a broad portfolio of best-in-class technology across many engineering disciplines. Our simulation software offers manufacturing companies opportunities to achieve better, lower cost products with fewer physical prototypes and tests, and reduces the time required to bring products to market.
We are a leading provider of data analytics technology for data preparation, management and analysis. Financial services organizations, such as banks, credit unions, and health care companies, as well as finance departments in various industries, including manufacturing, use our software to capture disparate data streams and apply analytics to make more informed business decisions.
We are a leading provider of high-performance and cloud computing workflow tools which empower customers to explore designs and analyze data in ways not possible in traditional computing environments. Our customers include Universities, government agencies, manufacturers, pharmaceutical firms, weather prediction agencies, and electronics design companies.

Software Products

Altair’s software products represent a comprehensive, open architecture solution for simulation, data analytics and cloud computing to empower decision making for improved product design and development, manufacturing, energy management and exploration, financial services, health care, and retail operations. We believe our products offer a comprehensive set of technologies to design and optimize high performance, efficient, innovative and sustainable products and processes in an increasingly connected world. Our products are categorized by:

- Design, Modeling & Visualization;
- Physics Simulation;
- Data Analytics;
- High Performance Computing; and
- Internet of Things, or IoT.

Design, Modeling & Visualization

Altair’s design, modeling & visualization tools under HyperWorks allow for advanced physics attributes to be modeled and rendered on top of object geometry in high fidelity. These tools are becoming more user friendly, design-centric and relevant earlier in the development process.

Addressing the large market of designers and design engineers who are not experts in simulation is important toward increasing the use of simulation in design processes. Altair has several technologies focused on this market, including Inspire and SimSolid.

Our industrial and concept design tools generate early concepts to address requirements for ergonomics, aesthetics, performance, manufacturing feasibility, and cost. These tools are all driven by simulation and machine learning algorithms. We believe these products are emerging as a market force with the potential to eclipse traditional computer-aided design, or CAD.

Models are increasingly required to deliver performance across a range of physics, including mechanical systems, communication and control, printed circuit boards, and combinations of these at various levels of fidelity. Altair’s math and system design tools help engineers to quickly explore requirements and performance throughout the design process.

Physics Simulation

At the core of Altair’s simulation software portfolios under HyperWorks are mathematical software “solvers” that use advanced computational algorithms to predict physical performance. Optimization leverages these solvers to derive the most efficient solutions to meet desired complex multi-objective requirements.

Altair’s solvers are a comprehensive set of fast, scalable and reliable physics algorithms for complex problems in linear and non-linear mechanics, fluid dynamics, electromagnetics, motion, systems and manufacturing simulation.

Altair’s solvers are now engaging GPU technology to accelerate solution times. Two of our products in the area of fluid mechanics, ultraFluidX (external aerodynamics) and nanoFluidX (machinery lubrication), were developed from the ground up to leverage GPUs and deliver significant performance advantages versus the competition.

We believe the breakthrough technology of SimSolid is game-changing and delivers extremely easy to model, fast, and accurate simulation results for complex designs versus the competition. SimSolid is especially relevant for simulation-driven design and seeing rapid adoption in many customer environments.

Altair’s optimization technology combined with superior multi-physics and multi-domain simulation is a key differentiator and spans our product offering. We believe customers using our technologies gain a sustainable competitive advantage by developing better products in less time.

Data Analytics

Altair’s data analytics offering under the Knowledge Works brand includes data preparation, data science and visualization solutions that fuel engineering, scientific, and business decisions. Our data preparation tools allow users to import, clean and organize structured and unstructured data for use in reporting and in data science applications. Our data science solutions allow users to develop machine learning workflows with best-in-class decision tree technology and scoring algorithms, and our visualization tools allow users to gain deep insights quickly with both live-streamed and historical data.

Today, Altair’s data analytics tools are extensively used by banks, credit unions, health care, and other financial services organizations. They are also used in finance departments across many industries, including manufacturing.

There is growing demand for this technology in engineering to improve designs and processes, and to manage sensor data coming from live physical assets in the field. Going forward, development lifecycles will include digital replicas of complex processes, services and physical assets and systems, or what is known as “digital twins”. Use of digital twins will enable developers to integrate simulation data and operational data to optimize product design and in-service operational performance. The convergence of simulation and machine learning is essential to creating better products, marketing them efficiently, and optimizing their performance.

Many of Altair’s manufacturing customers made presentations in 2019 describing how they used artificial intelligence and machine learning to achieve better products, lower scrap rates, and other business benefits. We believe this momentum can be built to increase the relevance of our data analytics products across many thousands of companies.

High Performance Computing

Altair's high performance computing software applications, under the brand PBS Works, are designed to maximize the efficient utilization of customers' complex compute resources and streamline the workflow management of compute-intensive tasks. Applications include data analytics, modeling, simulation, and visualization in fields such as financial services, weather prediction, bio-informatics, electronic design analysis, product development and lifecycle management.

We believe that Altair's high-performance tools to manage and optimize where and when jobs are running for customers and research organizations, will become increasingly mission critical as predictive modeling and analysis becomes increasingly computationally intensive, and as computing environments rely more on a mix of on-premise and cloud resources. Our powerful and easy to use solutions help IT administrators and business decision makers maximize throughput and minimize costs by leveraging sophisticated scheduling algorithms, enabling bursting to the cloud (or enabling applications to run on external data center resources to supplement internal data center capabilities), shifting workloads between different cloud providers depending on cost or resource availability and managing spot computing purchases.

Internet of Things

Altair offers tools under the SmartWorks brand to help customers develop connected products, including device enablement, data capture and management, edge computing, digital twins, data visualization, and predictive/ prescriptive analytics. Our software is used to design and optimize IoT devices and connectivity, and for modeling in-service product performance.

We believe Altair's digital twin solutions are compelling due to their openness and usability, and their ability to develop signal-based controls, mixed physics models, and electronics all within one environment and at varying levels of fidelity to support decision making in each stage of a product's lifecycle. For example, our multi-disciplinary models may include mechanics, fluids, electronics, and software among other technical elements, and encompass a scope of products ranging from components to IoT-enabled "systems of systems". And by employing varying degrees of fidelity, we aid the modeling process where computational requirements or data availability might otherwise prove to be obstacles.

We believe a key strength to Altair's math and systems solutions is allowing development organizations to move seamlessly in this multi-discipline, multi-component, multi-detail space while integrating models from various authoring tools. With a broad range of multi-physics solvers based on an open-system approach, a strong set of model reduction techniques can be employed toward IoT-enabled product development which can then be carried forward into device management and application development.

Altair's tools for simulation of communications and control, data analytics, and real-time data streaming are particularly relevant as more products are connected and collecting data to operate in complex environments.

Altair Partner Alliance

The Altair Partner Alliance, or APA, currently only available under HyperWorks, provides access to a broad spectrum of complementary software products using customers' existing HyperWorks Units. Our units-based subscription licensing model allows flexible and shared access to our applications and those of our partners, which can all be downloaded on-demand. This constantly growing portfolio extends their simulation and design capabilities to help create better products faster.

Software products in the APA include technologies ranging from computational fluid dynamics and fatigue to manufacturing process simulation and cost estimation, with applications specific to industry verticals including marine, motorcycles, aerospace, chemicals, and architecture. Altair plans to continue to add valuable third-party software solutions to empower innovation with comprehensive enterprise analytic and data analytics tools.

Software Services

To ensure customer success and deepen our relationships with them, we engage with our customers to provide services related to our software including consulting, training, and implementation services, especially when applying optimization and data science. Altair's headquarters includes an industrial design studio, a prototype shop, and test facilities. We have expertise designing and working with controls, power electronics, traditional and composite structures, and total system level development in the automotive, aerospace, consumer products and other markets. Our team of data scientists is experienced with applications ranging from credit scoring to predictive analytics of physical assets.

Implementation and custom software services are available to help customers leverage their investment in Altair's software to streamline workflows and solve specialized industry vertical engineering and business problems. We work closely with our clients to increase organizational efficiency and decision making by tailoring these solutions to a client's own environment and processes.

We believe the unique combination of our broad industry domain knowledge and software expertise has enabled Altair to enhance and replace customers' legacy applications, integrate our software applications with client business systems, develop clean-sheet designs or custom software solutions, and transform their product development and business processes.

Software Related Services

Altair engages with our customers to provide technical services throughout their entire product development lifecycle including design, engineering, and development, especially when applying optimization and data analysis. Our headquarters includes an industrial design studio, a prototype shop, and test facilities. We have expertise designing and working with controls, power electronics, traditional and composite structures, and total system level development in the automotive, aerospace, consumer products and other markets. Our team of data analysts is experienced with applications ranging from credit scoring to predictive analytics of physical assets.

Client Engineering Services

Altair provides Client Engineering Services, or CES, to support our customers with long-term ongoing expertise. This has the benefit of embedding us within customers, deepening our understanding of their processes, and allowing us to more quickly perceive trends in the overall market. Our presence at our customers' sites helps us to better tailor our software products' research and development, or R&D, and sales initiatives.

We operate our CES business by hiring engineers and data scientists for placement at a customer site for specific customer-directed assignments. We employ and pay them only for the duration of the placement.

We concentrate on placing simulation specialists, industrial designers, design engineers, materials experts, development engineers, manufacturing engineers and information technology specialists. As a leader in the simulation and data science technology markets, Altair attracts high caliber talent from around the world. CES is focused on placements that align strategically with customer usage of our software. We have a strong recruiting operation with sourcing specialists who identify, attract, vet, and hire technical professionals for our in-house and customer needs. We maintain a candidate database of over 150,000 highly qualified engineers, designers and data scientists. Our CES candidates and placed employees are valuable sources of talent acquisition for Altair's other business segments.

Research and Development

Our research and development efforts are focused on enhancing the functionality, breadth and scalability of our software, addressing new use cases, and developing additional innovative simulation technologies. Timely development of new products is essential to maintaining our competitive position, and we release new versions of our software on a regular basis.

Customer feedback, combined with our roadmap, enables us to deliver long-term value and stay ahead of market trends. The majority of product enhancements and new capabilities added to our offerings over the years have been developed internally, with acquisitions used to augment our capabilities with strategic technology.

From time-to-time, we incubate related technologies developed by our employees. For example, we developed and patented next-generation solid-state lighting technology as a result of an internal initiative. We commercialized this technology under our toggled subsidiary.

Our research and development initiatives foster a culture of innovation within the organization, helping us attract and retain a highly motivated team. Altair's research and development team consists of approximately 1,050 people worldwide. We maintain research and development centers with specific technical expertise in several geographies throughout the Americas, Asia-Pacific, Europe, the Middle East and Africa.

Our research and development efforts relating to our software focus on five areas:

- ***Design, Modeling & Visualization:*** The graphical applications used to construct and visualize simulation models require continuous R&D in the areas of data structures, computational methods, graphics, geometric modeling, mesh generation, and user interface design. Altair's modeling tools are becoming more design-centric and are adopting some of the capabilities of traditional CAD while leveraging simulation and optimization technology to drive design decisions rather than just simulate designs. Specific areas of R&D include handling large scale models of highly detailed and complex products, developing new methods to derive design geometry from optimizations, and unifying the modeling environment for multi-physics simulation. Adapting modeling and visualization technology for cloud deployment is also an area of active development as is supporting virtual and augmented reality hardware. Simulation-driven design requires tools to generate early concepts addressing requirements for ergonomics, aesthetics, performance, and manufacturing feasibility. We believe these tools are emerging as an alternative to traditional CAD tools, and are key to the democratization of simulation capabilities across large groups of designers and engineers who are not simulation specialists.

- ***Physics Simulation:*** At the core of Altair's simulation software portfolio are mathematical software "solvers" that use advanced computational algorithms to predict physical performance. Altair initially specialized in structural simulation, and now we continuously develop our portfolio of solvers to simulate fluid dynamics, high and low frequency electromagnetics, mechanical systems, electronic controls and more. Altair also invests to "couple" our solvers to simulate multiple physics domains simultaneously, and is considered a world leader in the development of optimization technology, which drives solvers to find solutions to complex multi-objective design problems. R&D is also conducted to leverage high performance computing technology for these compute intensive applications. Solver and optimization development is conducted by researchers with advanced degrees in engineering, physics, computer science and mathematics.

- ***Data Analytics:*** Altair's offering includes data preparation, data science and visualization solutions that fuel engineering, scientific, and business decisions. We develop and release new software on a regular basis to support existing data analytics customers with enhancements and other requested features and technologies for data preparation, data science and visualization. We continue to invest aggressively to evolve our best-in-class decision tree technology, scoring algorithms, streaming, and visualization. In addition, we are integrating all of our data analytics capabilities into a modern, cloud-based solution to deliver a more unified user experience for our users. This solution includes important enterprise level capabilities such as security, data discovery, collaboration, and operationalization of user developed machine learning work flows to gain deep insights quickly.

- ***High Performance Computing:*** Altair's high performance computing software applications are designed to maximize utilization of complex compute resources and streamline the workflow management of compute-intensive tasks for applications such as data analytics, modeling and simulation, and visualization in fields such as financial services, weather prediction, bio-informatics, electronic design analysis, product development and lifecycle management.

  Altair develops best-in-class HPC workload management technology for large scale, highly parallel job environments as well as solutions for chip design workloads which require massive numbers of jobs to be spawned and managed for relatively short durations. We are exploring the application of the same technology developed for electronic design automation industry, or EDA, workloads to significantly impact financial technology, or fintech, computing as these compute environments have similar profiles.

  We develop solutions for both CPU and GPU architectures and support all of the major computer vendors. This requires ongoing collaboration with hardware suppliers who depend on our solutions to make their products run efficiently for customers.

  Much of our more recent R&D investments allow customers to easily move and manage workflows in hybrid compute environments of on-premise and cloud resources.

  Altair's HPC development teams work closely with the simulation, data analytics and IoT development teams to ensure that our overall technology portfolio interoperates effectively and shares a common infrastructure and user experience.

- ***Internet of Things:*** Altair offers tools to help customers develop connected products, including device enablement, data capture and management, edge computing, digital twins, data visualization, and predictive/ prescriptive analytics. Our software is used to design and optimize IoT devices and connectivity, and for modeling in-service product performance. We are investing to deliver an end-to-end solution for customers developing connected products. We believe our products operate well as a complete and integrated suite, and are open such that they are designed to work seamlessly with other IoT or data analytics solutions in a disaggregated fashion. Altair's toggled LED lighting subsidiary is proving to be an important learning and deployment environment as we gain real-world experience with these technologies and share that knowledge with our customers.

  Our digital twin platform supports product development for the IoT through a math-based programming environment, multi-disciplinary system modeling, and control system development, and is an important ongoing research and development effort. We support our own high-level matrix-based numerical computing language, as well as more commonly used general purpose programming languages, like Python and Tcl, in an interactive programming environment for all types of math operations. We expect to add more language and library support, broaden the math libraries, and integrate these products more deeply with Altair's other software.

In order to maintain and extend our technology leadership and competitive position, we intend to continue devoting significant effort to our research and development activities.

Sales

We serve customers in the product lifecycle management, simulation, data analytics, and high performance computing markets. Our primary users are highly educated and technical engineers and data scientists.

HyperWorks

Under HyperWorks, we engage with our enterprise customers through Altair's experienced direct sales force, especially in industries requiring highly engineered products, such as automotive, aerospace, heavy machinery, rail and ship design. We are increasing our use of indirect channels to more efficiently address a broader set of customers in consumer products, electronics, energy and other industries.

Approximately 90% of our 2019 software revenue was generated through our direct global sales force. These sales teams interact with key decision makers, engage deeply with users of our products by leveraging a team of Altair's technical specialists, and work with user-group managers and executives to ensure they are maximizing the utility of our software solutions. We have been expanding our direct sales team including our inside sales operations aggressively to reach more customers and market verticals.

Our direct sales force is responsible for developing new customers, ensuring high recurring rates from our existing customers, and expanding the use of Altair and partner products within customers' environments through continuous training, support, and consulting engagements. Each of our field sales professionals are supported by technical specialists with deep knowledge of our products and the broader product development domain. We believe this approach differentiates Altair from our competitors, as our focus on establishing a strong working relationship with the user community has led to expanded usage of Altair and APA partner products. Our direct sales force is organized by geographic regions, consisting of Americas, EMEA, and APAC.

We leverage indirect sales channels especially in APAC and Eastern Europe and have been investing to extend our reseller relationships in all markets by offering a subset of our products focused on industrial design, concept engineering, manufacturing feasibility, and model-based design under solidThinking. solidThinking targets designers, engineers and architects at small and medium enterprises. Approximately 10% of our 2019 software revenue was generated through our growing network of indirect channel partners and resellers.

Knowledge Works

There is segmentation in the data analytics space by industry verticals where specific domain expertise is important for success. Altair's primary data analytics customer base is banks, credit unions, health care, and other financial services organizations along with finance departments across most industries including manufacturing. As we cross sell into Altair traditional manufacturing customer accounts, we are targeting both the finance departments, leveraging the expertise of our financial markets sales and technical teams, as well as engineering departments looking to apply data analytics to improve designs, manufacturing, and in-service operations. We intend to leverage our existing direct and indirect sales channels in order to support greater market opportunities.

High Performance Computing Solutions

Altair's HPC solutions are sold by our global strategic sales force with sales overlay support from Altair HPC sales specialists and application engineers. We have original equipment manufacturer, or OEM, arrangements for these solutions with most of the major hardware companies. We believe these arrangements reduce competition, grow our market share and improve sales efficiency.

We offer Altair PBS Professional as both an open source and a commercial solution. Commercial sites generally license the commercial version along with support. However, many universities, government agencies and small commercial sites prefer the open source version as their work often needs to be freely available for societal benefit. Large government and research installations generally still purchase support and often pay for specific development.

Licensing

There are two licensing methods we employ to deliver our software solutions:

- Most products are available under our unique, patented units-based licensing model.
- A small subset of our products is available on a node-locked, or hardware specific, and named-user basis. This is especially true for our data analytics solutions.

Altair pioneered a patented units-based subscription licensing model for software and other digital content. This units-based subscription licensing model allows flexible and shared access to our offerings, along with over 150 partner products. Our HyperWorks customers license a pool of units for their organizations giving individual users access to our entire portfolio of software applications as well as our growing portfolio of partner products. We believe our units-based subscription licensing model lowers barriers to adoption, creates broad engagement, encourages users to work within our ecosystem, and increases revenue. This, in turn, helps drive our recurring software license rate which has been on average approximately 88% over the past five years. Each year approximately 60% of new software revenue comes from expansion within existing customers.

Marketing

Altair’s global marketing team of approximately 85 people is focused on generating new business opportunities by driving awareness, deepening customer engagement, and developing content specific to technical fields and industry verticals. Our corporate marketing programs include social media, earned media, publications, blogs, white papers and case studies. Our regional marketing program supports working relationships with our user community through education, participation in local industry events, Altair technical conferences, and webinars.

We provide marketing support to our ecosystem of resellers and third-party technology partners on both a corporate and regional level.

In order to continue to drive growth and extend our market position, we intend to continue to invest significant resources into our marketing initiatives.

Customers

As of December 31, 2019, we had more than 11,000 customers worldwide. Our simulation, analytics, and HPC customers are primarily large manufacturing enterprises, with a growing presence in small and mid-size companies. Our data analytics customers include banks, credit unions, health care organizations, and other financial services organizations along with finance departments across most industries including manufacturing.

Automotive and aerospace combined account for approximately 50% of our 2019 billings, including 15 out of 15 of the world’s leading automotive manufacturers and 10 out of 10 of the world’s leading aerospace manufacturers. Other important industries include heavy machinery, rail and ship design, energy, government, life and earth sciences, and consumer electronics. No single customer, nor any of our resellers and OEMS, accounted for more than 2% of our 2019 software billings. In 2019, we generated 39%, 31% and 30% of our total billings from customers in the Americas, EMEA, and APAC, respectively. Billings consists of our total revenue plus the change in our deferred revenue, excluding deferred revenue from acquisitions during the period, and is discussed under *Key metrics* included in Part II, Item 6, Selected Financial Data of this Annual Report on Form 10-K.

For a summary of our financial information by geographic location, see Note 19 of Notes to consolidated financial statements in Item 15, Part IV of this Annual Report on Form 10-K, which is incorporated by reference.

Competition

The market for simulation, data analytics, and high-performance computing software is highly fragmented. Our primary competitors include companies such as IBM, Dassault Systèmes, Siemens, Ansys, MSC Software (a Hexagon company), and Alteryx. Many are large public companies, with significant financial resources. In addition to these competitors, we compete with many smaller companies offering similar software applications.

We believe the breadth and depth of Altair’s software offering is unique and no single competitor addresses our entire solution set. The units model further extends this advantage with a growing APA marketplace of third party software.

Our simulation solutions including modeling, visualization and solvers are noted in the market for their ability to handle large and complex models. Our software applications deliver high performance and high scalability, including massive parallelization, which is extremely important in the high-end simulation market. Altair is a leader in integrating optimization technology across all our products, including multi-disciplinary applications.

We believe our solutions for data preparation are extremely strong and broadly adopted and have several unique capabilities including handling large, complex data sets coupled with our ability to intelligently import unstructured data. Our data science solutions are also considered easy to use and powerful. The market is converging toward integrated data prep and data science solutions, and we are well positioned for this future.

To ensure customer success and deepen our relationships with them, we engage with our customers to provide consulting, implementation services, training, and support, especially when applying optimization. We believe these services, combined with our ability to leverage HPC as the industry transitions to cloud computing, positions us for future success.

We compete on a variety of factors including the breadth, depth, performance, and quality of our technical solutions. We believe our patented units-based subscription licensing model provides us with a competitive advantage by lowering barriers to adoption, creating broad engagement, and encouraging users to work within our ecosystem.

Intellectual property

We believe that our intellectual property rights are valuable and important to our business. We actively protect our investment in technology through establishment and enforcement of intellectual property rights. We protect our intellectual property through a combination of patent, copyright, trademark and trade secret protections, confidentiality procedures, and contractual provisions. The nature and extent of legal protection associated with each such intellectual property right depends on, among other things, the type of intellectual property right and the given jurisdiction in which such right arises.

As of December 31, 2019, we have 221 issued patents and more than 77 published patent applications worldwide. These patents and patent applications seek to protect proprietary inventions relevant to our business. We intend to pursue additional patent protection to the extent we believe it would be beneficial and cost effective. Additionally, we are the registered holder of a variety of trademarks and domain names that include “Altair” and similar variations.

Nonetheless, our intellectual property rights may not be successfully asserted in the future or may be invalidated, circumvented or challenged. In addition, the laws and enforcement of the laws of various countries where our products are distributed do not protect our intellectual property rights to the same extent as United States laws. Our inability to assert or enforce our intellectual property rights could harm our business.

From time to time, we receive claims alleging infringement of a third party’s intellectual property rights, including patents. Disputes involving our intellectual property rights or those of another party have in the past and may in the future lead to, among other things, costly litigation, diversion of time, money and resources to develop or obtain non-infringing products, or delay product distribution. Any significant impairment of our core intellectual property rights could harm our business or our ability to compete.

Our products are licensed to users pursuant to signed license agreements or ‘click through’ agreements containing restrictions on use, duplication, disclosure, and transfer. Cloud based products and associated services are provided to users pursuant to online or signed terms of service agreements containing appropriate restrictions on access and use.

We are unable to measure the full extent to which piracy of our software products exists. We believe, however, that software piracy is and can be expected to be a persistent problem that negatively impacts our revenue and financial results. We believe that our predominant subscription based business model combined with the change from desktop to cloud based computing will shift the incentives and means by which software is pirated.

In addition, through various licensing arrangements, we receive certain rights to intellectual property of others. We expect to maintain current licensing arrangements and to secure additional licensing arrangements in the future, as needed and to the extent available on reasonable terms and conditions, to support continued development and sales of our products and services. Some of these licensing arrangements require or may require royalty payments and other licensing fees. The amount of these payments and fees may depend on various factors, including but not limited to: the structure of royalty payments, offsetting considerations, if any, and the degree of use of the licensed technology.

Employees

As of December 31, 2019, we had over 2,500 in-house employees and over 450 on-site Client Engineering Service employees globally. Over two-thirds of our employees are located in the United States, India, France, Germany and China. None of our employees in the United States are represented by a labor organization or are party to any collective bargaining arrangement. In certain of the European countries in which we operate, we are subject to, and comply with, local labor law requirements in relation to the establishment of works councils. We are often required to consult and seek the consent or advice of these works councils. We have never experienced a work stoppage and we believe our employee relations are good.

Acquisitions

We have acquired 30 companies or strategic technologies since 1996, including 22 in the last five years. These acquisitions brought strategic IP assets, and more than 300 developers with expertise in disciplines ranging from electronics, material science, crash and safety to industrial design and rendering. Products which are commercially available as a result of these acquisitions include Click2Extrude, Altair PBS Professional, Radioss, Evolve, Acusolve, SimLab, Embed, Click2Cast, Multi-scale Designer, FEKO, FLUX, WinProp, Thea Render, Modeliis, SmartWorks, ESAComp, SimSolid, Monarch, Knowledge Studio, Panopticon, EDEM and PollEx.

Our 2019 acquisitions include the following:

- *Polliwog*: In October we acquired Polliwog Co Ltd. ("Polliwog"), a supplier of Electronic Design Automation software to the global electronics industry, based near Seoul, Korea.
- *DEM Solutions Limited*: In November we acquired DEM Solutions Limited ("DEM Solutions"), a company that provides market-leading Discrete Element Method software for bulk material simulation, based in Edinburgh, UK.

For further information about our acquisitions, see Note 4 of the Notes to consolidated financial statements in Item 15, Part IV of this Annual Report on Form 10-K.

Seasonal variations

We have experienced and expect to continue to experience seasonal variations in the timing of customers' purchases of our software and services. Many customers make purchase decisions based on their fiscal year budgets, which often coincide with the calendar year. These seasonal trends materially affect the timing of our cash flows, as license fees become due at the time the license term commences based upon agreed payment terms that customers may not adhere to. As a result, new and renewal licenses have been concentrated in the first and fourth quarter of the year, and our cash flows from operations have been highest late in the first quarter and early in the second quarter of the succeeding fiscal year.

Backlog

We generally enter into single year term-based software licensing subscription contracts for our solutions. The timing of our invoices to the customer is a negotiated term and thus varies among our subscription contracts. For multi-year agreements, it is common to invoice an initial amount at contract signing followed by subsequent annual invoices. At any point in the contract term, there can be amounts that we have not yet been contractually able to invoice. As we generally enter into single year subscription contracts for our platform, backlog is not significant.

Segments

We have identified two reportable segments: Software and Client Engineering Services. For additional information about our reportable segments, see Note 19 of the Notes to consolidated financial statements in Item 15, Part IV of this Annual Report on Form 10-K, which is incorporated by reference.

Corporate information

We were incorporated in Michigan in 1985 and became a Delaware company in October 2017. Our principal executive offices are located at 1820 E. Big Beaver Road, Troy, Michigan 48083.

Unless the context otherwise requires, the terms "Altair," "the Company," "we," "us" and "our" in this Annual Report on Form 10-K refers to Altair Engineering Inc. and its subsidiaries. The Altair design logo and the marks "OptiStruct," "RADIOSS," "AcuSolve," "FEKO," "Flux," "WinProp," "Multiscale Designer," "HyperStudy," "HyperMesh," "HyperView," "SimLab," "HyperCrash," "HyperGraph," "Inspire," "solidThinking Evolve," "Thea Render," "Click2Cast," "Click2Extrude," "Click2Form," "Carriots," "solidThinking Compose," "solidThinking Activate," "solidThinking Embed," "Altair PBS Works," "Altair PBS Professional," "Altair PBS Cloud," "MotionView," "MotionSolve," "Altair PBS Access," "SimSolid," "Knowledge Studio," "Monarch," "Panopticon," "EDEM," "PollEx" and our other registered or common law trade names, trademarks or service marks appearing in this Annual Report on Form 10-K are our property.

Available information

We file annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, proxy and information statements and amendments to reports filed or furnished pursuant to Sections 13(a), 14 and 15(d) of the Securities Exchange Act of 1934, as amended. The SEC also maintains a website at http://www.sec.gov that contains reports, proxy and information statements and other information regarding Altair Engineering Inc. and other companies that file materials with the SEC electronically. Copies of Altair's reports on Form 10-K, Forms 10-Q and Forms 8-K, may be obtained, free of charge, electronically through our internet website, http://investor.altair.com under the Financials tab.

Our website is *www.altair.com*. Investors and others should note that we announce material financial information to investors using press releases, SEC filings and public conference calls. The information contained on our website is not incorporated by reference into this Annual Report on Form 10-K or in any other report or document we file with the SEC.

Item 1A. Risk Factors

An investment in our Class A common stock involves a high degree of risk. You should carefully consider the risks and uncertainties described below, together with all the other information in this Annual Report on Form 10-K, including "Management's Discussion and Analysis of Financial Condition and Results of Operations" and the consolidated financial statements and the related notes. If any of the following risks actually occurs, our business, reputation, financial condition, results of operations, revenue, and future prospects could be seriously harmed. Unless otherwise indicated, references to our business being seriously harmed in these risk factors will include harm to our business, reputation, financial condition, results of operations, revenue, liquidity and future prospects.

Risks relating to our business and industry

We have experienced significant revenue growth and we may fail to sustain that growth rate or may not grow in the future.

We were founded in 1985 and launched our first commercial software in 1990. Our growth has primarily been attributed to the increasing reliance of customers on our engineering and simulation technologies to enhance product performance, compress development time, and reduce costs. Revenue from our software segment has historically constituted a significant portion of our total revenue. Our revenue growth could decline over time as a result of a number of factors, including increasing competition from smaller entities and well-established, larger organizations, limited ability to, or our decision not to, increase pricing, contraction of our overall market, the manner in which the markets for our products, including our data analytics products, evolve or our failure to capitalize on growth opportunities. Other factors include managing our global organization, revenues generated outside the United States that are subject to adverse currency fluctuations, uncertain international geopolitical landscapes and the acquisition of businesses which may grow more slowly than our business. Accordingly, we may not achieve similar growth rates in future periods, and you should not rely on our historical revenue growth as an indication of our future revenue or revenue growth.

If we cannot maintain our company culture of innovation, teamwork, and communication our business may be harmed.

We believe that a critical component to our success has been our company culture, which is based on our core values of innovation, envisioning the future, communicating honestly and broadly, seeking technology and business firsts, and embracing diversity. We have invested substantial time and resources in building a company embodying this culture. As we continue to develop the infrastructure of a public company and continue to grow, we may find it difficult to maintain these valuable aspects of our corporate culture. Any failure to preserve our culture, or embed our culture in our acquired businesses, could negatively impact our future success, including our ability to attract and retain personnel, encourage innovation and teamwork, and effectively focus on and pursue our corporate objectives.

If our existing customers or users do not increase their usage of our software, or we do not add new customers, the growth of our business may be harmed.

Our software includes a multitude of broad and deep design, simulation, optimization, and analysis applications and functionalities.

Our future success depends, in part, on our ability to increase the:

- number of customers and users accessing our software;
- usage of our software to address expanding design, engineering, computing and analytical needs; and/or
- number of our applications and functionalities accessed by users and customers through our licensing model.

In addition, through our Altair Partner Alliance, or APA, our customers have access to additional software offered by independent third parties, without the need to enter into additional license agreements.

If we fail to increase the number of customers or users and/or application usage among existing users of our software and the software of our APA partners, our ability to license additional software will be adversely affected, which would harm our operating results and financial condition.

Our ability to acquire new customers is difficult to predict because our software sales cycle can be long.

Our ability to increase revenue and maintain or increase profitability depends, in part, on widespread acceptance of our software by mid- to- large-size organizations worldwide. We face long, costly, and unpredictable sales cycles. As a result of the variability and length of the sales cycle, we have only a limited ability to forecast the timing of sales. A delay in or failure to complete sales could harm our business and financial results, and could cause our financial results to vary significantly from period to period. Our sales cycle varies widely, reflecting differences in potential customers' decision-making processes, procurement requirements, budget cycles and the specific software or products being purchased, and is subject to significant risks over which we have little or no control, including:

- longstanding use of competing products and hesitancy to change;

- customers’ budgetary constraints and priorities;
- timing of customers’ budget cycles;
- need by some customers for lengthy evaluations;
- hesitation to adopt new processes and technologies;
- length and timing of customers’ approval processes; and
- development of software by our competitors perceived to be equivalent or superior to our software.

To the extent any of the foregoing occur, our average sales cycle may increase and we may have difficulty acquiring new customers.

Reduced spending on product design and development activities by our customers may negatively affect our revenues.

Our revenues are largely dependent on our customers’ overall product design and development activities, particularly demand from mid- to- large-size organizations worldwide and their supplier base. The licensing of our software is discretionary. Our customers may reduce their research and development budgets, which could cause them to reduce, defer, or forego licensing of our software. To the extent licensing of our software is perceived by existing and potential customers to be extraneous to their needs, our revenue may be negatively affected by our customers’ delays or reductions in product development research and development spending. Customers may delay or cancel software licensing or seek to lower their costs. Deterioration in the demand for product design and development software for any reason would harm our business, operating results, and financial condition in the future.

Our business largely depends on annual renewals of our software licenses.

We typically license our software to our customers on an annual basis. In order for us to maintain or improve our operating results, it is important that our customers renew and/or increase the amount of software licensed on an annual basis. Customer renewal rates may be affected by a number of factors, including:

- our pricing or license term and those of our competitors;
- our reputation for performance and reliability;
- new product releases by us or our competitors;
- customer satisfaction with our software or support;
- consolidation within our customer base;
- availability of comparable software from our competitors;
- effects of global or industry specific economic conditions;
- our customers’ ability to continue their operations and spending levels; and
- other factors, a number of which are beyond our control.

If our customers fail to renew their licenses or renew on terms that are less beneficial to us, our renewal rates may decline or fluctuate, which may harm our business.

We believe our future success will depend, in part, on the growth in demand for our software by customers other than simulation engineering specialists and in additional industry verticals.

Historically, our customers have been simulation engineering specialists. To enable concept engineering, driven by simulation, we make our physics solvers more accessible to designers by wrapping them in powerful simple interfaces. We believe our future success will depend, in part, on growth in demand for our software by these designers, which could be negatively impacted by the lack of:

- continued and/or growing reliance on software to optimize and accelerate the design process;
- adoption of simulation technology by designers other than simulation engineering specialists;
- continued proliferation of mobility, large data sets, cloud computing and IoT;
- our ability to predict demands of designers other than simulation engineering specialists and achieve market acceptance of our software or products within these additional areas and customer bases or in additional industry verticals; or
- our ability to respond to changes in the competitive landscape, including whether our competitors establish more widely adopted products for designers other than simulation engineering specialists.

If some or all of this software does not achieve widespread adoption, our revenues and profits may be adversely affected.

Our ability to grow our business may be adversely impacted by difficulties we may experience in integrating recent acquisitions or in integrating future acquisitions.

We believe that our recent acquisitions result in certain benefits, including expanding our portfolio of software and products and enabling us to better serve our customers' requests for data analytics and simulation technology. However, to realize some of these anticipated benefits, the acquired businesses must be successfully integrated. The success of these acquisitions will depend in part on our ability to realize these anticipated benefits. We may fail to realize the anticipated benefits of these acquisitions for a variety of reasons, including the following:

- failure to successfully manage relationships with new or potential customers;
- failure of existing customers to accept new service and product offerings from us;
- revenue attrition in excess of anticipated levels;
- unanticipated incompatibility of technologies and systems;
- failure to leverage the increased scale of our business quickly and effectively;
- potential difficulties integrating and harmonizing financial reporting systems;
- the loss of key employees;
- failure to effectively coordinate sales and marketing efforts to communicate the capabilities of our enhanced portfolio of software and products;
- failure to combine product offerings and product lines quickly and effectively;
- failure to convert an increasing amount of new or acquired customer relationships revenue from perpetual to annual recurring revenue streams; or
- failure to effectively invest in further sales, marketing, and research and development efforts that lead to increased revenues.

We face significant competition, which may adversely affect our ability to add new customers, retain existing customers, and grow our business.

The market for simulation, data analytics, and high-performance computing software is highly fragmented. Our primary competitors include companies such as IBM, Dassault Systèmes, Siemens, Ansys, MSC Software (a Hexagon company), and Alteryx. Many are large public companies, with significant financial resources. In addition to these competitors, we compete with many smaller companies offering similar software applications.

A significant number of companies have developed or are developing software and services that currently, or in the future, may compete with some or all of our software and services. We may also face competition from participants in adjacent markets, including two-dimensional, or 2D, and three-dimensional, or 3D, CAD, and broader PLM competitors and others that may enter our markets by leveraging related technologies and partnering with or acquiring other companies.

The principal competitive factors in our industry include:

- breadth, depth and integration of software;
- domain expertise of sales and technical support personnel;
- consistent global support;
- performance and reliability; and
- price.

Many of our current and potential competitors have longer-term and more extensive relationships with our existing and potential customers that provide them with an advantage in competing for business with those customers. They may be able to devote greater resources to the development and improvement of their offerings than we can. These competitors could incorporate additional functionality into their competing products from their wider product offerings or leverage their commercial relationships in a manner that uses product bundling or closed technology platforms to discourage enterprises from purchasing our applications.

Many existing and potential competitors enjoy competitive advantages over us, such as:

- larger sales and marketing budgets and resources;

- access to larger customer bases, which often provide incumbency advantages;
- broader global distribution and presence;
- greater resources to make acquisitions;
- the ability to bundle competitive offerings with other software and services;
- greater brand recognition;
- lower labor and development costs;
- greater levels of aggregate investment in research and development;
- larger and more mature intellectual property portfolios; and
- greater financial, technical, management and other resources.

These competitive pressures in our markets or our failure to compete effectively may result in fewer customers, price reductions, licensing of fewer units, increased sales and marketing expenses, reduced revenue and gross profits and loss of market share. Any failure to address these factors could harm our business.

Because we derive a substantial portion of our revenues from customers in the automotive industry, we are susceptible to factors affecting this industry.

Billings in the automotive industry accounted for approximately 40% of our 2019 billings. An adverse occurrence, including industry slowdown, recession, political instability, costly or constraining regulations, excessive inflation, prolonged disruptions in one or more of our automotive customers' production schedules or labor disturbances, that results in a significant decline in the volume of sales in this industry, or in an overall downturn in the business and operations of our customers in this industry, could adversely affect our business.

The automotive industry is highly cyclical in nature and sensitive to changes in general economic conditions, consumer preferences and interest rates. Any weakness in demand in this industry, the insolvency of a manufacturer or suppliers, or constriction of credit markets may cause our automotive customers to reduce their amount of software licensed or services requested or request discounts or extended payment terms, any of which may cause fluctuations or a decrease in our revenues and timing of cash flows.

Adverse global conditions, including economic uncertainty, may negatively impact our financial results.

The ongoing coronavirus outbreak emanating from China at the beginning of 2020 has resulted in increased travel restrictions and extended shutdown of certain businesses in the region. These or any further political or governmental developments or health concerns in China or other countries in which we operate could result in social, economic and labor instability. We believe these uncertainties could have a material adverse effect on the continuity of our business and our results of operations and financial condition.

Global conditions, including the effects of the United Kingdom's exit from the European Union, or Brexit, dislocations in the financial markets or any negative financial impacts affecting United States corporations operating on a global basis as a result of tax reform or changes to existing trade agreements or tax conventions, could adversely impact our business in a number of ways, including longer sales cycles, lower prices for our software license fees, reduced licensing renewals, customer disruption or foreign currency fluctuations.

The long term effects of Brexit will depend on any agreements the United Kingdom makes to retain access to European Union markets either during a transitional period or more permanently. The measures could potentially disrupt some of the markets we serve and may cause those customers to closely monitor their costs and reduce their spending budget on our products and services. In addition, Brexit could lead to legal uncertainty and potentially divergent national laws and regulations as the United Kingdom determines which European Union laws to replace or replicate. Given the lack of comparable precedent, it is unclear what financial, trade and legal implications the withdrawal of the United Kingdom from the European Union will have on us.

The United Kingdom Financial Conduct Authority, or the FCA, has announced its intention to phase out LIBOR rates by the end of 2021. It is not possible to predict the effect of this change, or other reforms or the establishment of alternative reference rates in the United Kingdom or elsewhere. We currently expect that, as a result of any phase out of LIBOR, the interest rates under our loan agreement would be amended as necessary to provide for an interest rate that approximates the existing interest rate as calculated in accordance with LIBOR, but could result in an increase in the cost of our variable rate indebtedness.

During challenging economic times our customers may be unable or unwilling to make timely payments to us, which could cause us to incur increased bad debt expenses. Our customers may unilaterally extend the payment terms of our invoices, adversely affecting our short-term or long-term cash flows.

Our quarterly results may fluctuate significantly and may not fully reflect the underlying performance of our business.

Our quarterly results of operations and our key metrics, including Billings, Adjusted EBITDA, Modified Adjusted EBITDA and Free Cash Flow, may vary significantly in the future. Period-to-period comparisons of our operating results may not be meaningful. The results of any one quarter should not be relied upon as an indication of future performance. Our quarterly financial results and key metrics may fluctuate as a result of a variety of factors including:

- our ability to retain and/or increase sales to existing customers at various times;
- our ability to attract new customers;
- the addition or loss of large customers, including through their acquisitions or industry consolidations;
- the timing of recognition of revenues;
- the amount and timing of billings;
- the amount and timing of operating expenses and capital expenditures;
- the length of sales cycles;
- significant security breaches, technical difficulties or unforeseen interruptions to the functionality of our software;
- the number of new employees added;
- the amount and timing of billing for professional services engagements;
- the timing and success of new products, features, enhancements or functionalities introduced by us or our competitors;
- changes in our pricing policies or those of our competitors;
- changes in the competitive dynamics of our industry, including consolidation among competitors;
- the timing of expenses related to the development or acquisition of technology;
- any future charges for impairment of goodwill from acquired companies;
- extraordinary expenses such as litigation or other dispute-related settlement payments;
- the impact of new accounting pronouncements; and
- general economic conditions.

Billings have historically been highest in the first and fourth quarters of any calendar year and may vary in future quarters. This seasonality or the occurrence of any of the factors above may cause our results of operations to vary and our financial statements may not fully reflect the underlying performance of our business.

In addition, we may choose to grow our business for the long-term rather than to optimize for profitability or cash flows for a particular shorter-term period. If our quarterly results of operations fall below the expectations of investors or securities analysts, the price of our Class A common stock could decline and we could face lawsuits, including securities class action suits.

Seasonal variations in the purchasing patterns of our customers may lead to fluctuations in the timing of our cash flows.

We have experienced and expect to continue to experience seasonal variations in the timing of customers’ purchases of our software and services. Many customers make purchase decisions based on their fiscal year budgets, which often coincide with the calendar year. These seasonal trends materially affect the timing of our cash flows, as license fees become due at the time the license term commences based upon agreed payment terms that customers may not adhere to. As a result, new and renewal licenses have been concentrated in the first and fourth quarter of the year, and our cash flows from operations have been highest late in the first quarter and early in the second quarter of the succeeding fiscal year.

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

As a result of our international activities, we have revenue, expenses, cash, accounts receivable and payment obligations denominated in foreign currencies including Euros, British Pounds Sterling, Indian Rupees, Japanese Yen, and Chinese Yuan. Foreign currency risk arises primarily from the net difference between non-United States dollar receipts from customers and non-United States dollar operating expenses. The value of foreign currencies against the United States dollar can fluctuate significantly, and those fluctuations may occur quickly. We cannot predict the impact of future foreign currency fluctuations.

Strengthening of the United States dollar could cause our software to become relatively more expensive to some of our customers leading to decreased sales and a reduction in billings and revenue not denominated in United States dollars. A reduction in revenue or an increase in operating expenses due to fluctuations in foreign currency exchange rates could have an adverse effect on our financial condition and operating results. Such foreign currency exchange rate fluctuations may make it more difficult to detect underlying trends in our business and operating results.

We do not currently, and do not have plans to, engage in currency hedging activities to limit the risk of exchange rate fluctuations. In the future, we may use derivative instruments, such as foreign currency forward and option contracts, to hedge certain exposures to fluctuations in foreign currency exchange rates. The use of such hedging activities may not offset any or more than a portion of the adverse financial effects of unfavorable movements in foreign exchange rates over the limited time the hedges are in place, and the cost of those hedging techniques may have a significant negative impact on our operating results. The use of hedging instruments may introduce additional risks if we are unable to structure effective hedges with such instruments. If we are not able to successfully manage or hedge against the risks associated with currency fluctuations, our financial condition and operating results could be adversely affected.

If we fail to attract new or retain existing third party independent software vendors to participate in the APA, we may not be able to grow the APA program.

Our APA program allows our customers to use third party software that may be unrelated to our software, without the need to enter into additional license agreements. The APA program results in increased revenues through revenue sharing, and encourages users to stay within the Altair software ecosystem. If third party software providers are unwilling to join the APA on appropriate terms, including agreeing with our revenue share allocations, or if we are unable to retain our current APA participants, we may not be able to grow the APA program.

Licensing under our solidThinking brand is dependent on performance of our distributors and resellers.

We have historically licensed our software primarily through our direct sales force. Our solidThinking brand is primarily licensed through a network of distributors and resellers. If these distributors and resellers are unable to successfully adjust their sales methods to support our annual recurring licensing model, or become unstable, financially insolvent, or otherwise do not perform as we expect, our revenue growth derived from solidThinking could be negatively impacted.

If we fail to adapt to technology changes our software may become less marketable, less competitive, or obsolete.

Our success depends in part on our ability to:

- anticipate customer needs;
- foresee changes in technology, including to cloud-enabled hardware, software, networking, browser and database technologies;
- differentiate our software;
- maintain operability of our software with changing technology standards; and
- develop or acquire additional or complementary technologies.

We may not be able to develop or market new or enhanced software in a timely manner, which could result in our software becoming less marketable, less competitive, or obsolete.

We believe our long-term value as a company will be greater if we focus on growth, which may negatively impact our profitability in the near term.

Part of our business strategy is to focus on our long-term growth. As a result, our profitability may be lower in the near term than it would be if our strategy were to maximize short-term profitability. Expanding our research and development efforts, sales and marketing efforts, infrastructure and other such investments may not ultimately grow our business or cause higher long-term profitability. If we are ultimately unable to achieve greater profitability at the level anticipated by analysts and our stockholders, our Class A common stock price may decline.

Our research and development may not generate revenue or yield expected benefits.

A key element of our strategy is to invest significantly in research and development to create new software and enhance our existing software to address additional applications and serve new markets. Research and development projects can be technically challenging and expensive, and there may be delays between the time we incur expenses and the time we are able to generate revenue, if any.

Anticipated customer demand for any software we may develop could decrease after the development cycle has commenced, and we could be unable to avoid costs associated with the development of any such software. If we expend a significant amount of resources on research and development and our efforts do not lead to the timely introduction or improvement of software that is competitive in our current or future markets, it could harm our business.

Our continued innovation may not generate revenue or yield expected benefits.

As a business focused on innovation, we expect to continue developing new software and products both internally and through acquisitions. These offerings may focus either on our existing markets or other markets in which we see opportunities. We may not receive revenue from these investments sufficient to either grow our business or cover the related development or acquisition costs.

If we lose our senior executives, we may be unable to achieve our business objectives.

We currently depend on the continued services and performance of James Scapa, our chief executive officer, and other senior executives. Many members of this executive team have served the Company for more than 15 years, with Mr. Scapa having served since our founding in 1985. Loss of Mr. Scapa's services or those of other senior executives could delay or prevent the achievement of our business objectives.

If we are unable to attract and retain key personnel, we may be unable to achieve our business objectives.

Our business is dependent on our ability to attract and retain highly skilled software engineers, salespeople, and support teams. There is significant industry competition for these individuals. We have many employees whose equity awards in our company are fully vested and may increase their personal wealth, which could affect their decision to remain with the Company. Failure to attract or retain key personnel could delay or prevent the achievement of our business objectives.

Defects or errors in our software could result in loss of revenue or harm to our reputation.

Our software is complex and, despite extensive testing and quality control, may contain undetected or perceived bugs, defects, errors, or failures. From time to time we have found defects or errors in our software and we may discover additional defects in the future. We may not find defects or errors in new or enhanced software before release and these defects or errors may not be discovered by us or our customers until after they have used the software. We have in the past issued, and may in the future need to issue, corrective releases or updates of our software to remedy bugs, defects and errors or failures. The occurrence of any real or perceived bugs, defects, errors, or failures could result in:

- lost or delayed market acceptance of our software;
- delays in payment to us by customers;
- injury to our reputation;
- diversion of our resources;
- loss of competitive position;
- claims by customers for losses sustained by them;
- breach of contract claims or related liabilities;
- increased customer support expenses or financial concessions; and
- increased insurance costs.

Any of these problems could harm our business.

Acquisitions may dilute our stockholders, disrupt our core business, divert our resources, or require significant management attention.

Most of our software has been developed internally with acquisitions used to augment our capabilities. We may not effectively identify, evaluate, integrate, or use acquired technology or personnel from prior or future acquisitions, or accurately forecast the financial impact of an acquisition, including accounting charges.

After the completion of an acquisition, it is possible that our valuation of such acquisition for purchase price allocation purposes may change compared to initial expectations and result in unanticipated write-offs or charges, impairment of our goodwill, or a material change to the fair value of the assets and liabilities associated with a particular acquisition.

We may pay cash, incur debt, or issue equity securities to fund an acquisition. The payment of cash will decrease available cash. The incurrence of debt would likely increase our fixed obligations and could subject us to restrictive covenants or obligations. The issuance of equity securities would likely be dilutive to our stockholders. We may also incur unanticipated liabilities as a result of acquiring companies. Future acquisition activity may disrupt our core business, divert our resources, or require significant management attention.

Failure to protect and enforce our proprietary technology and intellectual property rights could substantially harm our business.

The success of our business depends, in part, on our ability to protect and enforce our proprietary technology and intellectual property rights, including our trade secrets, patents, trademarks, copyrights, and other intellectual property. We attempt to protect our intellectual property under trade secret, patent, trademark, and copyright laws. Despite our efforts, we may not be able to protect our proprietary technology and intellectual property rights, if we are unable to enforce our rights or if we do not detect unauthorized use of our intellectual property. It may be possible for unauthorized third parties to copy our technology and use information that we regard as proprietary to create products and services that compete with ours. Provisions in our licenses protect against unauthorized use, copying, transfer and disclosure of our technology, but such provisions may be difficult to enforce or are unenforceable under the laws of certain jurisdictions and countries. The laws of some countries do not protect proprietary rights to the same extent as the laws of the United States. Our international activities expose us to unauthorized copying and use of our technology and proprietary information.

We primarily rely on our unpatented proprietary technology and trade secrets. Despite our efforts to protect our proprietary technology and trade secrets, unauthorized parties may attempt to misappropriate, reverse engineer or otherwise obtain and use them. The contractual provisions that we enter into with employees, consultants, partners, vendors and customers may not be sufficient to prevent unauthorized use or disclosure of our proprietary technology or trade secrets and may not provide an adequate remedy in the event of unauthorized use or disclosure of our proprietary technology or trade secrets.

Policing unauthorized use of our technologies, software and intellectual property is difficult, expensive and time-consuming, particularly in countries where the laws may not be as protective of intellectual property rights as those in the United States and where mechanisms for enforcement of intellectual property rights may be weak. We may be unable to detect or determine the extent of any unauthorized use or infringement of our software, technologies or intellectual property rights.

From time to time, we may need to engage in litigation or other administrative proceedings to protect our intellectual property rights or to defend against allegations by third parties that we have infringed or misappropriated their intellectual property rights, including in connection with requests for indemnification by our customers who may face such claims. We have been approached and may be approached in the future by certain of our customers to indemnify them against third party intellectual property claims. Litigation and/or any requests for indemnification by our customers could result in substantial costs and diversion of resources and could negatively affect our business and revenue. If we are unable to protect and enforce our intellectual property rights, our business may be harmed.

Intellectual property disputes could result in significant costs and harm our business.

Intellectual property disputes may occur in the markets in which we compete. Many of our competitors are large companies with significant intellectual property portfolios, which they may use to assert claims of infringement, misappropriation or other violations of intellectual property rights against us, or our customers. Any allegation of infringement, misappropriation or other violation of intellectual property rights by a third party, even those without merit, could cause us to incur substantial costs defending against the claim, could distract our management from our business, and could cause uncertainty among our customers or prospective customers, all of which could have an adverse effect on our business or revenue.

Our agreements may include provisions that require us to indemnify others for losses suffered or incurred as a result of our infringement of a third party's intellectual property rights infringement, including certain of our employees and customers.

An adverse outcome of a dispute or an indemnity claim may require us to:

- pay substantial damages;
- cease licensing our software or portions of it;
- develop non-infringing technologies;
- acquire or license non-infringing technologies; and
- make substantial indemnification payments.

Any of the foregoing or other damages could harm our business, decrease our revenue, increase our expenses or negatively impact our cash flow.

Security breaches, computer malware, computer hacking attacks and other security incidents could harm our business, reputation, brand and operating results.

Security incidents have become more prevalent across industries and may occur on our systems. Security incidents may be caused by, or result in but are not limited to, security breaches, computer malware or malicious software, computer hacking, unauthorized access to confidential information, denial of service attacks, security system control failures in our own systems or from vendors we use, email phishing, software vulnerabilities, social engineering, sabotage and drive-by downloads. Such security incidents, whether intentional or otherwise, may result from actions of hackers, criminals, nation states, vendors, employees or customers.

We may experience disruptions, data loss, outages and other performance problems on our systems due to service attacks, unauthorized access or other security related incidents. Any security breach or loss of system control caused by hacking, which involves efforts to gain unauthorized access to information or systems, or to cause intentional malfunctions or loss, modification or corruption of data, software, hardware or other computer equipment and the inadvertent transmission of computer malware could harm our business.

In addition, our software stores and transmits customers' confidential business information in our facilities and on our equipment, networks, corporate systems and in the cloud. Security incidents could expose us to litigation, remediation costs, increased costs for security measures, loss of revenue, damage to our reputation and potential liability. Our customer data and corporate systems and security measures may be compromised due to the actions of outside parties, employee error, malfeasance, capacity constraints, a combination of these or otherwise and, as a result, an unauthorized party may obtain access to our data or our customers' data. Outside parties may attempt to fraudulently induce our employees to disclose sensitive information in order to gain access to our customers' data or our information. We must continuously examine and modify our security controls and business policies to address new threats, the use of new devices and technologies, and these efforts may be costly or distracting.

Because the techniques used to obtain unauthorized access, disable or degrade service, or sabotage systems change frequently or may be designed to remain dormant until a predetermined event and often are not recognized until launched against a target, we may be unable to anticipate these techniques or implement sufficient control measures to defend against these techniques. Though it is difficult to determine what harm may directly result from any specific incident or breach, any failure to maintain confidentiality, availability, integrity, performance and reliability of our systems and infrastructure may harm our reputation and our ability to retain existing customers and attract new customers. If an actual or perceived security incident occurs, the market perception of the effectiveness of our security controls could be harmed, our brand and reputation could be damaged, we could lose customers, and we could suffer financial exposure due to such events or in connection with remediation efforts, investigation costs, regulatory fines and changed security control, system architecture and system protection measures.

International operations expose us to risks inherent in international activities.

Operating in international markets requires significant resources and management attention and subjects us to regulatory, economic and political risks that are different from those in the United States. We face risks in doing business internationally that could adversely affect our business, including:

- the need to localize and adapt our software for specific countries, including translation into foreign languages and associated expenses;
- foreign exchange risk;
- import and export restrictions and changes in trade regulation, including uncertainty regarding renegotiation of international trade agreements and partnerships;
- sales and customer service challenges associated with operating in different countries;
- enhanced difficulties of integrating any foreign acquisitions;
- difficulties in staffing and managing foreign operations and working with foreign partners;
- different pricing environments, longer sales cycles, longer accounts receivable payment cycles, and collections issues;
- compliance challenges related to the complexity of multiple, conflicting and changing governmental laws and regulations, including the Foreign Corrupt Practices Act of 1977, or the FCPA, employment, ownership, tax, privacy and data protection laws and regulations;
- limitations on enforcement of intellectual property rights;
- more restrictive or otherwise unfavorable government regulations;
- increased financial accounting and reporting burdens and complexities;
- restrictions on the transfer of funds;

- withholding and other tax obligations on remittance and other payments made by our subsidiaries; and
- unstable regional, economic and political conditions.

Our inability to manage any of these risks successfully, or to comply with these laws and regulations, could reduce our sales and harm our business.

We may lose customers if our software does not work seamlessly with our customers' existing software.

Our customers may use our software, which in many instances has been designed to seamlessly interface with software from some of our competitors, together with their own software and software they license from third parties. If our software ceases to work seamlessly with our customers' existing software applications, we may lose customers.

Many of our customers use our software and services to design and develop their products, which when built and used may expose us to claims.

Many of our customers use our software and services, together with software and services from other third parties and their own resources, to assist in the design and development of products intended to be used in a commercial setting. To the extent our customers design or develop a product that results in potential liability, including product liability, we may be included in resulting litigation. We may be subject to litigation defense costs or be subject to potential judgments or settlement costs for which we may not be fully covered by insurance, which would result in an increase of our expenses.

We also license certain of our software on Altair branded computer hardware, which we acquire from original equipment manufacturers, which we refer to as OEMs, exposing us to potential liability for the hardware, such as product liability. To the extent this liability is greater than the warranty and liability protection from our OEM, we may incur additional expenses, which may be significant.

If we fail to educate and train our users regarding the use and benefits of our software, we may not generate additional revenue.

Our software is complex and highly technical. We continually educate and train our existing and potential users regarding the depth, breadth, and benefits of our software including through classroom and online training. If these users do not receive education and training regarding the use and benefits of our software, or the education and training is ineffective, they may not increase their usage of our software. We may incur costs of training directly related to this activity prior to generating additional revenue.

If we are unable to match engineers to open positions in our CES business or are otherwise unable to grow our CES business, our revenue could be adversely affected.

We operate our client engineering services business by hiring engineers and data scientists for placement at a customer site for specific customer-directed assignments and pay them only for the duration of the placement. The success of this business is dependent upon our ability to recruit and retain highly skilled, qualified engineers to meet the requirements of our customers and to maintain ongoing relationships with these customers. Our CES business constituted approximately 11% and 12% of our total revenues for the year ended December 31, 2019 and 2018, respectively. Some of our customers operate their engineering personnel needs through managed service providers, or MSPs. A significant percentage of the engineers we place, either directly or through MSPs, are with U.S.-based customers and are citizens of countries other than the United States. In the event these engineers are unable to enter into, or remain in, the United States legally, we may be unable to match engineers with the appropriate skill sets matched to open customer positions. If we are unable to attract highly skilled, qualified engineers because of competitive factors or immigration laws, or otherwise fail to match engineers to open customer positions, our revenue may be adversely affected.

Our sales to government agencies and their suppliers may be subject to reporting and compliance requirements.

Our customers include agencies of the various governments, including, but not limited to the United States, and their suppliers of products and services. These customers may procure our software and services through various governments' mandated procurement regulations. Because of governmental reporting and compliance requirements, we may incur unexpected costs. Government agencies and their suppliers may have statutory, contractual or other legal rights to terminate contracts for convenience or due to a default, and any such termination may adversely affect our future operating results.

We may require additional capital to support our business, which may not be available on acceptable terms.

We expect to continue to make investments in our business, which may require us to raise additional funds. We may raise these funds through either equity or debt financings. Issuances of equity or convertible debt securities may significantly dilute stockholders and any new equity securities could have rights, preferences and privileges superior to those holders of our Class A common stock. In addition to the restrictions under our current credit agreement, any future debt financings could contain restrictive covenants relating to our capital raising activities and other financial and operational matters, which may make it more difficult for us to obtain additional capital, manage our business and pursue business opportunities, including potential acquisitions.

We may not be able to obtain additional financing on terms favorable to us. If we are unable to obtain adequate financing or financing on terms satisfactory to us when we require it, our ability to continue to support our growth, develop new software or add capabilities and enhancements to our existing software and respond to business challenges could be significantly impaired, and our business may be adversely affected.

Our loan agreements contain operating and financial covenants that may restrict our business and financing activities.

Our credit agreement, as amended, provides for an initial aggregate commitment amount of $150 million, with a sublimit for the issuance of letters of credit of up to $5 million and a sublimit for swing line loans of up to $5 million and matures on December 15, 2023 (the “2019 Amended Credit Agreement”). Our 2019 Amended Credit Agreement is unconditionally guaranteed by us and all existing and subsequently acquired controlled domestic subsidiaries. It is also collateralized by a first priority, perfected security interest in, and mortgages on, substantially all of our tangible assets. The 2019 Amended Credit Agreement contains operating financial restrictions and covenants, including liens, limitations on indebtedness, fundamental changes, limitations on guarantees, limitations on sales of assets and sales of receivables, dividends, distributions and other restricted payments, transactions with affiliates, prepayment of indebtedness and limitations on loans and investments in each case subject to certain exceptions. In addition, the 2019 Amended Credit Agreement contains financial covenants relating to maintaining a minimum interest coverage ratio of 3.0 to 1.0, a maximum senior secured leverage ratio of 3.0 to 1.0, and maximum net leverage ratio of 5.0 to 1.0, as defined in the 2019 Amended Credit Agreement. The restrictions and covenants in the 2019 Amended Credit Agreement, as well as those contained in any future debt financing agreements that we may enter into, may restrict our ability to finance our operations and engage in, expand or otherwise pursue our business activities and strategies. Our ability to comply with these covenants and restrictions may be affected by events beyond our control, and breaches of these covenants and restrictions could result in a default under the loan agreement and any future financing agreements that we may enter into.

We operate internationally and must comply with employment and related laws in various countries, which may, in turn, result in unexpected expenses.

We are subject to a variety of domestic and foreign employment laws, including those related to safety, discrimination, whistle-blowing, privacy and data protection, employment of unauthorized or undocumented employees, classification of employees, wages, statutory benefits, and severance payments. Such laws are subject to change as a result of judicial decisions or otherwise, and there can be no assurance that we will not be found to have violated any such laws in the future. Such violations could lead to the assessment of significant fines against us by federal, state or foreign regulatory authorities or to the award of damages claims, including severance payments, against us in judicial or administrative proceedings by employees or former employees, any of which would reduce our net income or increase our net loss.

Changes in government trade, immigration or currency policies may harm our business.

We operate our business globally in multiple countries that have policies and regulations relating to trade, immigration and currency, which may change. Governments may change their trade policies by withdrawing from negotiations on new trade policies, renegotiating existing trade agreements, imposing tariffs or imposing other trade restrictions or barriers. Any such changes may result in:

- changes in currency exchange rates;
- changes in political or economic conditions;
- import or export licensing requirements or other restrictions on technology imports and exports;
- laws and business practices favoring local companies;
- changes in diplomatic and trade relationships;
- modification of existing or implementation of new tariffs;
- imposition or increase of trade barriers; or
- establishment of new trade or currency restrictions.

Any of these changes, changes in immigration policies, government intervention in currency valuation or other government policy changes may adversely impact our ability to sell software and services, which could, in turn, harm our revenues and our business. We are headquartered in the United States and may be particularly impacted by changes affecting the United States.

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

We use open source software in some of our software and expect to continue to use open source software in the future. Although we monitor our use of open source software to avoid subjecting our software to conditions we do not intend, we may face allegations from others alleging ownership of, or seeking to enforce the terms of, an open source license, including by demanding release of the open source software, derivative works, or our proprietary source code that was developed using such software. These allegations could also result in litigation. The terms of many open source licenses have not been interpreted by United States courts. There is a risk that these licenses could be construed in a way that could impose unanticipated conditions or restrictions on our ability to commercialize our software. In such an event, we may be required to seek licenses from third parties to continue commercially offering our software, to make our proprietary code generally available in source code form, to re-engineer our software or to discontinue the sale of our software if re-engineering could not be accomplished on a timely basis, any of which could adversely affect our business and revenue.

The use of open source software subjects us to a number of other risks and challenges. Open source software is subject to further development or modification by anyone. Others may develop such software to be competitive with or no longer useful by us. It is also possible for competitors to develop their own solutions using open source software, potentially reducing the demand for our software. If we are unable to successfully address these challenges, our business and operating results may be adversely affected, and our development costs may increase.

We currently open source certain of our software and may open source other software in the future, which could have an adverse effect on our revenues and expenses.

We offer our open matrix language, or OML, source code and a portion of our Altair PBS workload management software in an open source version to generate additional usage and broaden user-community development and enhancement of the software. We offer related software and services on a paid basis. We believe increased usage of open source software leads to increased purchases of these related paid offerings. We may offer additional software on an open source basis in the future. There is no assurance that the incremental revenues from related paid offerings will outweigh the lost revenues and incurred expenses attributable to the open sourced software.

Our revenue mix may vary over time, which could harm our gross margin and operating results.

Our revenue mix may vary over time due to a number of factors, including the mix of term-based licenses and perpetual licenses. Due to the differing revenue recognition policies applicable to our term-based licenses, perpetual licenses and professional services, shifts in the mix between subscription and perpetual licenses from quarter to quarter, or increases or decreases in revenue derived from our professional engineering services, which have lower gross margins than our software services, could produce substantial variation in revenues recognized even if our billings remain consistent. Our gross margins and operating results could be harmed by changes in revenue mix and costs, together with other factors, including: entry into new markets or growth in lower margin markets; entry into markets with different pricing and cost structures; pricing discounts; and increased price competition. Any one of these factors or the cumulative effects of certain of these factors may result in significant fluctuations in our gross margin and operating results. This variability and unpredictability could result in our failure to meet internal expectations or those of securities analysts or investors for a particular period. If we fail to meet or exceed such expectations for these or any other reasons, the market price of our common stock could decline.

The estimates of market opportunity and forecasts of market growth included in our periodic reports or other public disclosures may prove to be inaccurate, and even if the market in which we compete achieves the forecasted growth, our business could fail to grow at similar rates, if at all.

Market opportunity estimates and growth forecasts included in our periodic reports or other public disclosures, including those we have generated ourselves, are subject to significant uncertainty and are based on assumptions and estimates that may not prove to be accurate. Even if the market in which we compete meets the size estimates and growth forecasted in our periodic reports or other public disclosures, our business could fail to grow for a variety of reasons, which would adversely affect our results of operations.

We are subject to governmental export and import controls that could impair our ability to compete in international markets due to licensing requirements and subject us to liability if we are not in compliance with applicable laws.

Our software, services and hardware are subject to export control and import laws and regulations. As a company headquartered in the United States we are subject to regulations, including the International Traffic in Arms Regulations, or ITAR, and Export Administration Regulations, or EAR, United States Customs regulations and various economic and trade sanctions regulations administered by the United States Treasury Department’s Office of Foreign Assets Control, presenting further risk of unexpected reporting and compliance costs. Compliance with these regulations may also prevent and restrict us from deriving revenue from potential customers in certain geographic locations for certain of our technologies.

If we fail to comply with these laws and regulations, we and certain of our employees could be subject to substantial civil or criminal penalties, including the possible loss of export or import privileges, fines which may be imposed on us and responsible employees or managers and, in extreme cases, the incarceration of responsible employees or managers. Obtaining the necessary authorizations, including any required license, for a particular sale may be time-consuming, is not guaranteed and may result in the delay or loss of sales opportunities. In addition, changes in our software or changes in applicable export or import regulations may create delays in the introduction and sale of our software in international markets, prevent our customers with international operations from deploying our software or, in some cases, prevent the export or import of our software to certain countries, governments or persons altogether.

We incorporate encryption technology into portions of our software. Various countries regulate the import of certain encryption technology, including through import permitting and licensing requirements, and have enacted laws that could limit our ability to distribute our software or could limit our customers' ability to implement our software in those countries. Encrypted software and the underlying technology may also be subject to export control restrictions. Governmental regulation of encryption technology and regulation of imports or exports of encryption products, or our failure to obtain required import or export approval for our software, when applicable, could harm our international sales and adversely affect our revenue. Compliance with applicable regulatory requirements regarding the export of our software, including with respect to new releases of our software, may create delays in the introduction of our software in international markets, prevent our customers with international operations from deploying our software throughout their globally-distributed systems or, in some cases, prevent the export of our software to some countries altogether.

United States export control laws and economic sanction programs prohibit the shipment of certain software and services to countries, governments and persons that are subject to United States economic embargoes and trade sanctions, including, but not limited to, Iran, Cuba, North Korea, Syria and Sudan. Any violations of such economic embargoes and trade sanction regulations could have negative consequences, including government investigations, penalties and reputational harm.

Any change in export or import regulations, economic sanctions or related legislation, shift in the enforcement or scope of existing regulations, or change in the countries, governments, persons or technologies targeted by such regulations, could result in decreased use of our software by, or in our decreased ability to export or license our software to, existing or potential customers with international operations. Any decreased use of our software or limitation on our ability to export or license our software could adversely affect our business.

Our business is subject to a wide range of laws and regulations, and our failure to comply with those laws and regulations could harm our business.

Our business is subject to regulation by various federal, state, local and foreign governmental agencies, including agencies responsible for monitoring and enforcing employment and labor laws, workplace safety and environmental laws, privacy and data protection laws, financial services laws, anti-bribery laws, import and export controls, federal securities laws and tax laws and regulations. In certain foreign jurisdictions, these regulatory requirements may be more stringent than those in the United States. These laws and regulations are subject to change over time and thus we must continue to monitor and dedicate resources to ensure continued compliance. Non-compliance with applicable regulations or requirements could subject us to investigations, sanctions, mandatory product recalls, enforcement actions, disgorgement of profits, fines, damages, civil and criminal penalties or injunctions. If any governmental sanctions are imposed, or if we do not prevail in any possible civil or criminal litigation, our business, operating results, and financial condition could be materially adversely affected. In addition, responding to any action will likely result in a significant diversion of management's attention and resources and an increase in professional fees. Enforcement actions and sanctions could harm our business, operating results and financial condition.

If we or any of our employees violate the FCPA, the U.K. Bribery Act or similar anti-bribery laws we could be adversely affected.

The FCPA, the U.K. Bribery Act and similar anti-bribery laws generally prohibit companies and their intermediaries from authorizing, offering or providing, directly or indirectly, improper payments or benefits for the purpose of obtaining or retaining business to government officials, political parties and private-sector recipients. United States based companies are required to maintain records that accurately and fairly represent their transactions and have an adequate system of internal accounting controls. We operate in areas of the world that potentially experience corruption by government officials to some degree and, in certain circumstances, compliance with anti-bribery laws may conflict with local customs and practices. We cannot assure that our employees, resellers or distributors will not engage in prohibited conduct. If we are found to be in violation of the FCPA, the U.K. Bribery Act or other anti-bribery laws, we could suffer criminal or civil penalties or other sanctions.

Business interruptions could adversely affect our business.

Our operations and our customers are vulnerable to interruptions by fire, flood, earthquake, power loss, telecommunications failure, terrorist attacks, wars, environmental and climate change, and other events beyond our control. A catastrophic event that results in the destruction of any of our critical business or information technology systems could severely affect our ability to conduct normal business operations, including system interruptions, reputational harm, delays in our software development, breaches of data security and loss of critical data.

We rely on our network and third-party infrastructure and applications, internal technology systems, and our websites for our development, marketing, operational support, hosted services and sales activities. If these systems were to fail or be negatively impacted as a result of a natural disaster or other event, our ability to deliver software and training to our customers could be impaired.

Our business interruption insurance may not be sufficient to compensate us fully for losses or damages that may occur as a result of these events, if at all.

Our reported financial results may be adversely affected by changes in accounting principles generally accepted in the United States.

GAAP are subject to interpretation by the Financial Accounting Standards Board, or FASB, the United States Securities and Exchange Commission, or the SEC, and various bodies formed to promulgate and interpret appropriate accounting principles. A change in these principles or interpretations could have a significant effect on our reported financial results for periods prior and subsequent to such change. The adoption of new standards may require enhancements or changes in our systems and will continue to require significant time and effort of our financial management team.

We cannot predict the impact of all of the future changes to accounting principles or our accounting policies on our consolidated financial statements going forward, which could have a significant effect on our reported financial results, and could affect the reporting of transactions completed before the announcement of the change. In addition, if we were to change our critical accounting estimates, including those related to the recognition of license revenue and other revenue sources, our operating results could be significantly affected.

If our goodwill or intangible assets become impaired, we may be required to record a significant charge to earnings, which could harm our business.

Under GAAP, we review our intangible assets for impairment when events or changes in circumstances indicate the carrying value may not be recoverable. Goodwill is required to be tested for impairment at least annually. As of December 31, 2019 and 2018, respectively, we had $233.8 million and $210.5 million of goodwill and $66.8 million and $69.8 million of other intangible assets—net. An adverse change in market conditions, particularly if such change has the effect of changing one of our critical assumptions or estimates, could result in a change to the estimation of fair value that could result in an impairment charge.

We have significant deferred tax assets in the United States, which we will not use in future taxable periods.

As of December 31, 2019 and 2018, we had gross deferred tax assets, or DTAs, of $117.5 million and $93.6 million, respectively, primarily related to net operating loss carryforwards, tax credits, share-based compensation, deferred revenue, and capitalized research and development expenses. We are entitled to a United States federal tax deduction when non-qualified stock options, or NSOs, are exercised. In connection with our IPO, a significant number of NSOs were exercised resulting in a tax deduction for United States income tax purposes. This deduction, in conjunction with our other expected deferred tax asset reversals, resulted in our needing to establish a valuation allowance for $47.0 million in 2017 for the United States DTAs. Our ability to utilize any net operating losses or tax credits may be limited under provisions of the Internal Revenue Code of 1986, or the Code, if we undergo an ownership change after our IPO (generally defined as a greater than 50-percentage-point cumulative change, by value, in the equity ownership of certain stockholders over a rolling three-year period). We also inherited net operating losses, or NOLs, from the acquisition of Datawatch, which are subject to specific limitations on usage. We may or may not be able to realize the benefits of the acquired NOLs due to a number of factors, including those enumerated above. We may also be unable to realize our tax credit carryforwards prior to their expiry.

If our global tax methodology is challenged our tax expense may increase.

As a global business headquartered in the United States, we are required to pay tax in a number of different countries, exposing us to transfer pricing and other adjustments. Transfer pricing refers to the methodology of allocating revenue and expenses for tax purposes to particular countries. Taxing authorities may challenge our transfer pricing methodology, which if successful could increase our professional expenses and result in one-time or recurring tax charges, a higher worldwide effective tax rate, reduced cash flows, and lower overall profitability of our operations.

Our tax expense could be impacted depending on the applicability of withholding and other taxes including taxes on software licenses and related intercompany transactions under the tax laws of jurisdictions in which we have business operations. Our future income taxes may fluctuate if there is a change in the mix of income in the applicable tax jurisdictions in which we operate. We are subject to review and audit by the United States and other taxing authorities. Any review or audit could increase our professional expenses and, if determined adversely, could result in unexpected costs.

Sales and use, value-added and similar tax laws and rates vary by jurisdiction. Any of these jurisdictions may assert that such taxes are applicable, which could result in tax assessments, penalties and interest.

New legislation or tax-reform policies that would change U.S. or foreign taxation of international business activities, including uncertainties in the interpretation and application of the 2017 Tax Cuts and Jobs Act, could materially affect our tax obligations and effective tax rate.

We are subject to income tax in the numerous jurisdictions in which we operate. Reforming the taxation of international businesses has been a priority for politicians, and a wide variety of potential changes have been proposed. Some proposals, several of which have been enacted, impose incremental taxes on gross revenue, regardless of profitability. Furthermore, it is reasonable to expect that global taxing authorities will be reviewing current legislation for potential modifications in reaction to the implementation of the 2017 Tax Cuts and Jobs Act (the "Tax Act") in the U.S. Due to the large and expanding scale of our international business activities, any changes in the taxation of such activities may increase our worldwide effective tax rate and the amount of taxes we pay and seriously harm our business.

In the U.S., the Tax Act enacted on December 22, 2017 significantly affected U.S. tax law by changing how the U.S. imposes income tax on multinational corporations. The U.S. Department of Treasury has broad authority to issue regulations and interpretative guidance that may significantly impact how we will apply the law and impact our results of operations in the period issued.

The Tax Act requires complex computations not previously provided in U.S. tax law. As such, the application of accounting guidance for such items remain uncertain. Further, compliance with the Tax Act and the accounting for such provisions requires an accumulation of information not previously required or regularly produced. As additional regulatory guidance is issued by the applicable taxing authorities, as accounting treatment is clarified, and as we perform additional analysis on the application of the law, our effective tax rate could be materially different.

In addition to our software, we source, distribute and sell products, which may expose us to product liability claims, product recalls, and warranty claims that could be expensive and harm our business.

We source, distribute and sell products through certain of our wholly owned subsidiaries. To the extent these products do not perform as expected, cause injury or death or are otherwise unsuitable for usage, we may be held liable for claims, including product liability and other claims. A product liability claim, any product recalls or an excessive warranty claim, whether arising from defects in design or failure in our supply chains could negatively affect our sales or require a change in the design process or our product sourcing, any of which may harm our reputation and business.

Failure to protect and enforce toggled's proprietary technology and intellectual property rights could substantially harm toggled's lighting business.

Part of the success of toggled's lighting business depends on our ability to protect and enforce toggled's proprietary rights, including its patents, trademarks, copyrights, trade secrets and other intellectual property rights. As of December 31, 2019, toggled had 170 issued patents and 42 published patent applications worldwide. We attempt to protect toggled's intellectual property under patent, trademark, copyright, and trade secret laws. However, the steps we take to protect its intellectual property may be inadequate. We will not be able to protect toggled's intellectual property if we are unable to enforce its rights or if we do not detect unauthorized use of its intellectual property. It may be possible for unauthorized third parties to copy toggled's technology and use information that it regards as proprietary to create products that compete with toggled's products. Some license provisions protecting against unauthorized use, copying, transfer and disclosure of toggled's technology may be unenforceable under the laws of certain jurisdictions and foreign countries. Further, the laws of some countries do not protect proprietary rights to the same extent as the laws of the United States.

The process of obtaining patent protection is uncertain, expensive and time-consuming, and we may not be able to prosecute all necessary or desirable patent applications at a reasonable cost or in a timely manner. In addition, issuance of a patent does not guarantee that we have an absolute right to practice our patented technology, or that we have the right to exclude others from practicing our patented technology. As a result, we may not be able to obtain adequate patent protection or to enforce our issued patents effectively.

From time to time, toggled enforces its patents and other intellectual property rights including through initiating litigation. Any such litigation could result in substantial costs and diversion of resources and could negatively affect toggled's business, operating results, financial condition and cash flows. If toggled is unable to protect toggled's intellectual property rights, its business, operating results and financial condition will be harmed.

Assertions by third parties of infringement or other violations by toggled of their intellectual property rights, or other lawsuits brought against toggled, could result in significant costs and substantially harm toggled's business.

Patent and other intellectual property disputes are common in the markets in which toggled competes. Some of toggled's competitors, own large numbers of patents, copyrights, trademarks and trade secrets, which they may use to assert claims of infringement, misappropriation or other violations of intellectual property rights against toggled or its customers. As the number of patents and competitors in this market increases, allegations of infringement, misappropriation and other violations of intellectual property rights may increase. Any allegation of infringement, misappropriation or other violation of intellectual property rights by a third party, even those without merit, could cause toggled to incur substantial costs and resources defending against the claim, which could have an adverse effect on toggled's business.

Our business may collect personal information and is subject to data protection laws.

Companies that collect personal information are required to comply with data protection laws adopted by the United States and various state and foreign governments, including the European Union General Data Protection Regulation ("GDPR"), and the implementing legislation adopted by member states of the European Union. These data protection laws regulate the collection, use, storage, disclosure and security of personal information, such as names, email addresses and, in some jurisdictions, Internet Protocol addresses and other online indentifiers, business contact data, and customer profiles, that may be used to identify or locate an individual, including a customer or an employee.

Data protection laws and regulations may require us to implement privacy and security policies, permit individuals to access, correct and delete their own personal information collected, stored or maintained by us, inform individuals of security breaches that affect their personal information, and, in some cases, obtain individuals' consent to use their personal information for certain purposes. Governments could require that any personally identifiable information collected in a country not be disseminated outside of that country. We also may find it necessary or desirable to join industry or other self-regulatory bodies or other information security, or data protection, related organizations that require compliance with their rules pertaining to information security and data protection. We may agree to be bound by additional contractual obligations relating to our collection, use and disclosure of personal, financial and other data. Our failure to comply with these data protection laws or any actual or suspected security incident may result in governmental actions, fines and non-monetary penalties, or civil actions, which may harm our business.

Additionally, on January 2, 2020, the California Consumer Privacy Act, or the CCPA, became effective. CCPA protects the personal information of California residents, households and devices by placing additional requirements on the entities that collect, process, store and disclose personal information. The CCPA also provides for civil penalties for violations, as well as a private right of action for data breaches that may increase data breach litigation. The impact of this legislation is far-reaching and may require us to modify our data processing practices and policies and incur substantial costs and expenses in an effort to comply. California legislators have indicated their intention to further amend the CCPA in 2020. It remains unclear what, if any, additional modifications will be made to this legislation or how the regulators, courts or commercial parties will interpret the CCPA. We may be subject to new data protection laws including legislation currently pending in other states including Washington, Virginia and New York. We may also from time to time be subject to, or face assertions that we are subject to, additional obligations relating to personal information by contract or due to assertions that self-regulatory obligations or industry standards apply to our practices. Our failure to comply with these data protection laws or any actual or suspected security incident may result in governmental actions, fines and non-monetary penalties, or civil liability, which may harm our business.

Proposed or new legislation and regulations could significantly affect our business.

The GDPR became effective in May 2018 and applies to all of our business conducted in Europe. The GDPR introduces a number of new obligations for subject companies and we will need to continue dedicating financial resources and management time to GDPR compliance in the coming years. The GDPR enhances the obligations placed on companies that control or process personal data including, for example, expanded disclosures about how personal data is to be used, new mechanisms for obtaining consent from data subjects, new controls for data subjects with respect to their personal data (including by enabling them to exercise rights to erasure and data portability), limitations on retention of personal data and mandatory data breach notifications. Additionally, the GDPR places companies under obligations relating to data transfers and the security of the personal data they process. The GDPR provides that supervisory authorities in the European Union may impose administrative fines for certain infringements of the GDPR of up to EUR 20,000,000 or 4% of an undertaking's total, worldwide, annual turnover of the preceding financial year, whichever is higher. Individuals who have suffered damage as a result of a subject company's non-compliance with the GDPR also have the right to seek compensation from such company. Given the breadth of the GDPR, compliance with its requirements is likely to continue to require significant expenditure of resources on an ongoing basis, and there can be no assurance that the measures we have taken for the purposes of compliance will be successful in preventing breach of the GDPR. Given the potential fines, liabilities and damage to our reputation in the event of an actual or perceived breach of the GDPR, such a breach may have an adverse effect on our business and operations.

Catastrophic events may adversely affect our business

Our company is a highly automated business which relies on our network infrastructure and enterprise applications, cloud-based services, internal technology systems and website for development, marketing, operational, support and sales activities. A disruption or failure of these systems or in those of our external service providers, in the event of a major storm, earthquake, fire, telecommunications failure, cyber-attack, terrorist attack or other catastrophic event could cause system interruptions, reputational harm, delays in our product development and loss of critical data and could materially and adversely affect our ability to operate our business.

Risks related to ownership of our Class A common stock

An active public trading market for our Class A common stock may not be sustained.

Prior to our initial public offering in the fourth quarter of 2017, there had been no public market or active private market for trading shares of our Class A common stock. Our Class A common stock is listed on the Nasdaq Global Select Market under the symbol "ALTR." However, we cannot assure you that an active trading market will be sustained. The lack of an active market may impair your ability to sell your shares at the time you wish to sell them or at a price that you consider reasonable. The lack of an active market may also reduce the price of shares of Class A common stock. An inactive market may impair our ability to raise capital by selling shares and our ability to use our capital stock to acquire other companies or technologies. We cannot predict the prices at which our Class A common stock will trade.

The market price of our Class A common stock can be volatile.

The market price of our Class A common stock has and may continue to fluctuate from time to time. Our market price may continue to fluctuate substantially depending on a number of factors, many of which are beyond our control and may not be related to our operating performance. These fluctuations could cause you to lose all or part of your investment in our Class A common stock, since you might not be able to sell your shares at or above the price you paid for our Class A common stock. Factors that could cause fluctuations in the market price of our Class A common stock include the following:

- price and volume fluctuations in the overall stock market from time to time, including as a result of trends in the economy as a whole;
- volatility in the market prices and trading volumes of technology stocks;
- changes in operating performance and stock market valuations of other technology companies generally, or those in our industries in particular;
- the expiration of market stand-off or contractual lock-up agreements and sales of shares of our Class A common stock by us or our stockholders;
- the volume of shares of our Class A common stock available for public sale;
- additional shares of our Class A common stock being sold into the market by our existing stockholders, or the anticipation of such sales, including sales of our Class A common stock upon exercise of outstanding options or upon conversion of our Class B common stock into shares of Class A common stock;
- failure of financial analysts to maintain coverage of us, changes in financial estimates by any analysts who follow our company, or our failure to meet these estimates or the expectations of investors;
- the financial projections we may provide to the public, any changes in these projections or our failure to meet these projections;

- announcements by us or our competitors of new software or new or terminated significant contracts, commercial relationships or capital commitments;
- public analyst or investor reaction to our press releases, other public announcements and filings with the SEC;
- rumors and market speculation involving us or other companies in our industry;
- actual or anticipated changes or fluctuations in our operating results;
- actual or anticipated developments in our business, our customers' businesses, or our competitors' businesses or the competitive landscape generally;
- litigation involving us, our industry or both, or investigations by regulators into our operations or those of our competitors;
- developments or disputes concerning our intellectual property or our solutions, or third party proprietary rights;
- announced or completed acquisitions of businesses or technologies by us or our competitors;
- new laws or regulations or new interpretations of existing laws or regulations applicable to our business;
- changes in accounting standards, policies, guidelines, interpretations or principles;
- any major changes in our management or our board of directors;
- general economic conditions and slow or negative growth of our markets; and
- other events or factors, including those resulting from major weather events, war, potential global health issues, incidents of terrorism or responses to these events.

In addition, the stock market in general, and the market for technology companies in particular, have experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of those companies. Broad market and industry factors may affect the market price of our Class A common stock, regardless of our actual operating performance. In the past, following periods of volatility in the overall market and the market prices of a particular company's securities, securities class action litigation has often been instituted against that company. We may become the target of this type of litigation in the future. Securities litigation, if instituted against us, could result in substantial costs and divert our management's attention and resources from our business.

We do not intend to pay dividends in the foreseeable future. As a result, your ability to achieve a return on your investment will depend on appreciation in the price of our Class A common stock.

We have never declared or paid any cash dividends on our Class A common stock. We currently intend to retain all available funds and any future earnings for use in the operation of our business and do not anticipate paying any dividends on our Class A common stock in the foreseeable future. Any determination to pay dividends in the future will be at the discretion of our board of directors. Consequently, your only opportunity to achieve a return on your investment in our company will be if the market price of our Class A common stock appreciates and you sell your shares at a profit. There is no guarantee that the price of our Class A common stock that will prevail in the market will ever exceed the price that you paid.

We are incurring increased costs and devote additional management time as a result of operating as a public company.

As a public company, we are incurring legal, accounting and other expenses that we did not incur as a private company. We are subject to the reporting requirements of the Securities Exchange Act of 1934, as amended, or the Exchange Act, and are required to comply with the applicable requirements of the Sarbanes-Oxley Act of 2002, or SOX, and the Dodd-Frank Wall Street Reform and Consumer Protection Act, or Dodd-Frank, as well as rules and regulations subsequently implemented by the SEC and the Nasdaq Global Select Market, including the establishment and maintenance of effective disclosure and financial controls and changes in corporate governance practices.

As of December 31, 2018, we ceased to be an "emerging growth company", as defined by the JOBS Act, which has the effect of expanding disclosure and other obligations applicable to us, including, but not limited to, enhanced disclosure obligations regarding executive compensation in our periodic reports and proxy statements and the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved, along with accelerated compliance with SOX and earlier implementation of certain changes in GAAP such as revenue recognition and leasing standards. Compliance with these requirements increases our legal and financial compliance costs and makes some activities more time consuming and costly. In addition, our management and other personnel need to divert attention from operational and other business matters to devote time to these public company requirements. In particular, we have incurred, and expect to continue to incur, additional expenses and have devoted, and expect to continue to devote, additional management effort toward ensuring compliance with the requirements of Section 404 of SOX, as a result of our ceasing to be an emerging growth company. Although we have already hired additional employees to help comply with these requirements, we may need to further expand our legal and finance departments in the future, which will increase our costs and expenses.

If we fail to maintain effective internal controls, we may not be able to report financial results accurately or on a timely basis, or to detect fraud, which could have a material adverse effect on our business or share price.

Effective internal controls are necessary for us to provide reasonable assurance with respect to our financial reports and to effectively prevent financial fraud. Pursuant to SOX, we are required to periodically evaluate the effectiveness of the design and operation of our internal controls. Internal controls over financial reporting may not prevent or detect misstatements because of inherent limitations, including the possibility of human error or collusion, the circumvention or overriding of controls, or fraud. If we fail to maintain an effective system of internal controls, our business and operating results could be harmed, and we could fail to meet our reporting obligations, which could have a material adverse effect on our business and our share price.

As a public company, we are required to maintain internal controls over financial reporting and to report any material weaknesses in such internal controls. Section 404 of SOX requires annual management assessments of the effectiveness of our internal controls over financial reporting beginning with this Annual Report. We have designed, implemented and tested the internal control over financial reporting required to comply with this obligation, which was and is time consuming, costly, and complicated. As disclosed in Item 9A of our Annual Report on Form 10-K for the fiscal year ended December 31, 2018, we did not maintain effective controls over the income tax process for fiscal years 2018, 2017 and 2016. A material weakness is defined as a deficiency, or combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of our annual or interim financial statements will not be prevented or detected on a timely basis. While management identified and implemented changes to our internal controls over the income tax process to remediate the control deficiencies that led to this material weakness, and the material weakness has been remediated as of December 31, 2019, we cannot assure investors that we will not have other material weaknesses in the future. If we identify material weaknesses in our internal control over financial reporting in the future or if we are unable to successfully remediate the identified material weaknesses or, if we are unable to comply with the requirements of Section 404 in a timely manner or assert that our internal control over financial reporting is effective, investors may lose confidence in the accuracy and completeness of our financial reports and the market price of our Class A common stock could be negatively affected, and we could become subject to investigations by the stock exchange on which our securities are listed, the SEC, or other regulatory authorities, which could require additional financial and management resources.

We cannot predict the impact our capital structure may have on our stock price.

In July 2017, S&P Dow Jones, a provider of widely followed stock indices, announced that companies with multiple share classes, such as ours, will not be eligible for inclusion in certain of their indices. As a result, our Class A common stock will likely not be eligible for these stock indices. Additionally, FTSE Russell, another provider of widely followed stock indices, has stated that it plans to require new constituents of its indices to have at least five percent of their voting rights in the hands of public stockholders. Many investment funds are precluded from investing in companies that are not included in such indices, and these funds would be unable to purchase our Class A common stock. We cannot assure you that other stock indices will not take a similar approach to S&P Dow Jones or FTSE Russell in the future. Given the sustained flow of investment funds into passive strategies that seek to track certain indexes, exclusion from indices could make our Class A common stock less attractive to investors. As a result, the market price of our Class A common stock could be adversely affected.

If financial or industry analysts do not publish research or reports about our business or if they issue inaccurate or unfavorable commentary or downgrade our Class A common stock, our stock price and trading volume could decline.

The trading market for our Class A common stock may be influenced by the research and reports that industry or financial analysts publish about us or our business. We do not control these analysts, or the content and opinions included in their reports. As a relatively new public company, we may be slow to attract research coverage, and the analysts who publish information about our Class A common stock still have relatively little experience with our company, which could affect their ability to accurately forecast our results and make it more likely that we fail to meet their estimates. If any of the analysts who cover us issue an inaccurate or unfavorable opinion regarding our stock price, our stock price would likely decline. In addition, the stock prices of many companies in the technology industry have declined significantly after those companies have failed to meet, or often times failed to exceed, the financial guidance publicly announced by the companies or the expectations of analysts. If our financial results fail to meet, or fail to significantly exceed, our announced guidance or the expectations of analysts or public investors, analysts could downgrade our Class A common stock or publish unfavorable research about us. If one or more of these analysts cease coverage of our company or fail to publish reports on us regularly, we could lose visibility in the financial markets, which in turn could cause our stock price or trading volume to decline.

Future sales of substantial amounts of our Class A common stock may cause our stock price to decline.

Future sales of a substantial number of shares of our Class A common stock, particularly sales by our directors, executive officers and significant stockholders could adversely affect the market price of our Class A common stock and may make it more difficult to sell Class A common stock at a time and price that you deem appropriate. As of December 31, 2019, we had an aggregate of 41,271,363 shares of Class A common stock and 31,130,732 shares of Class B common stock outstanding.

All of the shares of Class A common stock sold in our initial public offering and June 2018 follow-on public offering are freely tradable without restrictions or further registration under the Securities Act of 1933, as amended, or the Securities Act, except for any shares held by our affiliates as defined in Rule 144 under the Securities Act.

Shares held by directors, executive officers and other affiliates are subject to volume limitations under Rule 144 under the Securities Act and various vesting agreements.

We have registered the offer and sale of an aggregate of approximately 19,960,830 shares of Class A common stock that have been issued or reserved for future issuance under our equity compensation plans on a Form S-8 registration statement. These shares can be freely sold in the public market upon issuance, unless they are held by "affiliates," as that term is defined in Rule 144 of the Securities Act. Additionally, the number of shares of Class A common stock available for grant and issuance under our 2017 Equity Incentive Plan is subject to an automatic annual increase on January 1 of each year beginning in 2018 by an amount equal to the lesser of (i) 3% of the number of shares of all classes of our common stock outstanding on December 31 of the preceding calendar year or (ii) a lesser number of shares of Class A common stock determined by our board of directors. We also intend to register the offer and sale of any shares of Class A common stock resulting from such increases. If the holders of these shares choose to sell a large number of shares, they could adversely affect the market price for our Class A common stock.

We may also issue shares of our Class A common stock or securities convertible into shares of our Class A common stock from time to time in connection with a financing, acquisition, investment or otherwise. Any such issuance could result in substantial dilution to our existing stockholders and cause the trading price of our Class A common stock to decline.

The dual class structure of our common stock has the effect of concentrating voting control with certain stockholders who hold shares of our Class B common stock, including our founders, certain of our directors and executive officers and affiliates, who hold in the aggregate approximately 90% of the voting power of our capital stock. This will limit or preclude your ability to influence corporate matters, including the election of directors, amendments of our organizational documents, and any merger, consolidation, sale of all or substantially all of our assets, or other major corporate transaction requiring stockholder approval.

Our Class B common stock has ten votes per share, and our Class A common stock has one vote per share. Our Class B stockholders, including our founders, certain of our directors and executive officers, and affiliates, hold, in the aggregate approximately 90% of the voting power of our capital stock. The ten-to-one voting ratio between our Class B and Class A common stock, results in the holders of our Class B common stock collectively controlling a majority of the combined voting power of our common stock and therefore being able to control all matters submitted to our stockholders for approval until 2029, or upon the occurrence of a triggering event at which time all shares of our Class B common stock will automatically convert into shares of our Class A common stock, or on an earlier date, as set forth in our Delaware certificate of incorporation.

This concentrated control will limit or preclude your ability to influence corporate matters for the foreseeable future, including the election of directors, amendments of our organizational documents, and any merger, consolidation, sale of all or substantially all of our assets, or other major corporate transaction requiring stockholder approval. In addition, this may prevent or discourage unsolicited acquisition proposals or offers for our capital stock that you may feel are in your best interest as one of our stockholders.

Future transfers by holders of our Class B common stock will generally result in those shares converting to Class A common stock, subject to the specific exceptions set forth in our Delaware certificate of incorporation, such as certain transfers effected for estate planning purposes and between or among our founders. The conversion of Class B common stock to Class A common stock will have the effect, over time, of increasing the relative voting power of those holders of Class B common stock who retain their shares in the long-term.

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

Our Delaware certificate of incorporation and bylaws contain provisions that could delay or prevent a change in control of our company that stockholders may consider favorable, including transactions in which stockholders might otherwise receive a premium for their shares. These provisions may also prevent or delay attempts by stockholders to replace or remove our current management or members of our board of directors. These provisions include:

- providing for a dual class common stock structure for 12 years following the completion of our IPO;
- providing for a classified board of directors with staggered three-year terms, which could delay the ability of stockholders to change the membership of a majority of our board of directors;
- authorizing our board of directors to issue shares of preferred stock and to determine the price and other terms of those shares, including preferences and voting rights, without stockholder approval;
- the requirement that a special meeting of stockholders may be called only by the chairman of our board of directors, our chief executive officer, our president, or a majority vote of our board of directors, which could delay the ability of our stockholders to force consideration of a proposal or to take action, including the removal of directors;
- requiring the affirmative vote of holders of at least 66 2/3% of the voting power of all of the then outstanding shares of the voting stock, voting together as a single class, to adopt, amend, or repeal provisions of (i) our certificate of incorporation relating to the issuance of preferred stock without stockholder approval, voting rights of our Class A common stock and our Class B common stock, and management of our business, and (ii) our bylaws relating to the ability of stockholders to call a special meeting and amending our bylaws in their entirety, which may inhibit the ability of an acquirer to effect such amendments to facilitate an unsolicited takeover attempt;
- the ability of our board of directors, by majority vote, to amend our bylaws, which may allow our board of directors to take additional actions to prevent an unsolicited takeover and inhibit the ability of an acquirer to amend our bylaws to facilitate an unsolicited takeover attempt; and
- requiring advance notice procedures with which stockholders must comply to nominate candidates to our board of directors or to propose matters to be acted upon at a stockholders' meeting, which may discourage or deter a potential acquirer from conducting a solicitation of proxies to elect the acquirer's own slate of directors or otherwise attempting to obtain control of us.

In addition, as a Delaware corporation, we are subject to Section 203 of the Delaware General Corporation Law. These provisions may prohibit large stockholders, in particular those owning 15% or more of our outstanding voting stock, from merging or combining with us for a certain period of time.

These and other provisions in our certificate of incorporation, our bylaws and under Delaware law could discourage potential takeover attempts, reduce the price that investors might be willing to pay for shares of our Class A common stock in the future and result in the market price being lower than it would be without these provisions.

Risks Related to Our Indebtedness

Our 0.250% Convertible Senior Notes due 2024, or the Convertible Notes, are effectively subordinated to our secured debt and any liabilities of our subsidiaries.

The Convertible Notes rank senior in right of payment to any of our indebtedness that is expressly subordinated in right of payment to the Convertible Notes; equal in right of payment to any of our liabilities that are not so subordinated; effectively junior in right of payment to any of our secured indebtedness (including all amounts outstanding under our revolving credit facility) to the extent of the value of the assets securing such indebtedness; and structurally junior to all indebtedness and other liabilities (including trade payables) of our subsidiaries. In the event of our bankruptcy, liquidation, reorganization or other winding up, our assets that secure debt ranking senior or equal in right of payment to the Convertible Notes (including all amounts outstanding under our revolving credit facility) will be available to pay obligations on the Convertible Notes only after the secured debt has been repaid in full from these assets, and the assets of our subsidiaries will be available to pay obligations on the Convertible Notes only after all claims senior to the Convertible Notes have been repaid in full. There may not be sufficient assets remaining to pay amounts due on any or all of the Convertible Notes then outstanding. The indenture governing the Convertible Notes will not prohibit us from incurring additional senior debt or secured debt, nor does it prohibit any of our subsidiaries from incurring additional liabilities.

The Convertible Notes are our obligations only and a substantial portion of our operations are conducted through, and a substantial portion of our consolidated assets are held by, our subsidiaries.

The Convertible Notes are our obligations exclusively and are not guaranteed by any of our operating subsidiaries. A substantial portion of our operations is conducted through, and a substantial portion of our consolidated assets is held by, our subsidiaries. Accordingly, our ability to service our debt, including the Convertible Notes, depends in part on the results of operations of our subsidiaries and upon the ability of such subsidiaries to provide us with cash, whether in the form of dividends, loans or otherwise, to pay amounts due on our obligations, including the Convertible Notes. Our subsidiaries are separate and distinct legal entities and have no obligation, contingent or otherwise, to make payments on the Convertible Notes or to make any funds available for that purpose. In addition, dividends, loans or other distributions to us from such subsidiaries may be subject to contractual and other restrictions and are subject to other business considerations.

Servicing our debt will require a significant amount of cash, and we may not have sufficient cash flow from our business to pay our substantial debt.

Our ability to make scheduled payments of the principal of, to pay interest on, or to refinance our future indebtedness, including the amounts payable under our revolving credit facility and the Convertible Notes, depends on our future performance, which is subject to economic, financial, competitive and other factors beyond our control. Our business may not continue to generate cash flow from operations in the future sufficient to service our debt and make necessary capital expenditures. If we are unable to generate such cash flow, we may be required to adopt one or more alternatives, such as selling assets, restructuring debt or obtaining additional equity capital on terms that may be onerous or highly dilutive. Our ability to refinance our indebtedness will depend on the capital markets and our financial condition at such time. We may not be able to engage in any of these activities or engage in these activities on desirable terms, which could result in a default on our debt obligations. In addition, any of our future debt agreements may contain restrictive covenants that may prohibit us from adopting any of these alternatives. Our failure to comply with these covenants could result in an event of default which, if not cured or waived, could result in the acceleration of our debt.

We may still incur substantially more debt or take other actions which would intensify the risks discussed above.

We and our subsidiaries may be able to incur substantial additional debt in the future, subject to the restrictions contained in our debt instruments, some of which may be secured debt. We will not be restricted under the terms of the indenture governing the Convertible Notes from incurring additional debt, securing existing or future debt, recapitalizing our debt or taking a number of other actions that are not limited by the terms of the indenture governing the Convertible Notes that could have the effect of diminishing our ability to make payments on the Convertible Notes when due. Our existing revolving credit facility restricts our ability to incur additional indebtedness, including secured indebtedness, but if the facility matures or is repaid, we may not be subject to such restrictions under the terms of any subsequent indebtedness.

We may not have the ability to raise the funds necessary to settle conversions of the Convertible Notes in cash or to repurchase the Convertible Notes upon a fundamental change, and our current debt contains, and our future debt may contain, limitations on our ability to pay cash upon conversion or repurchase of the Convertible Notes.

Holders of the Convertible Notes will have the right to require us to repurchase their Convertible Notes upon the occurrence of a fundamental change at a defined repurchase price equal to 100% of the principal amount of the Convertible Notes to be repurchased, plus accrued and unpaid interest, if any. In addition, upon conversion of the Convertible Notes, unless we elect to deliver solely shares of our Class A common stock to settle such conversion (other than paying cash in lieu of delivering any fractional share), we will be required to make cash payments in respect of the Convertible Notes being converted. However, we may not have enough available cash or be able to obtain financing at the time we are required to make repurchases of Convertible Notes surrendered therefor or Convertible Notes being converted.

In addition, our ability to repurchase the Convertible Notes or to pay cash upon conversions of the Convertible Notes may be limited by law, by regulatory authority or by agreements governing our indebtedness including our existing revolving credit facility. Our failure to repurchase Convertible Notes at a time when the repurchase is required by the indenture or to pay any cash payable on future conversions of the Convertible Notes as required by the indenture would constitute a default under the indenture. A default under the indenture or the occurrence of a fundamental change itself would likely also lead to a default under our revolving credit facility and may lead to a default under agreements governing our future indebtedness. If the repayment of the related indebtedness were to be accelerated after any applicable notice or grace periods, we may not have sufficient funds to repay the indebtedness and repurchase the Convertible Notes or make cash payments upon conversions thereof.

Our revolving credit facility limits our ability to pay any cash amount upon the conversion or repurchase of the Convertible Notes.

Our existing revolving credit facility prohibits us from making any cash payments on the conversion or repurchase of the Convertible Notes if a default under such credit facility exists or would be created thereby. In addition, our ability to make cash payments on the conversion or repurchase of the Convertible Notes will be limited to the extent we do not satisfy certain financial covenant tests after giving effect to such payments. Any new credit facility that we may enter into may have similar restrictions. Our failure to make cash payments upon the conversion or repurchase of the Convertible Notes as required under the terms of the Convertible Notes would permit holders of the Convertible Notes to accelerate our obligations under the Convertible Notes.

The conditional conversion feature of the Convertible Notes, if triggered, may adversely affect our financial condition and operating results.

In the event the conditional conversion feature of the Convertible Notes is triggered, holders of Convertible Notes will be entitled to convert the Convertible Notes at any time during specified periods at their option. If one or more holders elect to convert their Convertible Notes, unless we elect to satisfy our conversion obligation by delivering solely shares of our Class A common stock (other than paying cash in lieu of delivering any fractional share), we would be required to settle a portion or all of our conversion obligation through the payment of cash, which could adversely affect our liquidity. In addition, even if holders of the Convertible Notes do not elect to convert their Convertible Notes, we could be required under applicable accounting rules to reclassify all or a portion of the outstanding principal of the Convertible Notes as a current rather than long-term liability, which would result in a material reduction of our net working capital.

The accounting method for convertible debt securities that may be settled in cash, such as the Convertible Notes, could have a material effect on our reported financial results.

Under Financial Accounting Standards Board Accounting Standards Codification 470-20, Debt with Conversion and Other Options (“ASC 470-20”), an entity must separately account for the liability and equity components of the convertible debt instruments (such as the Convertible Notes) that may be settled entirely or partially in cash upon conversion in a manner that reflects the issuer’s economic interest cost. The effect of ASC 470-20 on the accounting for the Convertible Notes is that the equity component is required to be included in the additional paid-in capital section of stockholders’ equity on our consolidated balance sheet, and the value of the equity component would be treated as debt discount for purposes of accounting for the debt component of the Convertible Notes. As a result, we will be required to record a greater amount of non-cash interest expense in current periods presented as a result of the amortization of the discounted carrying value of the Convertible Notes to their face amount over the term of the Convertible Notes. We will report larger net losses (or lower net income) in our financial results because ASC 470-20 will require interest to include both the current period’s amortization of the debt discount and the instrument’s coupon interest, which could adversely affect our reported or future financial results, the trading price of our Class A common stock and the trading price of the Convertible Notes.

In addition, under certain circumstances, convertible debt instruments (such as the Convertible Notes) that may be settled entirely or partly in cash are currently accounted for utilizing the treasury stock method, the effect of which is that the shares issuable upon conversion of the Convertible Notes are not included in the calculation of diluted earnings per share except to the extent that the conversion value of the Convertible Notes exceeds their principal amount. Under the treasury stock method, for diluted earnings per share purposes, the transaction is accounted for as if the number of shares of Class A common stock that would be necessary to settle such excess, if we elected to settle such excess in shares, are issued. We cannot be sure that the accounting standards in the future will continue to permit the use of the treasury stock method. If we are unable to use the treasury stock method in accounting for the shares issuable upon conversion of the Convertible Notes, then our diluted earnings per share would be adversely affected.

Transactions relating to the Convertible Notes may affect the value of our Class A common stock.

The conversion of some or all of the Convertible Notes would dilute the ownership interests of existing stockholders to the extent we satisfy our conversion obligation by delivering shares of our Class A common stock upon any conversion of the Convertible Notes. If holders of our Convertible Notes elect to convert their notes, we may settle our conversion obligation by delivering to them a significant number of shares of our Class A common stock, which would cause dilution to our existing stockholders.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

Our corporate headquarters are located in Troy, Michigan. We own our corporate headquarters facility, a building in Korea, and an undeveloped parcel of land adjacent to our headquarters, which we expect to develop over the next few years.

We lease or sublease all of our other domestic and international offices. We expect to add facilities as we grow our employee base and expand geographically. We believe that our facilities are adequate to meet our needs for the immediate future, and that, should it be needed, suitable additional space will be available to accommodate expansion of our operations.

Item 3. Legal Proceedings

From time to time, we may be subject to legal proceedings and claims in the ordinary course of business. We have received, and may in the future continue to receive, claims from third parties asserting, among other things, infringement of their intellectual property rights. Future litigation may be necessary to defend ourselves, our partners and our customers by determining the scope, enforceability and validity of third party proprietary rights, or to establish and enforce our proprietary rights. The results of any current or future litigation cannot be predicted with certainty and regardless of the outcome, litigation can have an adverse impact on us because of defense and settlement costs, diversion of management resources and other factors.

Swedish Tax Litigation

The Swedish Tax Authorities, or STA, have assessed tax (net of utilization of tax attributes), penalties and interest in the amount of $6.5 million related to the acquisition of Panopticon AB by Datawatch Corporation, in 2013 for the years 2013, 2014 and 2015. The STA, upon auditing the acquisition transaction, reached a conclusion that post acquisition, certain assets were transferred from Sweden, triggering the tax obligation. The STA is also of the opinion that some services related to product development provided to the new parent company in the U.S. were performed by Panopticon AB at a price below market price triggering tax obligations. Datawatch contested the findings by the STA throughout the audit process including contesting the STA position in the first level of administrative courts. An Administrative Court hearing was held on May 16, 2019. On May 29, 2019, the Administrative Court issued its ruling in favor of Datawatch AB. On July 4, 2019, the STA filed an appeal of the Administrative Court ruling with the Administrative Court of Appeal, or the Court of Appeals, in Stockholm, effectively continuing to assert that the assessments are in fact appropriate. In late September 2019, the Company submitted its filing in response to the STA appeal with the Court of Appeals. On October 10, 2019, the STA filed an answer to the Company's defrayment, and on January 31, 2020, the Company filed a second submission to the Court. The Court of Appeals held a hearing regarding this matter on February 20, 2020. The Company continues to contest the assessment through the appeals process and no rulings have been issued by the Court of Appeals relative to the claims of the STA and the Company's response as of this point. The Company has determined that these events do not cause a change in the assessment of uncertain tax positions.

Potential Export Violation

As previously disclosed, on May 10, 2019, the Company discovered potential violations of U.S. economic sanctions and export control laws and immediately filed preliminary self-disclosure notices with the U.S. Treasury Department's Office of Foreign Assets Control ("OFAC") and the U.S. Commerce Department's Bureau of Industry & Security ("BIS").

The Company subsequently conducted an internal investigation into these issues under the direction of outside legal counsel and filed voluntary self-disclosures with both agencies on July 25, 2019. These disclosures describe the unintentional transfer of commercial software and trial software licenses to various individuals located in Iran and other restricted countries. These transfers involved freeware, trial software licenses, and volunteer software testing communities. The Company did not discover any evidence indicating any commercial transactions with restricted parties or countries.

In addition to filing voluntary self-disclosures with OFAC and BIS, the Company has implemented a series of additional compliance measures to prevent unintentional transfers of the sort described above. These measures will further enhance the Company's international trade compliance program, which is designed to assure that the Company does not conduct business directly or indirectly with any countries or parties subject to U.S. economic sanctions and export control laws.

On August 30, 2019, BIS notified the Company that it had completed its investigation of the potential violation of U.S. export control laws by the Company and concluded that no criminal or administrative prosecution was warranted and closed the matter.

On January 10, 2020, OFAC issued a Cautionary Letter to the Company stating that it had completed its investigation of the potential violation of U.S. export control laws by the Company and concluded that no criminal or administrative prosecution or fines were warranted and closed the matter.

Item 4. Mine Safety Disclosures

Not applicable.

PART II

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

Market Information for Common Stock

Our Class A common stock began trading on the Nasdaq Global Select Market under the symbol “ALTR” on November 1, 2017. Prior to that date, there was no public trading market for our Class A common stock.

Our Class B common stock is not listed nor traded on any stock exchange.

Holders

As of February 15, 2020, there were approximately 500 registered stockholders of record of our Class A common stock, 4 registered stockholders of record of our Class B common stock, and we believe a substantially greater number of beneficial owners who hold shares through brokers, banks or other nominees.

Dividends

We have never declared or paid any cash dividends on our common stock. We currently intend to retain all available funds and any future earnings for use in the operation of our business and do not anticipate paying any dividends on our common stock in the foreseeable future. The terms of our 2019 Amended Credit Agreement also restrict our ability to pay dividends, and we may also enter into credit agreements or other borrowing arrangements in the future that will restrict our ability to declare or pay cash dividends on our capital stock. Any future determination regarding the declaration and payment of dividends, if any, will be at the discretion of our board of directors and will depend on then-existing conditions, including our financial condition, operating results, contractual restrictions, capital requirements, business prospects, and other factors our board of directors may deem relevant. There can be no assurance that any dividends will be paid in the future.

Unregistered Sales of Equity Securities

On October 7, 2019, in connection with the acquisition of Polliwog, the Company issued, or agreed to issue, to shareholders of Polliwog an aggregate of 455,954 shares of the Company’s Class A Common Stock, par value $0.0001 per share (the “SPA Stock Consideration”). Forty percent of the SPA Stock Consideration (183,815 shares) was issued at closing and is subject to customary securities law restrictions on transferability for the first six months after the closing. The remaining sixty percent (an aggregate of 272,139 shares) of the SPA Stock Consideration will be issuable in installments of 88,323 shares of the Company’s Class A Common Stock on the first anniversary of the closing and 91,908 shares on the second and third year anniversaries of the closing, conditioned upon continued employment of specified former employees of Polliwog and further subject to potential reduction in certain other circumstances. All shares of Class A Common Stock issued or to be issued as the SPA Stock Consideration were or will be issued without registration under the Securities Act of 1933, as amended (the “Securities Act”), pursuant to Section 4(a)(2) of the Securities Act. Polliwog’s existing stockholders provided customary representations for a private placement of securities and agreed to customary restrictions on transferability. The Company also agreed to issue an additional 14,213 shares of its Class A Common Stock on or about October 7, 2022 to one of the sellers to complete the acquisition of Polliwog.

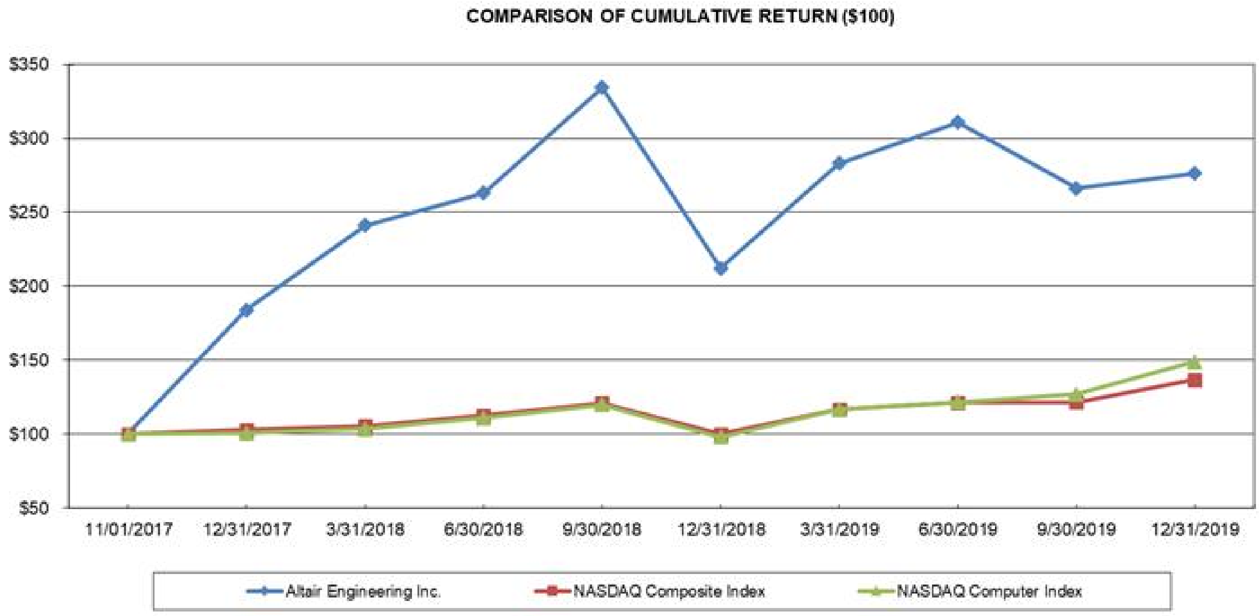
Performance Graph

The following shall not be deemed “filed” for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, or incorporated by reference into any of our other filings under the Securities Exchange Act of 1934, as amended, or the Securities Act .

The graph below compares the cumulative total stockholder return on our Class A common stock with the cumulative total return on the Nasdaq Composite Index and the Nasdaq Computer Index. The graph assumes $100 was invested at the market close on November 1, 2017, which was our initial trading day, in our Class A common stock, the Nasdaq Composite Index and the Nasdaq Computer Index.

Data for the Nasdaq Composite Index and the Nasdaq Computer Index assumes reinvestment of dividends. The offering price of our Class A common stock in our IPO, which had a closing stock price of $18.31, was $13.00 per share.

The comparisons in the graph below are based upon historical data and are not indicative of, nor intended to forecast, future performance of our Class A common stock.



Item 6. Selected Financial Data

The following tables summarize the consolidated financial data for our business. You should read this summary of consolidated financial data in conjunction with the "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our consolidated financial statements and related notes included elsewhere in this Annual Report on Form 10-K. The consolidated statements of operations data for the fiscal years ended December 31, 2019, 2018 and 2017 and the consolidated balance sheet data as of December 31, 2019 and 2018 are derived from our audited consolidated financial statements and related notes included elsewhere in this Annual Report on Form 10-K. The consolidated statements of operations data for the fiscal years ended December 31, 2016 and 2015, and the consolidated balance sheet data as of December 31, 2017 and 2016 are derived from audited consolidated financial statements that are not included in this Annual Report on Form 10-K. Our historical results are not necessarily indicative of the results that may be expected in the future. The summary consolidated financial data in this section are not intended to replace our consolidated financial statements and the related notes, and are qualified in their entirety by the consolidated financial statements and related notes included elsewhere in this Annual Report on Form 10-K.

(in thousands, except share data)	Year ended December 31, 2019	2018	2017 (1)	2016 (1)	2015 (1)
Consolidated statements of operations data:					
Revenue:					
License	$ 244,321	$ 207,164			
Maintenance and other services	122,381	97,197			
Total software	366,702	304,361	$ 244,817	$ 223,818	$ 205,567
Software related services	34,576	36,945	35,397	35,770	37,294
Total software and related services	401,278	341,306	280,214	259,588	242,861
Client engineering services	48,987	47,852	46,510	47,702	45,075
Other	8,650	7,221	6,609	5,950	6,193
Total revenue	458,915	396,379	333,333	313,240	294,129
Cost of revenue:					
License	21,285	16,119			
Maintenance and other services	38,401	29,655			
Total software (2)	59,686	45,774	36,360	31,962	27,406
Software related services	25,640	26,415	26,888	27,653	30,079
Total software and related services	85,326	72,189	63,248	59,615	57,485
Client engineering services	39,875	38,979	38,131	38,106	36,081
Other	7,398	4,805	5,212	4,879	5,642
Total cost of revenue	132,599	115,973	106,591	102,600	99,208
Gross profit	326,316	280,406	226,742	210,640	194,921
Operating expenses:					
Research and development (2)	117,510	97,592	93,234	71,325	62,777
Sales and marketing (2)	106,051	80,277	79,958	66,086	63,080
General and administrative (2)	82,178	79,751	87,979	57,202	54,069
Amortization of intangible assets	14,442	7,739	5,448	3,322	2,624
Other operating income	(2,072)	(9,597)	(6,620)	(2,742)	(2,576)
Total operating expenses	318,109	255,762	259,999	195,193	179,974
Operating income (loss)	8,207	24,644	(33,257)	15,447	14,947
Interest expense	6,371	200	2,160	2,265	2,416
Other (income) expense, net	(1,552)	(2,580)	994	(520)	782
Income (loss) before income taxes	3,388	27,024	(36,411)	13,702	11,749
Income tax expense	10,930	11,489	65,530	3,772	818
Net (loss) income	$ (7,542)	$ 15,535	$ (101,941)	$ 9,930	$ 10,931
(Loss) income per share:					
Net (loss) income per share attributable to common stockholders, basic (3)	$ (0.11)	$ 0.23	$ (1.94)	$ 0.20	$ 0.23
Net (loss) income per share attributable to common stockholders, diluted (3)	$ (0.11)	$ 0.21	$ (1.94)	$ 0.17	$ 0.19
Weighted average shares outstanding:					
Weighted average number of shares used in computing net (loss) income per share, basic (3)	71,544	67,468	52,466	48,852	46,609
Weighted average number of shares used in computing net (loss) income per share, diluted (3)	71,544	74,878	52,466	57,856	58,709
Other financial information:					
Net cash provided by operating activities	$ 31,393	$ 36,230	$ 16,091	$ 21,385	$ 10,838

(1) The years ended December 31, 2017, 2016, and 2015, have been reported under ASC 605 and have not been adjusted under the modified retrospective approach of ASC 606. See Note 3 in the Notes to consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

(2) Includes stock-based compensation expense as follows:

(in thousands)	Year ended December 31, 2019	2018	2017	2016	2015
Cost of revenue—software	$ 1,069	$ 31	$ 350	$ 22	$ 44
Research and development	2,917	740	12,540	1,370	149
Sales and marketing	2,250	910	7,693	775	109
General and administrative	2,292	1,658	26,698	2,965	295
Total stock-based compensation expense	$ 8,528	$ 3,339	$ 47,281	$ 5,132	$ 597

(3) See Note 15 to our consolidated financial statements for an explanation of the method used to calculate basic and diluted net (loss) income per share attributable to common stockholders.

(in thousands)	As of December 31, 2019	2018	2017	2016
Consolidated balance sheet data:				
Cash and cash equivalents	$ 223,117	$ 35,345	$ 39,213	$ 16,874
Working capital	$ 199,591	$ 26,802	$ (53,575)	$ (52,902)
Total assets	$ 743,145	$ 487,197	$ 286,229	$ 251,668
Deferred revenue, current and non-current	$ 83,567	$ 66,519	$ 139,762	$ 113,929
Debt	$ 178,668	$ 31,748	$ 410	$ 85,241
Total stockholders' equity (deficit)	$ 354,707	$ 293,686	$ 58,949	$ (33,761)

Key metrics

We monitor the following key non-GAAP (United States generally accepted accounting principles) financial and operating metrics to help us evaluate our business, measure our performance, identify trends affecting our business, formulate business plans and make strategic decisions. In addition to our results determined in accordance with GAAP, we believe the following non-GAAP financial and operating metrics are useful in evaluating our operating performance.

Billings. Billings consists of our total revenue plus the change in our deferred revenue, excluding deferred revenue from acquisitions during the period. Given that we generally bill our customers at the time of sale but typically recognize a portion of the related revenue ratably over time, management believes that Billings is a meaningful way to measure and monitor our ability to provide our business with the working capital generated by upfront payments from our customers. While we believe that Billings provides valuable insight into the cash that will be generated from sales of our software and services, this metric may vary from period-to-period for a number of reasons including the impact of changes in foreign currency exchange rates and the potential impact of acquisitions. See the section entitled "Reconciliation of non-GAAP financial measures" for a reconciliation of Billings to revenue, the most directly comparable financial measure calculated in accordance with GAAP.

Our Billings were as follows:

(in thousands)	Year ended December 31, 2019	2018	2017	2016
Billings	$ 475,963	$ 401,913	$ 357,212	$ 320,299

Adjusted EBITDA. We define Adjusted EBITDA as net income (loss) adjusted for income tax expense (benefit), interest expense, interest income and other, depreciation and amortization, stock-based compensation expense, restructuring charges, asset impairment charges and other special items as determined by management. We believe that Adjusted EBITDA is a meaningful measure of performance as it is commonly utilized by us and the investment community to analyze operating performance in our industry. See the section entitled "Reconciliation of non-GAAP financial measures" for a reconciliation of Adjusted EBITDA to net income (loss), the most directly comparable financial measure calculated in accordance with GAAP.

Our Adjusted EBITDA was as follows:

(in thousands)	Year ended December 31, 2019	2018	2017	2016
Adjusted EBITDA	$ 39,549	$ 50,180	$ 22,517	$ 30,830

Modified Adjusted EBITDA. Modified Adjusted EBITDA is consistent with our definition of Adjusted EBITDA; however, it includes the revenue not recognized under GAAP due to acquisition accounting adjustments associated with accounting for deferred revenue in significant business combinations. See the section entitled "Reconciliation of non-GAAP financial measures" for a reconciliation of Modified Adjusted EBITDA to net income (loss), the most directly comparable financial measure calculated in accordance with GAAP.

Our Modified Adjusted EBITDA was as follows:

(in thousands)	Year ended December 31, 2019	2018	2017	2016
Modified Adjusted EBITDA	$ 48,549	$ 50,180	$ 22,517	$ 30,830

Free Cash Flow. Free Cash Flow is a non-GAAP financial measure that we calculate as cash flow provided by operating activities less capital expenditures. We believe that Free Cash Flow is useful in analyzing our ability to service and repay debt, when applicable, and return value directly to stockholders. See the section entitled "Reconciliation of non-GAAP financial measures" for a reconciliation of Free Cash Flow to net cash provided by operating activities, the most directly comparable financial measure calculated in accordance with GAAP.

Our Free Cash Flow was as follows:

(in thousands)	Year ended December 31, 2019	2018	2017	2016
Free Cash Flow	$ 21,733	$ 29,571	$ 8,569	$ 11,941

These non-GAAP financial measures reflect an additional way of viewing aspects of our business that, when viewed with our GAAP results and the accompanying reconciliations to corresponding GAAP financial measures included in the tables below, may provide a more complete understanding of factors and trends affecting our business. These non-GAAP financial measures should not be relied upon to the exclusion of GAAP financial measures and are by definition an incomplete understanding of the Company and must be considered in conjunction with GAAP measures.

We believe that the non-GAAP measures disclosed herein are only useful as an additional tool to help management and investors make informed decisions about our financial and operating performance and liquidity. By definition, non-GAAP measures do not give a full understanding of the Company. To be truly valuable, they must be used in conjunction with the comparable GAAP measures. In addition, non-GAAP financial measures are not standardized. It may not be possible to compare these financial measures with other companies' non-GAAP financial measures having the same or similar names. We strongly encourage investors to review our consolidated financial statements and the notes thereto in their entirety and not to rely on any single financial measure.

Reconciliation of non-GAAP financial measures

The following tables provide reconciliations of revenue to Billings, net income (loss) to Adjusted EBITDA and Modified Adjusted EBITDA, and net cash provided by operating activities to Free Cash Flow:

Billings

(in thousands)	Year ended December 31, 2019	2018	2017	2016
Revenue	$ 458,915	$ 396,379	$ 333,333	$ 313,240
Ending deferred revenue	83,567	66,519	139,762	113,929
Adoption of ASC 606 on beginning deferred revenue	—	82,909	—	—
Beginning deferred revenue	(66,519)	(139,762)	(113,929)	(106,516)
Deferred revenue acquired	—	(4,132)	(1,954)	(354)
Billings	$ 475,963	$ 401,913	$ 357,212	$ 320,299

Adjusted EBITDA and Modified Adjusted EBITDA

	Year Ended December 31,			
(in thousands)	**2019**	**2018**	**2017**	**2016**
Net (loss) income	$ (7,542)	$ 15,535	$ (101,941)	$ 9,930
Income tax expense	10,930	11,489	65,530	3,772
Stock-based compensation	8,528	3,339	47,281	5,132
Interest expense	6,371	200	2,160	2,265
Interest income and other (1)	(260)	4,883	(2,260)	(249)
Depreciation and amortization	21,522	14,734	11,747	9,980
Adjusted EBITDA	39,549	50,180	22,517	30,830
Acquisition related deferred revenue (2)	9,000	—	—	—
Modified Adjusted EBITDA	$ 48,549	$ 50,180	$ 22,517	$ 30,830

(1) Includes for the year ended December 31, 2019 a) nonrecurring acquisition related costs of $0.6 million, b) nonrecurring severance expenses of $0.4 million and c) impairment charges for royalty contracts for $1.0 million of expense. Includes for the year ended December 31, 2018 a) nonrecurring costs from the acquisition of Datawatch of $10.4 million, b) gain on the sale of a building of $4.4 million and c) impairment charges for royalty contracts and trade names of $2.8 million of expense. Includes for the years ended December 31, 2018 and 2017, a non-recurring adjustment for a change in estimated legal expenses of $2.0 million of income in each year.

(2) Represents revenue not recognized under GAAP due to acquisition accounting adjustments associated with the accounting for deferred revenue in significant business combinations.

Free Cash Flow

	Year ended December 31,			
(in thousands)	**2019**	**2018**	**2017**	**2016**
Net cash provided by operating activities	$ 31,393	$ 36,230	$ 16,091	$ 21,385
Capital expenditures	(9,660)	(6,659)	(7,522)	(9,444)
Free Cash Flow	$ 21,733	$ 29,571	$ 8,569	$ 11,941

Recurring Software License Rate. A key factor to our success is our recurring software license rate which we measure through billings, primarily derived from annual renewals of our existing subscription customer agreements. We calculate our recurring software license rate for a particular period by dividing (i) the sum of software term-based license billings, software license maintenance billings, and 20% of software perpetual license billings which we believe approximates maintenance as an element of the arrangement by (ii) the total software license, including all term-based subscriptions, maintenance and perpetual license billings from all customers for that period. Our recurring software license rate was 87%, for the year ended December 31, 2019, and 89% for each of the years ended December 31, 2018 and 2017.

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

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with our audited consolidated financial statements (and notes thereto) for the year ended December 31, 2019 included elsewhere in this Annual Report on Form 10-K. This discussion contains forward-looking statements that involve risks and uncertainties. Our actual results could differ materially from those discussed below. Factors that could cause or contribute to such differences include, but are not limited to, those identified below and those discussed in "Risk factors" and "Cautionary Note Regarding Forward-Looking Statements" included elsewhere in this Annual Report on Form 10-K.

Overview

We are a global technology company providing software and cloud solutions in the areas of product design and development, high performance computing, and data analytics. We enable organizations across broad industry segments to compete more effectively in a connected world while creating a more sustainable future.

Our simulation-driven approach to innovation is powered by our broad portfolio of high-fidelity and high-performance physics solvers. Our integrated suite of software optimizes design performance across multiple disciplines encompassing structures, motion, fluids, thermal management, electromagnetics, system modeling, and embedded systems, while also providing data analytics and true-to-life visualization and rendering. Our high performance computing solutions maximize the efficient utilization of complex compute resources and streamline the workflow management of compute-intensive tasks for applications including data analytics, modeling and simulation, and visualization. Our data analytics products include data preparation, data science and visualization solutions that fuel engineering, scientific, and business decisions.

Altair's software products represent a comprehensive, open architecture solution for simulation, data analytics and cloud computing to empower decision making for improved product development, manufacturing, energy management and exploration, financial services, health care, and retail operations. We believe our products offer a comprehensive set of technologies to design and optimize high performance, efficient, innovative and sustainable products and processes in an increasingly connected world. Our products are categorized by:

- Design, Modeling & Visualization;
- Physics Simulation;
- Data Analytics;
- High Performance Computing; and
- Internet of Things, or IoT.

Altair also provides Client Engineering Services, or CES, to support our customers with long-term ongoing expertise. This has the benefit of embedding us within customers, deepening our understanding of their processes, and allowing us to more quickly perceive trends in the overall market. Our presence at our customers' sites helps us to better tailor our software products' research and development, or R&D, and sales initiatives.

Our Primary Business Model

Altair pioneered a patented units-based subscription licensing model for software and other digital content. This units-based subscription licensing model allows flexible and shared access to our offerings, along with over 150 partner products. Our HyperWorks customers license a pool of units for their organizations giving individual users access to our entire portfolio of software applications as well as our growing portfolio of partner products. We believe our units-based subscription licensing model lowers barriers to adoption, creates broad engagement, encourages users to work within our ecosystem, and increases revenue. This, in turn, helps drive our recurring software license rate which has been on average approximately 88% over the past five years. In each of the last three fiscal years, approximately 60% of new software revenue comes from expansion within existing customers.

Recent Business Developments

Acquisition of Polliwog

In October 2019, the Company entered into a stock purchase agreement and simultaneously acquired 97% of the outstanding capital stock of Polliwog, a software company based near Seoul, Korea. The Company paid cash consideration of $10.7 million and issued 183,815 shares of Class A Common Stock at closing. In addition, the Company is obligated to issue 88,323 shares of its Class A Common Stock on the first anniversary of the closing and 91,908 shares on the second and third anniversaries of the closing, subject to certain employment vesting provisions and subject to potential reduction in certain circumstances. Polliwog is a supplier of Electronic Design Automation software to global electronics industry customers, which will expand Altair's ability to provide software for system-level design decisions. The Company believes Polliwog's printed circuit board solvers and verification tools will integrate well with Altair's existing HyperWorks software solutions.

Acquisition of DEM Solutions Limited

In November 2019, the Company entered into a stock purchase agreement and simultaneously acquired 100% of the outstanding capital stock of DEM Solutions, a company that provides market-leading Discrete Element Method software for bulk material simulation, based in Edinburgh, UK, for aggregate consideration of $13.1 million. The acquisition of DEM Solutions enables Altair to provide new technology and solutions to customers in the agricultural, mining, material handling, construction and heavy machinery, chemical and pharmaceutical industries.

Convertible Senior Notes

In June 2019, we issued $230.0 million aggregate principal amount of 0.25% convertible senior notes due in 2024 (the "Notes"), which includes the underwriters' exercise in full of their option to purchase an additional $30.0 million principal amount of the Convertible Notes, in a public offering. The net proceeds from the issuance of the Convertible Notes were $221.9 million after deducting the underwriting discounts and commissions and issuance costs.

In conjunction with the issuance of the Convertible Notes, we entered into a base indenture and a supplemental indenture by and between the Company and U.S. Bank National Association (collectively, the "Indenture"). The Indenture includes customary covenants and sets forth certain events of default after which the Convertible Notes may be declared immediately due and payable and sets forth certain types of bankruptcy or insolvency events of default involving the Company after which the Convertible Notes become automatically due and payable. The Convertible Notes are senior unsecured obligations of the Company.

The Convertible Notes bear interest at a rate of 0.25% per year, payable semi-annually in arrears on June 1 and December 1 of each year, commencing December 1, 2019. The Convertible Notes will mature on June 1, 2024, unless, earlier repurchased or redeemed by us or converted pursuant to their terms.

The Convertible Notes have an initial conversion rate of 21.5049 shares of our Class A common stock per $1,000 principal amount of Convertible Notes, which is equivalent to an initial conversion price of approximately $46.50 per share of our Class A common stock. The conversion rate will be subject to adjustment upon the occurrence of certain events specified in the Indenture but will not be adjusted for any accrued and unpaid interest. In addition, upon the occurrence of a make whole fundamental change or a redemption period (each as defined in the Indenture), we will, in certain circumstances, increase the conversion rate by a specified number of additional shares for a holder who elects to convert its Convertible Notes in connection with such make whole fundamental change or during the relevant redemption period.

Holders of the Convertible Notes may convert all or any portion of their Convertible Notes at any time prior to the close of business on December 1, 2023, in integral multiples of $1,000 principal amount, only under the following circumstances:

- During any calendar quarter commencing after the calendar quarter ending on September 30, 2019 (and only during such calendar quarter), if the last reported sale price of the Class A Common Stock for at least 20 trading days (whether or not consecutive) during a period of 30 consecutive trading days ending on, and including, the last trading day of the immediately preceding calendar quarter is greater than or equal to 130% of the conversion price on each applicable trading day;

- During the five business day period after any five consecutive trading day period (the "measurement period") in which the trading price (as defined in the Indenture) per $1,000 principal amount of Convertible Notes for each trading day of the measurement period was less than 98% of the product of the last reported sale price of the Class A Common Stock and the conversion rate on each such trading day;

- If we call any or all of the Convertible Notes for redemption (which the Company may not do prior to June 6, 2022), at any time prior to the close of business on the scheduled trading day immediately preceding the redemption date; or

- Upon the occurrence of specified corporate events.

On or after December 1, 2023 until the close of business on the business day immediately preceding the maturity date, holders may convert their Convertible Notes at any time, regardless of the foregoing circumstances. Upon conversion, we may satisfy our conversion obligation by paying and/or delivering, as the case may be, cash, shares of Class A Common Stock or a combination of cash and shares of the Class A Common Stock, at our election, in the manner and subject to the terms and conditions provided in the Indenture.

Credit agreement

In June 2019, we amended our $150.0 million credit facility to, among other things, permit the issuance of the Convertible Notes and extend the maturity date of the credit facility to December 15, 2023.

Factors affecting our performance

We believe that our future success will depend on many factors, including those described below. While these areas present significant opportunity, they also present risks that we must manage to achieve successful results. If we are unable to address these challenges, our business, operating results and prospects could be harmed. See Part I, Item 1A. – Risk Factors included elsewhere in this Annual Report on Form 10-K.

Seasonality and quarterly results

Our billings have historically been highest in the first and fourth quarters of any calendar year and may vary in future quarters. The timing of recording billings and the corresponding effect on our cash flows may vary due to the seasonality of the purchasing patterns of our customers. In addition, the timing of the recognition of revenue, the amount and timing of operating expenses, including employee compensation, sales and marketing activities, and capital expenditures, may vary from quarter-to-quarter which may cause our reported results to fluctuate significantly. In addition, we may choose to grow our business for the long-term rather than to optimize for profitability or cash flows for a particular shorter-term period. This seasonality or the occurrence of any of the factors above may cause our results of operations to vary and our financial statements may not fully reflect the underlying performance of our business.

Integration of recent acquisitions

We believe that our recent acquisitions result in certain benefits, including expanding our portfolio of software and products and enabling us to better serve our customer's requests for data analytics and simulation technology. However, to realize some of these anticipated benefits, the acquired businesses must be successfully integrated. The success of these acquisitions will depend in part on our ability to realize these anticipated benefits. We may fail to realize the anticipated benefits of these acquisitions for a variety of reasons.

Foreign currency fluctuations

Because of our substantial international operations, we are exposed to foreign currency risks that arise from our normal business operations, as well as our transactions that are denominated in foreign currencies, including the Euro, British Pound Sterling, Indian Rupee, Japanese Yen, and Chinese Yuan. To present the changes in our underlying business without regard to the impact of currency fluctuations, we evaluate certain of our operating results both on an as reported basis, as well as on a constant currency basis.

Constant currency amounts exclude the effect of foreign currency fluctuations on our reported results. Our comparative financial results were impacted by fluctuations in the value of the United States dollar relative to other currencies during the year ended December 31, 2019, as compared to the year ended December 31, 2018. To present this information, the results for 2019 for entities whose functional currency is a currency other than the United States dollar were converted to United States dollars at rates that were in effect for 2018. These adjusted amounts are then compared to our current period reported amounts to provide operationally driven variances in our results.

The net effects of currency fluctuations on our Revenue, Adjusted EBITDA and Billings are reflected in the table below. Amounts in brackets indicate a net adverse effect from currency fluctuations.

(in thousands)	**Year ended December 31, 2019**
Revenue	$ (9,129)
Adjusted EBITDA	$ (1,878)
Billings	$ (7,795)

Expanded use of our software applications

Our ability to grow our revenue is affected, in part, by the pace at which our customers continue to expand their use of our design, simulation, optimization and analysis applications, and suite of data analytics products and the degree to which prospective customers realize the benefit of using our software applications. To grow our presence within our customers and attract new customers, we devote substantial sales and marketing resources to drive increased adoption across our existing customers and encourage new customers to commence using our software. As a result of this "land and expand" business model, we expect to generate additional revenue from our current and future customer base. To the extent our sales and marketing efforts do not translate into customer retention or expansion, or if we do not allocate those expenses efficiently, our financial performance may be adversely affected. Therefore, our financial performance will depend in part on the degree to which our "land and expand" strategies are successful.

Investments for growth

We have made and plan to continue to make investments for long-term growth, including investments in our ongoing research and development activities seeking to create new software and to enhance our existing applications to address emerging technology trends and additional customer needs. Generally, the development of new or improved applications in our software can result in the expansion of our user base within an organization and a potential increase in revenue over time, although the expenditures associated with such developments may adversely affect our performance in the near term. We intend to continue to invest resources in sales and marketing, by further expanding our sales teams and increasing our marketing activities. Our ability to continue to grow revenue from our current and potential customer base is dependent, in part, upon the success of our current and future research and development and sales and marketing activities.

Business segments

We have identified two reportable segments: Software and Client Engineering Services:

- *Software* —Our Software segment includes software and software related services. The software component of this segment includes our portfolio of software products including our solvers and optimization technology products, modeling and visualization tools, data analytics and analysis products, high performance computing, software applications and hardware products, IoT platform and analytics tools as well as support and the complementary software products we offer through our Altair Partner Alliance, or APA. The APA includes technologies ranging from computational fluid dynamics and fatigue to manufacturing process simulation and cost estimation. The software related services component of this segment includes consulting, implementation services, and training focused on product design and development expertise and analysis from the component level up to complete product engineering at any stage of the lifecycle.
- *Client Engineering Services* —Our client engineering services, or CES, segment provides client engineering services to support our customers with long-term, ongoing expertise. We operate our CES business by hiring engineers and data scientists for placement at a customer site for specific customer-directed assignments. We employ and pay them only for the duration of the placement.

Our other businesses which do not meet the criteria to be separate reportable segments are combined and reported as "Other" which represents innovative services and products, including toggled, our LED lighting business. toggled is focused on developing and selling next-generation solid state lighting technology along with communication and control protocols based on our intellectual property for the direct replacement of fluorescent light tubes with LED lamps. Other businesses combined within Other include our WEYV business, which was terminated in the third quarter of 2019, and potential services and product concepts that are still in their development stages. For additional information about the termination of the WEYV business, see Note 4 in the Notes to consolidated financial statements in Item 15, Part IV of this Annual Report on Form 10-K.

For additional information about our reportable segments and other businesses, see Note 19 in the Notes to consolidated financial statements in Item 15, Part IV of this Annual Report on Form 10-K.

Components of results of operations

Revenue

We primarily derive revenue from the licensing of our software, which includes our units-based subscription licensing model and for term and perpetual software licenses, as well as software related services. Our CES business derives revenue from providing engineers and data scientists to support our customers' long-term, ongoing projects.

Software

Software revenue is principally comprised of subscription licenses, and to a lesser extent, perpetual licenses and associated maintenance and support fees. Subscriptions are typically governed by contracts with annual terms which include product updates, maintenance and support. We generally recognize software license revenue up front, while maintenance and support revenue is generally recognized over the term of the contract. To a much lesser extent, Software also includes revenue from the sale of hardware products.

Software includes consulting, implementation services and training. Our software related services team is comprised of almost 350 highly technical people globally. We focus on establishing a strong working relationship with the user community allowing us to offer guidance and expertise throughout their product creation process. We generally recognize revenue for software related services as those services are performed.

Software related services

Consulting services from product design and development projects are considered distinct performance obligations and are provided to customers on a time-and-materials, or T&M, or fixed-price basis. Altair recognizes services revenue from our T&M contracts using input-based estimates, utilizing direct labor and contractually agreed-upon hourly rates as the input measure. For fixed-price contracts, software services revenue is recognized over time using a method that measures the extent of progress towards completion of a performance obligation, generally using a cost-input method where revenue is recognized based on the proportion of total cost incurred to estimated total costs at completion. If output or input measures are not available or cannot be reasonably estimated, revenue is recognized upon completion of the services.

Client engineering services

We operate our CES business by hiring engineers and data scientists for placement at a customer site for specific customer-directed assignments. We employ and pay them only for the duration of the placement.

Our CES business generates revenue from placing simulation specialists, industrial designers, design engineers, materials experts, development and test engineers, manufacturing engineers, information technology specialists and data scientists on-site with our customers in businesses operating in the virtual simulation, product design and development, software development, high performance computing and data analytics spaces. We recognize CES revenue based upon hours worked and contractually agreed-upon hourly rates.

Other

Our Other revenue consists primarily of revenue related to our LED lighting business operated out of our wholly-owned subsidiary, toggled. toggled designs, and sources through contract manufacturers, LED lighting and related products for sale to consumers and businesses. We also generate revenue through royalties from licensing toggled technology to third party manufacturers and resellers.

Cost of revenue

Software

Cost of software revenue consists of expenses related to software licensing, hardware sales and customer support. Significant expenses include employee compensation and related costs for support team members, including salaries, benefits, bonuses and stock-based compensation, as well as travel costs, hardware costs, certain data center and facility costs and royalties for third-party software products available to customers through our products or as part of our APA.

Software related services

Cost of software related services revenue consists of personnel and related costs, such as salaries, benefits, bonuses and stock-based compensation, as well as travel expenses and certain data center and facility costs.

Cost of client engineering services

Cost of engineering services revenue consists primarily of employee compensation and related costs. We employ and pay them only for the duration of the placement at a customer site.

Cost of other

Cost of other revenue includes the cost of LED lighting products and freight related to products sold to retail and commercial sales channels.

Operating expenses

Operating expenses, as defined and discussed below, support all the products and services that we provide to our customers and, as a result, they are presented in an aggregate total.

Research and development

Research and development expenses consist primarily of employee compensation and related costs associated with our development team, including salaries, benefits, bonuses, professional consulting and development fees, and stock-based compensation expense. Our research and development efforts are focused on enhancing the functionality, breadth and scalability of our software, addressing new use cases, and developing additional innovative technologies. Timely development of new products is essential to maintaining our competitive position, and we release new versions of our software on a regular basis. All software development costs are expensed as incurred as our current software development process is essentially completed concurrent with the establishment of technological feasibility.

Sales and marketing

Sales and marketing expenses consist primarily of employee compensation and related costs associated with our sales and marketing staff, including salaries, benefits, bonuses, commissions and stock-based compensation, as well as costs relating to our marketing and business development programs including trade shows and events. We intend to continue to invest resources in our sales and marketing initiatives to drive growth and extend our market position.

General and administrative

General and administrative expenses consist of employee compensation and related costs for executive, finance, legal, human resources, recruiting, and employee-related information technology and administrative personnel, including salaries, benefits, bonuses and stock-based compensation expense, professional fees for external legal and accounting services, depreciation, facilities, recruiting and other consulting services.

Amortization of intangible assets

Amortization of intangible assets consists primarily of amortization of intangibles associated with acquisitions. We expect to incur additional amortization expenses resulting from future strategic acquisitions.

Other operating income

Other operating income consists primarily of government subsidies, primarily in France, in the form of grant income associated with certain of our research and development activities and other items as disclosed.

Interest expense

Interest expense consists of interest expense on our outstanding indebtedness and amortization of debt issuance costs.

Other (income) expense, net

Other (income) expense, net is comprised primarily of 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 and interest income on invested cash.

Income tax expense

Income tax expense is comprised primarily of income taxes related to United States, foreign, and state jurisdictions in which we conduct business. Income tax expense also includes taxes withheld outside of the United States attributable to remittances to the Company from certain foreign subsidiaries for which offsetting tax credits are not recognizable due to valuation allowance considerations. We record interest and penalties related to income tax matters as income tax expense. We expect the amount of income tax expense (benefit), if any, to vary each reporting period depending upon fluctuations in our quantum and tax jurisdictional mix of income (loss). We have substantial United States net operating loss carryforwards with no expiration period for losses generated 2018 onwards, and tax credit carryforwards which began to expire in 2018. The ability to utilize these tax attributes is highly dependent upon our ability to generate taxable income in the United States in the future.

Our future effective annual tax rate may be materially impacted by the amount of benefits and charges from tax amounts associated with our foreign earnings that are taxed at rates different from the federal statutory rate, the taxation of the foreign earnings in the U.S. under the Global Intangible Low-Taxed Income, or GILTI, regime, changes in valuation allowances, level of profit before tax, accounting for uncertain tax positions, stock-based compensation, business combinations, payments to the Company from certain foreign subsidiaries, closure of statute of limitations, settlements of tax audits, and changes in tax laws including United States tax law changes that were enacted in December 2017. A significant amount of our earnings is generated in our EMEA and APAC regions. Our future effective tax rates may be adversely affected to the extent earnings are lower than anticipated in countries where we have lower statutory tax rates.

As of December 31, 2019 and 2018, we had gross deferred tax assets, or DTAs, of $117.5 million and $93.6 million, respectively, primarily related to net operating loss carryforwards, tax credits, share-based compensation, deferred revenue, and capitalized research and development expenses. We are entitled to a United States federal tax deduction when non-qualified stock options, or NSOs, are exercised. In connection with our IPO, a significant number of our NSOs were exercised, resulting in a tax deduction for United States income tax purposes. This deduction, in conjunction with other expected deferred tax asset reversals, resulted in our needing to establish a valuation allowance for $47.0 million in 2017 for the United States DTAs. Our ability to utilize any net operating losses or tax credits may be limited under provisions of the Code if we undergo an ownership change after our IPO (generally defined as a greater than 50-percentage point cumulative change (by value) in the equity ownership of certain stockholders over a rolling three-year period). We also inherited net operating losses, or NOLs, from the acquisition of Datawatch, which are subject to specific limitations on usage. We may also be unable to realize our tax credit carryforwards which began to expire in 2018.

Based on the evidence available, including a lack of taxable earnings in the United States, we recorded a valuation allowance against substantially all of our net deferred tax assets in the United States. If a change in judgment regarding this valuation allowance were to occur in the future, we will record a potentially material deferred tax benefit, which could result in a favorable impact on our effective tax rate in that period. The utilization of tax attributes to offset taxable income reduces the amount of deferred tax assets subject to a valuation allowance.

The Tax Cuts and Jobs Act, or the Tax Act, was enacted on December 22, 2017. The Tax Act reduced the U.S. federal corporate income tax rate from 35% to 21%, required companies to pay a one-time transition tax on earnings of certain foreign subsidiaries that were previously tax deferred and created new taxes on certain foreign sourced earnings. Previously, we applied the guidance in Staff Accounting Bulletin No. 118, Income Tax Accounting Implications of the Tax Cut and Jobs Act when accounting for the enactment-date effects of the Tax Act. As of December 31, 2018, we completed our accounting for the tax effects of the Tax Act; we have not recorded any adjustments to the provisional amounts recorded at December 31, 2017 related to the remeasurement of our deferred balances. At December 31, 2017, we originally recorded a provisional amount for its one-time transition tax of $4.2 million, which was substantially offset by available foreign tax credits. During the year ended December 31, 2018, we revised our estimate of the provisional amount of the one-time transition tax. Upon further analyses of certain aspects of the Tax Act and refinement of its calculations, we increased our provisional amount of transition tax by approximately $0.6 million for the year ended December 31, 2018. This resulted in no change to income tax expense due to the impact of foreign tax credits.

The Tax Act subjects a U.S. shareholder to current tax on Global Intangible Low-Taxed Income, or GILTI, earned by certain foreign subsidiaries. The impact of GILTI resulted in no incremental tax expense for the year ended December 31, 2019 due to a full valuation allowance on U.S. net deferred tax assets. In addition, we have made an accounting policy election to treat taxes due under the GILTI provision as a current period expense.

Results of operations

The following table sets forth our results of operations and certain financial data for the years ended December 31, 2019 and 2018:

(in thousands)	Year ended December 31, 2019	2018
Revenue:		
License	$ 244,321	$ 207,164
Maintenance and other services	122,381	97,197
Total software	366,702	$ 304,361
Software related services	34,576	36,945
Total software and related services	401,278	341,306
Client engineering services	48,987	47,852
Other	8,650	7,221
Total revenue	458,915	396,379
Cost of revenue:		
License	21,285	16,119
Maintenance and other services	38,401	29,655
Total software	59,686	45,774
Software related services	25,640	26,415
Total software and related services	85,326	72,189
Client engineering services	39,875	38,979
Other	7,398	4,805
Total cost of revenue	132,599	115,973
Gross profit	326,316	280,406
Operating expenses:		
Research and development	117,510	97,592
Sales and marketing	106,051	80,277
General and administrative	82,178	79,751
Amortization of intangible assets	14,442	7,739
Other operating income, net	(2,072)	(9,597)
Total operating expenses	318,109	255,762
Operating income (loss)	8,207	24,644
Interest expense	6,371	200
Other (income) expense, net	(1,552)	(2,580)
Income (loss) before income taxes	3,388	27,024
Income tax expense	10,930	11,489
Net (loss) income	$ (7,542)	$ 15,535
Other financial information:		
Billings (1)	$ 475,963	$ 401,913
Adjusted EBITDA (2)	$ 39,549	$ 50,180
Net cash provided by operating activities	$ 31,393	$ 36,230
Free cash flow (3)	$ 21,733	$ 29,571

(1) Billings consists of our total revenue plus the change in our deferred revenue, excluding deferred revenue from acquisitions. For more information about Billings and our other non-GAAP financial measures and reconciliations of our non-GAAP financial measures to the most directly comparable financial measures calculated and presented in accordance with GAAP, see Item 6, Selected Financial Data of this Annual Report on Form 10-K.

(2) We define Adjusted EBITDA as net income (loss) adjusted for income tax expense (benefit), interest expense, interest income and other, depreciation and amortization, stock-based compensation expense, restructuring charges, asset impairment charges and other special items as determined by management. For more information about Adjusted EBITDA and our other non-GAAP financial measures and reconciliations of our non-GAAP financial measures to the most directly comparable financial measure calculated and presented in accordance with GAAP, see Item 6, Selected Financial Data of this Annual Report on Form 10-K.

(3) We define Free Cash Flow as net cash provided by operating activities less capital expenditures. For a reconciliation of Free Cash Flow to the most directly comparable financial measure calculated and presented in accordance with GAAP, see Item 6, Selected Financial Data of this Annual Report on Form 10-K.

The following table sets forth our revenue growth on a constant currency basis for the year ended December 31, 2019 compared to the year ended December 31, 2018:

(dollars in thousands)	Year ended December 31, 2019	Year ended December 31, 2018	Change %	Constant currency change (1) %
Revenue:				
Software	$ 366,702	$ 304,361	20%	23%
Software related services	34,576	36,945	(6%)	(3%)
Total software and related services	401,278	341,306	18%	20%
Client engineering services	48,987	47,852	2%	2%
Other	8,650	7,221	20%	20%
Total revenue	$ 458,915	$ 396,379	16%	18%

(1) The results for entities whose functional currency is a currency other than the United States dollar were converted to United States dollars at rates that were in effect for the corresponding period of the prior year.

Years ended December 31, 2019 and 2018

Revenue

Total revenue increased by $62.5 million, or 16%, for year ended December 31, 2019, as compared to the year ended December 31, 2018. The increase was primarily attributable to an increase in software revenue.

Software

(dollars in thousands)	Year ended December 31, 2019	Year ended December 31, 2018	Change $	Change %
Software revenue	$ 366,702	$ 304,361	$ 62,341	20%
As a percent of software segment revenue	91%	89%		
As a percent of consolidated revenue	80%	77%		

The 20% increase in our software revenue for the year ended December 31, 2019, as compared to the year ended December 31, 2018, was primarily the result of an expansion in the number of units licensed by our existing customers under renewed software license agreements, contributions from recent acquisitions and licensing of units to new customers pursuant to new software license agreements.

Software related services

(dollars in thousands)	Year ended December 31, 2019	Year ended December 31, 2018	Change $	Change %
Software related services revenue	$ 34,576	$ 36,945	$ (2,369)	(6%)
As a percent of software segment revenue	9%	11%		
As a percent of consolidated revenue	8%	9%		

The 6% decrease in our software related services revenue for the year ended December 31, 2019, as compared to the year ended December 31, 2018. This decrease was the result of a decline in revenue from consulting services. On a constant currency basis, our software related services revenue decreased by 3%.

Client engineering services

(dollars in thousands)	Year ended December 31, 2019	Year ended December 31, 2018	Change $	Change %
Client engineering services revenue	$ 48,987	$ 47,852	$ 1,135	2%
As a percent of consolidated revenue	11%	12%		

The 2% increase in CES revenue for the year ended December 31, 2019, as compared to the year ended December 31, 2018, was primarily due to an increase in demand for our consulting services. Our CES business is primarily affected by customer demand and our ability to fill customers' open positions.

Other

(dollars in thousands)	Year ended December 31, 2019	2018	Change $	%
Other revenue	$ 8,650	$ 7,221	$ 1,429	20%
As a percent of consolidated revenue	2%	2%		

The 20% increase in other revenue for the year ended December 31, 2019, as compared to the year ended December 31, 2018, was due to increased revenue from toggled, our LED lighting business, driven by increased product unit sales, partially offset by a reduction in unit price and a decline in royalties.

Cost of revenue

Software

(dollars in thousands)	Year ended December 31, 2019	2018	Change $	%
Cost of software revenue	$ 59,686	$ 45,774	$ 13,912	30%
As a percent of software revenue	16%	15%		
As a percent of consolidated revenue	13%	12%		

Cost of software revenue increased by $13.9 million, or 30%, for the year ended December 31, 2019, as compared to the year ended December 31, 2018. This increase in the current year was due to increased employee compensation and related costs of $6.3 million, $4.2 million in hardware costs related to software revenue, $1.0 million in stock-based compensation expense, increased third party royalty costs of $0.7 million for software programs, and $0.3 million in software maintenance.

Software related services

(dollars in thousands)	Year ended December 31, 2019	2018	Change $	%
Cost of software related services revenue	$ 25,640	$ 26,415	$ (775)	(3%)
As a percent of software related services revenue	74%	71%		
As a percent of consolidated revenue	6%	7%		

Cost of software related services revenue decreased $0.8 million, or 3%, for the year ended December 31, 2019, as compared to the year ended December 31, 2018. The decrease was primarily the result of fluctuations in foreign currencies.

Client engineering services

(dollars in thousands)	Year ended December 31, 2019	2018	Change $	%
Cost of client engineering services revenue	$ 39,875	$ 38,979	$ 896	2%
As a percent of client engineering services segment revenue	81%	81%		
As a percent of consolidated revenue	9%	10%		

Cost of CES revenue increased by $0.9 million, or 2%, for the year ended December 31, 2019, as compared to the year ended December 31, 2018. Employee costs increased in line with increased headcount resulting in the 2% higher cost of CES revenue.

Other

(dollars in thousands)	Year ended December 31, 2019	2018	Change $	%
Cost of other revenue	$ 7,398	$ 4,805	$ 2,593	54%
As a percent of other revenue	86%	67%		
As a percent of consolidated revenue	2%	1%		

The cost of other revenue increase of $2.6 million, or 54%, for the year ended December 31, 2019, as compared to the year ended December 31, 2018, was primarily due to higher unit sales. Margins for our LED lighting business declined in 2019 as a result of price reductions. We anticipate margins returning to more typical levels in 2020 due to manufacturing cost reductions in 2019.

Gross profit

(dollars in thousands)	Year ended December 31, 2019	2018	Change $	%
Gross profit	$ 326,316	$ 280,406	$ 45,910	16%
As a percent of consolidated revenue	71%	71%		

Gross profit increased by $45.9 million, or 16%, for the year ended December 31, 2019, as compared to the year ended December 31, 2018. This increase in gross profit was primarily attributable to the growth of our software revenue of $62.3 million driven by the factors described above. The increase in revenue was partially offset by the increase in cost of revenue as described above.

Operating expenses

Operating expenses, as discussed below, support all the products and services that we provide to our customers and, as a result, they are reported and discussed here in the aggregate.

Research and development

(dollars in thousands)	Year ended December 31, 2019	2018	Change $	%
Research and development	$ 117,510	$ 97,592	$ 19,918	20%
As a percent of consolidated revenue	26%	25%		

Research and development expenses increased by $19.9 million, or 20%, for the year ended December 31, 2019, as compared to the year ended December 31, 2018. This increase was primarily attributable to higher employee costs of $12.0 million resulting from an increase in our headcount, primarily due to acquisitions, and annual compensation adjustments. In addition, there was an increase in outsourced development fees of $3.3 million as a result of acquisitions, an increase in stock-based compensation expense of $2.2 million and an increase in software maintenance expense of $1.2 million for the year ended December 31, 2019, as compared to the year ended December 31, 2018.

Sales and marketing

(dollars in thousands)	Year ended December 31, 2019	2018	Change $	%
Sales and marketing	$ 106,051	$ 80,277	$ 25,774	32%
As a percent of consolidated revenue	23%	20%		

Sales and marketing expenses increased by $25.8 million, or 32%, for the year ended December 31, 2019, as compared to the year ended December 31, 2018. This increase was primarily attributable to higher employee costs of $18.0 million resulting from annual compensation adjustments and an increase in our headcount, primarily due to acquisitions. Travel and trade show related expense increased $3.2 million and sales and marketing campaigns to support our direct sales force increased $0.8 million. In addition, stock-based compensation expense, consulting fees and software maintenance expense increased by $1.3 million, $0.6 million and $0.5 million, respectively.

General and administrative

(dollars in thousands)	Year ended December 31, 2019	2018	Change $	%
General and administrative	$ 82,178	$ 79,751	$ 2,427	3%
As a percent of consolidated revenue	18%	20%		

General and administrative expenses increased by $2.4 million, or 3%, for the year ended December 31, 2019, as compared to the year ended December 31, 2018. This increase was primarily attributable to higher employee costs of $3.7 million resulting from annual compensation adjustments and an increase in our headcount, primarily due to acquisitions, higher facility costs of $1.9 million, higher stock-based compensation expense of $0.6 million, and higher software maintenance expense of $1.0 million, partially offset by a decrease in professional fees of $6.8 million which were elevated in 2018 due to the acquisition of Datawatch.

Amortization of intangible assets

(dollars in thousands)	Year ended December 31, 2019	2018	Change $	%
Amortization of intangible assets	$ 14,442	$ 7,739	$ 6,703	87%
As a percent of consolidated revenue	3%	2%		

Amortization of intangible assets increased by $6.7 million for the year ended December 31, 2019, as compared to the year ended December 31, 2018. This was attributable to an increase in the amortization of developed technology and customer relationships in the current year as a result of 2019 and 2018 acquisitions.

Other operating income, net

(dollars in thousands)	Year ended December 31, 2019	2018	Change $	%
Other operating income, net	$ (2,072)	$ (9,597)	$ (7,525)	(78%)
As a percent of consolidated revenue	(—%)	(2%)		

Other operating income, net decreased $7.5 million for the year ended December 31, 2019, as compared to the year ended December 31, 2018. The prior year period includes a gain on the sale of a building for $4.4 million, a non-recurring adjustment for a change in estimated legal expenses of $2.0 million of income and impairment of trade names for $0.6 million expense as a result of rebranding certain products.

Interest expense

(dollars in thousands)	Year ended December 31, 2019	2018	Change $	%
Interest expense	$ 6,371	$ 200	$ 6,171	NM
As a percent of consolidated revenue	1%	—%		

Interest expense increased $6.2 million for the year ended December 31, 2019, as compared to the year ended December 31, 2018. The increase in interest expense was a result of the $5.6 million amortization of debt discount and issuance costs and $0.3 million of interest expense related to the Convertible Senior Notes and $0.2 million of increased interest expense due to increased borrowings under the line of credit during the year ended December 31, 2019.

Other income, net

(dollars in thousands)	Year ended December 31, 2019	2018	Change $	%
Other income, net	$ (1,552)	$ (2,580)	$ (1,028)	(40%)
As a percent of consolidated revenue	—%	(1%)		

Other income, net decreased by $1.0 million for the year ended December 31, 2019, as compared to the year ended December 31, 2018. This decrease was due to fluctuations in the United States dollar relative to other functional currencies during the year ended December 31, 2019, compared to the year ended December 31, 2018.

Income tax expense

(dollars in thousands)	Year ended December 31, 2019	2018	Change $	%
Income tax expense	$ 10,930	$ 11,489	$ (559)	(5%)

The effective tax rate was 323% and 43% for the year ended December 31, 2019 and 2018, respectively. The tax rate is affected by the Company being a U.S. resident taxpayer, the tax rates in the U.S. and other jurisdictions in which the Company operates, the relative amount of income earned by jurisdiction and the relative amount of losses or income for which no benefit or expense is recognized. The effective tax rate was impacted by the geographic income mix in 2019 as compared to 2018, primarily related to a United States pre-tax loss of $14.6 million for the year ended December 31, 2019, for which a tax benefit was not recognized due to the valuation allowance, compared to a United States pre-tax income of $4.2 million for the year ended December 31, 2018, for which tax expense was not recognized due to the valuation allowance. Income tax expense also includes taxes withheld outside of the United States attributable to remittances to the Company from certain foreign subsidiaries for which offsetting tax credits are not recognizable due to valuation allowance considerations.

Offsetting the impact to the tax expense and the effective tax rate for December 31, 2019, was a reversal of reserve adjustments recorded for uncertain tax positions of $1.1 million.

For information regarding the comparison of results of operations for the years ended December 31, 2018 and 2017, please see Item 7 of our Annual Report on Form 10-K for the year ended December 31, 2018.

Non-GAAP financial measures

In analyzing and planning for our business, we supplement our use of GAAP financial measures with non-GAAP financial measures, including Billings as a liquidity measure, Adjusted EBITDA and Modified Adjusted EBITDA as performance measures and Free Cash Flow as a liquidity measure. See Part II, Item 6, Selected Financial Data for information regarding the limitations of using non-GAAP financial measure and for reconciliations of these non-GAAP financial measures to the most directly comparable financial measure calculated in accordance with GAAP.

Our Billings were as follows:

	Year ended December 31,		2018 to 2019 Change
(in thousands, except percentages)	**2019**	**2018**	**%**
Billings	$ 475,963	$ 401,913	18%

Billings increased by $74.1 million, or 18%, for the year ended December 31, 2019, as compared to the year ended December 31, 2018. This increase in Billings was attributable to a 24% increase in Software segment billings. On a constant currency basis, billings increased $81.8 million or 20% for the year ended December 31, 2019.

Our Adjusted EBITDA was as follows:

	Year ended December 31,		2018 to 2019 Change
(in thousands, except percentages)	**2019**	**2018**	**%**
Adjusted EBITDA	$ 39,549	$ 50,180	(21%)

Adjusted EBITDA decreased by $10.6 million, or 21%, for the year ended December 31, 2019, as compared to the year ended December 31, 2018. This decrease in Adjusted EBITDA was primarily attributable to the increased employee costs from acquired companies in addition to strategic hiring within our global sales organization. Further impacting Adjusted EBITDA is the revenue not recognized under GAAP due to acquisition accounting adjustments associated with accounting for deferred revenue in significant business combinations amounting to $9.0 million in 2019.

Our Modified Adjusted EBITDA was as follows:

	Year ended December 31,		**2018 to 2019 Change**
(in thousands, except percentages)	**2019**	**2018**	**%**
Modified Adjusted EBITDA	$ 48,549	$ 50,180	(3%)

Our Free Cash Flow was as follows:

	Year ended December 31,		2018 to 2019 Change
(in thousands, except percentages)	**2019**	**2018**	**%**
Net cash provided by operating activities	$ 31,393	$ 36,230	(13%)
Free Cash Flow	$ 21,733	$ 29,571	(27%)

Free Cash Flow decreased by $7.8 million, or 27%, for the year ended December 31, 2019, as compared to year ended December 31, 2018. This decrease in Free Cash Flow was attributable to a decrease in net cash from operating activities of $4.8 million in 2019 as a result of net changes to our working capital position, primarily related to the acceleration in the timing of funding payroll in the United States, and an increase in capital spending of $3.0 million in the year ended December 31, 2019.

Liquidity and capital resources

Our principal sources of liquidity have been the net payments received from global customers using our software and services and net proceeds from our convertible debt offering, as well as periodic draws on our credit facilities, when needed. We believe that funds generated from operations, with cash and cash equivalents and the amounts available to us to borrow under our credit facility, will be sufficient to meet our anticipated cash needs for at least the next 12 months.

Revolving credit facility

We have a $150.0 million credit facility that was amended on June 5, 2019, to permit the issuance of the Convertible Notes and extend the maturity date of the credit facility to December 15, 2023 (“2019 Amended Credit Agreement”). The 2019 Amended Credit Agreement allows us to request that the aggregate commitments under the 2019 Amended Credit Agreement be increased by up to $50.0 million for a total of $200.0 million, subject to certain conditions.

As of December 31, 2019, we had no outstanding borrowings under the 2019 Amended Credit Agreement and there was $150.0 million available for future borrowing. The 2019 Amended Credit Agreement is available for general corporate purposes, including working capital, capital expenditures and permitted acquisitions.

The 2019 Amended Credit Agreement is secured by collateral including (i) substantially all of our properties and assets, and the properties and assets of our domestic subsidiaries but excluding any patents, copyrights, patent applications or copyright applications or any trade secrets or software products and (ii) pledges of the equity interests in all present and future domestic subsidiaries (subject to certain exceptions as provided for under the 2019 Amended Credit Agreement). Our direct and indirect domestic subsidiaries are guarantors of all of the obligations under the 2019 Amended Credit Agreement. In addition, the 2019 Amended Credit Agreement contains financial covenants which require, as of the end of each fiscal quarter, the maintenance of a minimum Interest Coverage Ratio of 3.0 to 1.0 a maximum Senior Secured Leverage Ratio of 3.0 to 1.0 and a maximum net Leverage Ratio of 5.0 to 1.0, as such terms are defined in the 2019 Amended Credit Agreement. At December 31, 2019, we were in compliance with all financial covenants. For additional information about the 2019 Amended Credit Agreement, see Note 7 in the Notes to consolidated financial statements in Item 15, Part IV of this Annual Report on Form 10-K.

Cash flows

As of December 31, 2019 and 2018, respectively, we had an aggregate of cash and cash equivalents of $223.1 million and $35.3 million, which we held for working capital purposes, acquisitions, and capital expenditures. At December 31, 2019 and 2018, respectively, $180.5 million and $3.1 million of this aggregate amount was held in the United States and $35.1 million and $28.9 million was held in the APAC and EMEA regions with the remainder held in Canada, Mexico, and South America.

Other than statutory limitations, there are no significant restrictions on the ability of our subsidiaries to pay dividends or make other distributions to Altair. Based on our current liquidity needs and repatriation strategies, we expect that we can manage our global liquidity needs without material adverse tax implications. The 2017 changes in U.S. tax law could materially affect our tax obligations. For further discussion, please see “Item 1A. Risk Factors – New legislations or tax-reform policies that would change U.S. or foreign taxation of international business activities, including uncertainties in the interpretation and application of the 2017 Tax Cuts and Jobs Act, could materially affect our tax obligations and effective tax rate.”

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

	Year ended December 31,		
(in thousands)	**2019**	**2018 (1)**	**2017 (1)**
Net cash provided by operating activities	$ 31,393	$ 36,230	$ 16,091
Net cash used in investing activities	(35,839)	(206,210)	(24,851)
Net cash provided by financing activities	191,916	167,530	29,558
Effect of exchange rate changes on cash, cash equivalents and restricted cash	342	(1,443)	1,641
Net increase (decrease) in cash, cash equivalents and restricted cash	$ 187,812	$ (3,893)	$ 22,439

(1) For information regarding a comparison of net cash provided/used in operating activities, investing activities and financing activities for the years ended December 31, 2018 and 2017, please see Item 7 of our Annual Report on Form 10-K for the year ended December 31, 2018.

Net cash provided by operating activities

Net cash provided by operating activities for the year ended December 31, 2019 was $31.4 million, which reflects a decrease of $4.8 million compared to the year ended December 31, 2018. This decrease was the result of changes to our working capital position for the year ended December 31, 2019, primarily related to the acceleration in the timing of funding payroll in the United States, as compared to the year ended December 31, 2018.

Net cash used in investing activities

Net cash used in investing activities for the year ended December 31, 2019 was $35.8 million, which reflects a decrease of $170.4 million compared to the year ended December 31, 2018. This decrease was primarily the result of a decrease in cash payments for business acquisitions in the year ended December 31, 2019, offset by cash received from the sale of a building in the year ended December 31, 2018.

Net cash provided by financing activities

Net cash provided by financing activities for the year ended December 31, 2019 was $191.9 million, which reflects an increase in cash provided of $24.4 million compared with the year ended December 31, 2018. For the year ended December 31, 2019, we received aggregate proceeds of $223.1 million from our Convertible Notes offering, net of underwriters' discounts and commissions and expenses, and we had net cash payments on our revolving commitment of $31.0 million. For the year ended December 31, 2018, we received aggregate proceeds of $135.6 million from our follow-on public offering, net of underwriters' discounts and commissions, and we had net cash borrowings on our revolving commitment of $31.0 million.

Effect of exchange rate changes on cash, cash equivalents and restricted cash

There was a favorable effect of exchange rate changes on cash, cash equivalents and restricted cash of $0.3 million for the year ended December 31, 2019, compared to an adverse effect of exchange rates changes on cash, cash equivalents and restricted cash of $1.4 million for the year ended December 31, 2018.

Commitments and contractual obligations

Our principal commitments and contractual obligations at December 31, 2019 consist of our Convertible Notes due in 2024, obligations under operating leases for our office facilities and other debt obligations. The following summarizes our non-cancelable contractual obligations as of December 31, 2019:

		Payments due by period			
(in thousands)	**Total**	**Less than 1 year**	**1-3 years**	**3-5 years**	**More than 5 years**
Convertible senior notes	$ 230,000	$ —	$ —	$ 230,000	$ —
Aggregate interest obligations (1)	$ 2,540	575	1,150	815	—
Operating lease obligations	$ 32,858	10,444	13,945	5,414	3,055
Royalties	$ 865	455	410	—	—
Finance lease obligations	$ 1,141	462	617	62	—
Other long-term liabilities	$ 2,987	1,786	1,201	—	—
Total	$ 270,391	$ 13,722	$ 17,323	$ 236,291	$ 3,055

(1) Represents estimated aggregate interest obligations for our outstanding convertible senior notes that are payable in cash.

The table does not include contractual obligations associated with our pension and post-retirement benefit plans. As of December 31, 2019, we had recognized a net benefit liability of $11.0 million. For additional information on pension and other post-retirement benefits, including expected benefit payments for the next 10 years, see Note 16 in the Notes to consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

The table also does not include liabilities associated with uncertain tax positions due to the high degree of uncertainty regarding the future cash outflows associated with these amounts. For additional discussion of uncertain tax positions, see Note 14 in the Notes to consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

Off-balance sheet arrangements

Through December 31, 2019, we did not have any relationships with unconsolidated organizations or financial partnerships, such as structured finance or special purpose entities that would have been established for the purpose of facilitating off-balance sheet arrangements or other contractually narrow or limited purposes.

Critical accounting policies and estimates

Our management's discussion and analysis of our financial condition and results of operations is based on our financial statements, which have been prepared in accordance with GAAP. The preparation of these financial statements requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements, as well as the reported revenues generated and expenses incurred during the reporting periods. Our estimates are based on our historical experience and on various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying value 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 accounting policies discussed below are critical to understanding our historical and future performance, as these policies relate to the more significant areas involving management's judgments and estimates. For further discussion on our significant accounting policies, see Note 2 in the Notes to consolidated financial statements in Item 15, Part IV of this Annual Report on Form 10-K.

Revenue recognition

We generate revenue from our Software and CES segments and our other businesses. Revenue is recognized by identifying a contract with a customer, identifying the performance obligations in the contract, determining the transaction price, allocating the transaction price to the performance obligations in the contract, and recognizing revenue when (or as) we satisfy a performance obligation.

Software

Software revenue includes product revenue from software product licensing arrangements, related services consisting of software maintenance and support in the form of post-contract customer support (PCS or maintenance) and professional services such as consulting and training services. Software products are sold to customers primarily under a term-based software licensing model and to a lesser degree, perpetual software licenses. We enter into contracts that include combinations of products, maintenance and services, which are accounted for as separate performance obligations with differing revenue recognition patterns.

Most term-based software license agreements include our patented units-based subscription model which allows customers to license a pool of units for their organizations, providing individual users flexible access to our entire portfolio of engineering software applications as well as to our growing portfolio of partner products. The amount of software usage is limited by the number of the units licensed by the customer. Revenue from these arrangements is fixed (based on the units licensed) and is not based on actual customer usage of each software product.

Revenue from term-based software licenses is classified as license software revenue. Term-based licenses are sold only as a bundled arrangement that includes the rights to a term software license and PCS, which includes unspecified technical enhancements and customer support. Maximizing the use of observable inputs, we determined that a majority of the estimated standalone selling price of the term-based license is attributable to the term license and a minority is attributable to the PCS. The license component is recognized as revenue upon the later of delivery of the licensed product or the beginning of the license period. The PCS is classified as maintenance revenue and is recognized ratably over the term of the contract, as we provide the PCS benefit over time.

In addition to term-based software licenses, we sell perpetual licenses. Typically, our perpetual licenses are sold with PCS, which includes unspecified technical enhancements and customer support. Revenue from the software component is classified as license software revenue and is recognized upon the later of delivery of the licensed product or the beginning of the license period. We allocate values in bundled perpetual and PCS arrangements based on the standalone selling prices of the perpetual license and PCS. Revenue from PCS is classified as maintenance revenue and is recognized ratably over the term of the contract, as we satisfy the PCS performance obligation over time.

Revenue from training, consulting and other services is recognized as the services are performed. For contracts in which the service consists of a single performance obligation, such as providing a training class to a customer, we recognize revenue upon completion of the performance obligation. For service contracts that are longer in duration and often include multiple performance obligations (for example, both training and consulting), we measure the progress toward completion of the obligations and recognizes revenue accordingly. In measuring progress towards the completion of performance obligations, we typically utilize output-based estimates for services with contractual billing arrangements that are not based on time and materials, and estimate output based on the total tasks completed as compared to the total tasks required for each work contract. Input-based estimates are utilized for services that involve general consultations with contractual billing arrangements based on time and materials, utilizing direct labor as the input measure.

We also execute arrangements through indirect channel partners in which the channel partners are authorized to market and distribute our software products to end users of our products and services in specified territories. In sales facilitated by channel partners, the channel partner generally bears the risk of collection from the end-user customer. We recognize revenue from transactions with channel partners when the channel partner submits a purchase commitment, collectability from the channel partner is probable, and the performance obligation was met, at a point in time or over time as appropriate, provided that all other revenue recognition criteria are satisfied. Revenue from channel partner transactions is the amount remitted to us by the channel partners. This amount includes a fee for

PCS that is compensation for providing technical enhancements and the second level of technical support to the end user, which is recognized over the period that PCS is to be provided. We do not offer right of return, product rotation or price protection to any of its channel partners.

Some of our contracts with customers contain multiple performance obligations. Judgment is required in determining whether each performance obligation is distinct. We allocate the transaction price for each contract to each performance obligation based on the relative standalone selling price, or SSP, for each performance obligation within each contract. The SSP is the price that we would sell a promised service separately to one of our customers. Judgment is required to determine the SSP for each distinct performance obligation. We estimate SSP using information such as past transactions, internally approved pricing guidelines related to the performance obligations and other information reasonably available to us.

Non-income related taxes collected from customers and remitted to governmental authorities are recorded on the consolidated balance sheet as accounts receivable, net and other accrued expenses and current liabilities. These amounts are reported on a net basis in the consolidated statements of operations and do not impact reported revenues or expenses. Certain hardware revenue is included within software revenue and is recognized when all revenue recognition criteria stated above are met, which is generally when the products are delivered to end customers.

Software related services

Consulting services from product design and development projects are considered distinct performance obligations and are provided to customers on a time-and-materials, or T&M, or fixed-price basis. Altair recognizes services revenue from our T&M contracts using input-based estimates, utilizing direct labor and contractually agreed-upon hourly rates as the input measure. For fixed-price contracts, software services revenue is recognized over time using a method that measures the extent of progress towards completion of a performance obligation, generally using a cost-input method where revenue is recognized based on the proportion of total cost incurred to estimated total costs at completion. If output or input measures are not available or cannot be reasonably estimated, revenue is recognized upon completion of the services.

Client engineering services

CES revenue is derived from our hiring of engineers and data scientists for placement at a customer site for specific customer-directed assignments. These professional services are considered distinct performance obligations and are provided to customers on a T&M basis. We recognize client engineering services revenue based upon hours worked and contractually agreed-upon hourly rates.

Other

Other revenue includes product revenue from the sale of LED products for the replacement of fluorescent tubes. Revenue from the sale of LED products for the replacement of fluorescent tubes is recognized when all revenue recognition criteria stated above are met, which is generally when the products are delivered to resellers or to end customers. Sales returns, which reduce revenue and cost of revenue, are estimated using historical experience.

Acquisitions

We account for acquisitions of entities that include inputs and processes and have the ability to create outputs as business combinations. We allocate the fair value of purchase consideration of acquired businesses to the identifiable tangible and intangible assets acquired and liabilities assumed in the transaction based upon their estimated fair values as of the acquisition date. The excess of the purchase price over those fair values is recorded as goodwill. During the measurement period, which may be up to one year from the acquisition date, we may record adjustments to the assets acquired and liabilities assumed with the corresponding offset to goodwill. Upon the conclusion of the measurement period or final determination of the values of assets acquired or liabilities assumed, whichever comes first, any subsequent adjustments are recorded to the consolidated statements of operations.

We determine the estimated fair values using information available to us and engage independent third-party valuation specialists when necessary. We generally use an income approach to determine the fair value of intangible assets acquired. Estimating fair values can be complex and subject to significant business judgment. Critical estimates in valuing certain of the intangible assets we have acquired include, but are not limited to, future expected cash flows from product sales, customer contracts and acquired technologies, expenses to operate the acquired business, and discount rates. Unanticipated events and circumstances may occur that could affect either the accuracy or validity of such assumptions, estimates or actual results. Although we believe the assumptions and estimates we have made in the past have been reasonable and appropriate, these estimates are based on historical experience and information obtained from the management of the acquired companies and are inherently uncertain.

Goodwill and indefinite-lived intangible assets

In accordance with ASC 360, we assess the carrying value of goodwill each year, based on weighting estimates of future cash flows from the reporting units or estimates of the market value of the reporting units, based on comparable companies. We also perform impairment analyses whenever events or circumstances indicate that goodwill or certain intangibles may be impaired. These estimates of future discounted cash flows are based upon historical results, adjusted to reflect our best estimate of future market and operating conditions. Historically, actual results have occasionally differed from our estimated future cash flow estimates. In the future, actual results may differ materially from these estimates. In addition, the comparable companies used to establish market value for our reporting units is based on management's judgment.

The timing and size of any future impairment charges involves the application of our estimates and judgment and could result in the impairment of all, or substantially all, of our goodwill or intangible assets.

Accounting for income taxes

We utilize the asset and liability method of accounting for income taxes in accordance with ASC 740, *Accounting for Income Taxes*. Under this method, deferred tax assets and liabilities are determined based on differences between the financial reporting and tax basis of assets and liabilities. Deferred tax assets and liabilities are measured using the enacted tax rates and statutes that will be in effect when those differences are expected to reverse. Deferred tax assets can result from unused operating losses, research and development credits, foreign tax credit carryforwards, and deductions recorded for financial statement purposes prior to them being deductible on a tax return. 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 reversal of taxable temporary differences. We consider, among other available information, scheduled reversals of deferred tax liabilities, projected future taxable income, limitations on the availability of tax credit carryforwards, and other evidence assessing the potential realization of deferred tax assets. Adjustments to the valuation allowance are included in the tax provision in our consolidated statements of operations in the period they become known or can be estimated.

The valuation allowance is based on our estimates of taxable income for jurisdictions in which we operate and the period over which our deferred tax assets may be recoverable. Historically, we have had substantial United States tax credit carryforwards which began to expire in 2018. The ability to utilize these DTAs is highly dependent upon our ability to generate taxable income in the United States in the future.

We apply a more-likely-than-not recognition threshold to our accounting for tax uncertainties. We review all of our tax positions and make determinations as to whether our tax positions are more likely than not to be sustained upon examination by the relevant taxing authorities. Only those benefits, or exposures, that have a greater than fifty percent likelihood of being sustained upon examination by taxing authorities are recognized. Interest and penalties related to uncertain tax positions are recorded in income tax expense (benefit) in the consolidated statements of operations.

Recently issued accounting pronouncements

For information regarding recent accounting guidance and the impact of this guidance on our consolidated financial statements, see Note 2 of the Notes to consolidated financial statements in Item 15, Part IV of this Annual Report on Form 10-K, which is incorporated by reference.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

We are exposed to certain global market risks, including foreign currency exchange risk and interest rate risk associated with our debt.

Foreign Currency Risk

As a result of our substantial international operations, we are exposed to foreign currency risks that arise from our normal business operations, including in connection with our transactions that are denominated in foreign currencies. In addition, we translate sales and financial results denominated in foreign currencies into United States dollars for purposes of our consolidated financial statements. As a result, appreciation of the United States dollar against these foreign currencies generally will have a negative impact on our reported revenue and operating income while depreciation of the United States dollar against these foreign currencies will generally have a positive effect on reported revenue and operating income.

To date, we have not entered into any foreign currency hedging contracts, since exchange rate fluctuations have not had a material impact on our operating results and cash flows. Based on our current international operations, we do not plan on engaging in hedging activities in the near future.

Market Risk and Interest Rate Risk

In June 2019, we issued $230.0 million aggregate principal amount of 0.250% Convertible Notes. Our Convertible Notes have fixed annual interest rates at 0.250% and, therefore, we do not have economic interest rate exposure on our Convertible Notes. However, the value of the Convertible Notes is exposed to interest rate risk. Generally, the fair market value of our fixed interest rate Convertible Notes will increase as interest rates fall and decrease as interest rates rise. In addition, the fair values of the Convertible Notes are affected by our stock price. The fair value of the Convertible Notes will generally increase as our Class A common stock price increases in value and will generally decrease as our Class A common stock price declines in value. Additionally, we carry the Convertible Notes at face value less unamortized discount and issuance costs on our balance sheet, and we present the fair value for required disclosure purposes only.

As of December 31, 2019 and 2018, we had cash, cash equivalents and restricted cash of $223.5 million and $35.7 million, respectively, consisting primarily of bank deposits and money market funds. As of December 31, 2019 and 2018, we had no borrowings outstanding under our credit agreement. Such interest-bearing instruments carry a degree of interest rate risk; however, historical fluctuations of interest expense have not been significant.

Interest rate risk relates to the gain/increase or loss/decrease we could incur on our debt balances and interest expense associated with changes in interest rates. It is our policy not to enter into derivative instruments for speculative purposes, and therefore, we hold no derivative instruments for trading purposes.

Item 8. Financial Statements and Supplementary Data.

The financial statements required by this Item 8 are included in our consolidated financial statements and set forth in the pages indicated in Part IV, Item 15(a) of this Annual Report on Form 10-K and are incorporated herein by reference. The supplementary financial information required by this Item 8 is included in Note 20 of the Notes to consolidated financial statements and set forth in the pages indicated in Part IV, Item 15(a) of this Annual Report on Form 10-K and is incorporated herein by reference.

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure.

None.

Item 9A. Controls and Procedures

(a) Evaluation of Disclosure Controls and Procedures

The Company maintains disclosure controls and procedures (as defined in Rule 13a-15(e) or 15d-15(e) of the Exchange Act) that are designed to ensure that information required to be disclosed in periodic reports filed with the SEC under the Securities Exchange Act of 1934 is recorded, processed, summarized and reported within the time periods specified in the SEC’s rules and forms, and that such information is accumulated and communicated to the Company’s management, including its Chief Executive Officer and Chief Financial Officer, as appropriate, to allow timely decisions regarding required disclosure. The Company's management, with the participation of its Chief Executive Officer and Chief Financial Officer, has evaluated the effectiveness of the design and operation of our disclosure controls and procedures (as defined in Rule 13a-15(e) and Rule 15d-15(e) under the Securities Exchange Act of 1934 (the “Exchange Act”)) as of December 31, 2019. Based upon that evaluation, the Company's Chief Executive Officer and Chief Financial Officer have concluded that our disclosure controls and procedures were effective as of December 31, 2019.

(b) Management’s Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Exchange Act Rule 13a-15(f) and 15d(f). 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 United States generally accepted accounting principles. 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. A material weakness is a deficiency, or a 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.

Our management, including our Chief Executive Officer and Chief Financial Officer, conducted an assessment of the effectiveness of our internal control over financial reporting as of December 31, 2019 based on the criteria established by Internal Control – Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework). In accordance with guidance issued by the Securities and Exchange Commission, companies are permitted to exclude acquisitions from their assessment of internal control over financial reporting for the first fiscal year in which the acquisition occurred. Accordingly, we have excluded from our assessment the internal control over financial reporting of Polliwog Co. Ltd. and DEM Solutions Limited, which are included in our December 31, 2019 consolidated financial statements and constituted 2% and 5% of total and net assets (excluding acquired goodwill and intangible assets), respectively, as of December 31, 2019, and 0% of revenues for the year then ended. We have excluded all current year acquisitions from our annual assessment of and conclusion on the effectiveness of our internal control over financial reporting.

Based on the evaluation under these frameworks, management has concluded that our internal control over financial reporting was effective as of December 31, 2019. The results of management's assessment have been reviewed with the Audit Committee.

The effectiveness of our internal control over financial reporting at December 31, 2019, has been audited by Ernst & Young LLP, an independent registered public accounting firm, as stated in their report which is included elsewhere herein.

Remediation of Previously Reported Material Weakness

The material weakness over the income tax process that was previously reported in Item 9A of our Annual Report on Form 10-K for the fiscal year ended December 31, 2018, was remediated during our fiscal year ended December 31, 2019, and we determined that we maintained effective internal controls over our income tax process as of December 31, 2019.

Management took significant steps to remediate the control deficiencies that led to the material weakness. Our efforts consisted primarily of strengthening our tax organization and re-designing a suite of controls related to the components of our income tax process, including the tax accounting over acquisitions and routine and non-routine transactions. The key remediation actions taken included:

- Re-designing our management review controls and enhancing the precision of review around the key income tax areas; and
- Demonstrating operating effectiveness of our management review controls over income taxes.

(c) Changes in Internal Control Over Financial Reporting

Other than those described above, there was no change in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f)) under the Exchange Act) that occurred during the fourth quarter ended December 31, 2019, that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information.

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

The information called for by this item will be set forth in our Proxy Statement for the 2020 Annual Meeting of Stockholders to be filed with the SEC within 120 days of the fiscal year ended December 31, 2019, or Proxy Statement, and is incorporated herein by reference.

Item 11. Executive Compensation.

The information called for by this item will be set forth in our Proxy Statement and is incorporated herein by reference.

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

The information required by this item will be set forth in our Proxy Statement and is incorporated herein by reference.

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

The information required by this item will be set forth in our Proxy Statement and is incorporated herein by reference.

Item 14. Principal Accountant Fees and Services.

The information required by this item will be set forth in our Proxy Statement and is incorporated herein by reference.

PART IV

Item 15. Exhibits, Financial Statement Schedules.

(a) *Documents Filed as Part of This Annual Report on Form 10-K:*

(1) *Financial Statements:* The following consolidated financial statements and reports of the independent registered account firm are filed as part of this report:

(2) *Financial Statement Schedule:* The following financial statement schedule is filed as part of this report and should be read in conjunction with the consolidated financial statements.

Schedule II – Valuation and Qualifying Accounts
(in thousands)

	Balance at beginning of year	Additions	Deductions	Balance at end of year
Allowance for Doubtful Accounts				
Year ended December 31, 2019	$ 1,150	$ 671	$ (406)	$ 1,415
Year ended December 31, 2018	$ 798	$ 394	$ (42)	$ 1,150
Year ended December 31, 2017	$ 565	$ 610	$ (377)	$ 798

Schedules not listed above have been omitted because they are not applicable, are not required or the information required to be set forth therein in included in the consolidated financial statements or notes thereto.

(3) *Exhibits:* The exhibits listed in the accompanying Exhibit Index immediately following the financial statements are filed as part of, or incorporated by reference into, this Annual Report on Form 10-K.

(b) *Exhibits:* See Item 15(a)(3) as set forth above.

(c) *Financial Statement Schedules:* See Item 15(a)(2) as set forth above.

Report of Independent Registered Public Accounting Firm

To the Stockholders and the Board of Directors of Altair Engineering Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Altair Engineering Inc. and subsidiaries (the Company) as of December 31, 2019 and 2018, the related consolidated statements of operations, comprehensive (loss) income, changes in stockholders' equity (deficit) and cash flows for each of the three years in the period ended December 31, 2019, and the related notes and financial statement schedule listed in the Index at Item 15(a) (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2019 and 2018, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2019, 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 December 31, 2019, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework), and our report dated March 2, 2020 expressed an unqualified opinion thereon.

Adoption of New Accounting Standards

As discussed in Note 3 to the consolidated financial statements, the Company changed its method of accounting for revenue from contracts with customers, and incremental costs to acquire contracts with customers effective January 1, 2018, using the modified retrospective approach.

Basis for Opinion

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

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

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current period audit of the 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 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 separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Software Revenue Recognition

Description of the Matter	As described in Note 3, the Company's software contracts with customers typically include a promise to transfer licenses and services to a customer. Judgement is required to allocate the transaction price to each of these performance obligations. The Company's determination of standalone selling price for performance obligations is based on the midpoint of the range of historical observable prices for goods and services sold separately. In addition, the Company estimates the standalone selling price for certain performance obligations where observable prices are not directly available or a significant portion of historical prices are not within the range. The Company estimates the standalone selling price for each performance obligation at contract inception considering all information that is reasonably available and is based on the amount of consideration for which the Company expects to be entitled in exchange for transferring the promised good or service to the customer. Auditing the Company's estimate of the standalone selling prices in software contracts was challenging and complex due to the Company's wide range of observable prices from goods or services sold separately and the estimation used for certain performance obligations where observable prices are not available.
How We Addressed the Matter in Our Audit	We obtained an understanding, evaluated the design and tested the operating effectiveness of the Company's process and controls to establish and monitor the relative standalone selling price for each distinct performance obligation in software contracts. To test the estimated standalone selling prices, our audit procedures included, among others, evaluating the assumptions used by the Company to determine the standalone selling price for each distinct performance obligation in software contracts. For example, we evaluated the methodology used to determine the standalone selling price by testing a historical analysis prepared by the Company and practices observed in the industry. We also tested the data used in the analysis and recalculated the standalone selling prices.
	Business Combination
Description of the Matter	As described in Note 4, the Company completed the acquisition of Polliwog Co. Ltd and DEM Solutions Limited for aggregate consideration of $33.2 million. Each transaction was accounted for as a business combination. The significant estimation uncertainty was primarily due to the sensitivity of the respective fair values to the underlying assumptions regarding future performance of the acquired business and the limited historical data on which to base these assumptions. The significant assumptions used to estimate the value of the identified intangible assets include valuation methods selected, discount rates, and certain assumptions that form the basis of the forecasted results (e.g., revenue growth rates, and operating expenses as a percentage of revenue). Auditing the Company's accounting for the acquisition of Polliwog and DEM Solutions was complex due to the significant estimation required in determining the fair value of the identified intangibles, which primarily consisted of developed technology of $4.1 million and customer relationships of $3.6 million.
How We Addressed the Matter in Our Audit	We obtained an understanding, evaluated the design and tested the operating effectiveness of the Company's controls over its accounting for acquisitions. For example, we tested controls over the estimation process supporting the recognition and measurement of the identified intangible assets, including management's evaluation of underlying assumptions (e.g., revenue growth rates, operating expenses and as a percentage of revenue). In addition, we tested controls over management's review of specialist valuation calculation, the review includes validating the discount rates selected and methods used. To test the estimated fair value of the identified intangible assets, our audit procedures included, evaluating the Company's selection of valuation methodology and testing the significant assumptions used in the model. We involved our valuation specialists to assist with our evaluation of the methodology and discount rates used by the Company and significant assumptions included in the fair value estimates. We performed procedures to test the assumptions in the forecasted data which is used in the model. For example, we compared revenue growth rates to historical results of the acquired business, to third party market data, to peer companies with in the same industry and to other acquisitions completed by the Company in the past. We compared operating expenses as a percentage of revenue to historical results of the acquired company, and to other acquisitions completed by the Company in the past.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2015.

Detroit, Michigan
March 2, 2020

Report of Independent Registered Public Accounting Firm

To the Stockholders and the Board of Directors of Altair Engineering Inc.

Opinion on Internal Control over Financial Reporting

We have audited Altair Engineering Inc. and subsidiaries internal control over financial reporting as of December 31, 2019, based on criteria established in Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) (the COSO criteria). In our opinion, Altair Engineering Inc. and subsidiaries (the Company) maintained, in all material respects, effective internal control over financial reporting as of December 31, 2019, based on the COSO criteria.

As indicated in the accompanying Management's Report on Internal Control over Financial Reporting, management's assessment of and conclusion on the effectiveness of internal control over financial reporting did not include the internal controls of Polliwog Co. Ltd. and DEM Solutions Limited, which are included in the December 31, 2019 consolidated financial statements of the Company and constituted 2% and 5% of total and net assets (excluding acquired goodwill and intangible assets), respectively, as of December 31, 2019 and 0% of revenues for the year then ended. Our audit of internal control over financial reporting of the Company also did not include an evaluation of the internal control over financial reporting of all current year acquisitions.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the 2019 consolidated financial statements of the Company and our report dated March 2, 2020 expressed an unqualified opinion thereon.

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 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 included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and 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/ Ernst & Young LLP

Detroit, Michigan
March 2, 2020

ALTAIR ENGINEERING INC. AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS

(in thousands)	December 31, 2019	December 31, 2018
ASSETS		
CURRENT ASSETS		
Cash and cash equivalents	$ 223,117	$ 35,345
Accounts receivable, net	104,984	96,803
Income tax receivable	7,264	4,431
Prepaid expenses and other current assets	17,092	17,455
Total current assets	352,457	154,034
Property and equipment, net	36,297	30,153
Operating lease right of use assets	28,134	—
Goodwill	233,683	210,532
Other intangible assets, net	67,075	69,836
Deferred tax assets	5,791	5,354
Other long-term assets	19,708	17,288
TOTAL ASSETS	$ 743,145	$ 487,197
LIABILITIES, MEZZANINE EQUITY AND STOCKHOLDERS' EQUITY		
CURRENT LIABILITIES		
Current portion of long-term debt	$ 430	$ 331
Accounts payable	8,585	8,357
Accrued compensation and benefits	30,676	31,740
Current portion of operating lease liabilities	9,141	—
Other accrued expenses and current liabilities	28,603	27,039
Deferred revenue	75,431	59,765
Total current liabilities	152,866	127,232
Long-term debt, net of current portion	178,238	31,417
Operating lease liabilities, net of current portion	20,174	—
Deferred revenue, non-current	8,136	6,754
Other long-term liabilities	26,672	25,756
TOTAL LIABILITIES	386,086	191,159
Commitments and contingencies		
MEZZANINE EQUITY	2,352	2,352
STOCKHOLDERS' EQUITY		
Preferred stock ($0.0001 par value), authorized 45,000 shares, none issued and outstanding	—	—
Common stock ($0.0001 par value)		
Class A common stock, authorized 513,797 shares, issued and outstanding 41,271 and 38,349 shares as of December 31, 2019 and 2018, respectively	4	4
Class B common stock, authorized 41,203 shares, issued and outstanding 31,131 and 32,171 shares as of December 31, 2019 and 2018, respectively	3	3
Additional paid-in capital	446,633	379,832
Accumulated deficit	(82,405)	(74,863)
Accumulated other comprehensive loss	(9,528)	(11,290)
TOTAL STOCKHOLDERS' EQUITY	354,707	293,686
TOTAL LIABILITIES, MEZZANINE EQUITY AND STOCKHOLDERS' EQUITY	$ 743,145	$ 487,197

See accompanying notes to consolidated financial statements.

ALTAIR ENGINEERING INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF OPERATIONS

	Year ended December 31,		
(in thousands, except per share data)	**2019**	**2018**	**2017 (1)**
Revenue			
License	$ 244,321	$ 207,164	
Maintenance and other services	122,381	97,197	
Total software	366,702	304,361	$ 244,817
Software related services	34,576	36,945	35,397
Total software and related services	401,278	341,306	280,214
Client engineering services	48,987	47,852	46,510
Other	8,650	7,221	6,609
Total revenue	458,915	396,379	333,333
Cost of revenue			
License	21,285	16,119	
Maintenance and other services	38,401	29,655	
Total software	59,686	45,774	36,360
Software related services	25,640	26,415	26,888
Total software and related services	85,326	72,189	63,248
Client engineering services	39,875	38,979	38,131
Other	7,398	4,805	5,212
Total cost of revenue	132,599	115,973	106,591
Gross profit	326,316	280,406	226,742
Operating expenses			
Research and development	117,510	97,592	93,234
Sales and marketing	106,051	80,277	79,958
General and administrative	82,178	79,751	87,979
Amortization of intangible assets	14,442	7,739	5,448
Other operating income	(2,072)	(9,597)	(6,620)
Total operating expenses	318,109	255,762	259,999
Operating income (loss)	8,207	24,644	(33,257)
Interest expense	6,371	200	2,160
Other (income) expense, net	(1,552)	(2,580)	994
Income (loss) before income taxes	3,388	27,024	(36,411)
Income tax expense	10,930	11,489	65,530
Net (loss) income	$ (7,542)	$ 15,535	$ (101,941)
(Loss) income per share:			
Net (loss) income per share attributable to common stockholders, basic	$ (0.11)	$ 0.23	$ (1.94)
Net (loss) income per share attributable to common stockholders, diluted	$ (0.11)	$ 0.21	$ (1.94)
Weighted average shares outstanding:			
Weighted average number of shares used in computing net (loss) income per share, basic	71,544	67,468	52,466
Weighted average number of shares used in computing net (loss) income per share, diluted	71,544	74,878	52,466

(1) The year ended December 31, 2017 has been reported under ASC 605 and has not been adjusted under the modified retrospective approach of ASC 606. See Note 3 – Revenue from contracts with customers for the effect of the adoption of ASC 606 on the Company's consolidated financial statements.

See accompanying notes to consolidated financial statements.

ALTAIR ENGINEERING INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF COMPREHENSIVE (LOSS) INCOME

	Year ended December 31,		
(in thousands)	**2019**	**2018**	**2017**
Net (loss) income	$ (7,542)	$ 15,535	$ (101,941)
Other comprehensive (loss) income, net of tax:			
Foreign currency translation (net of tax effect of $0 for all periods)	1,895	(5,449)	2,351
Retirement related benefit plans (net of tax effect of $(16), $318 and $0, respectively)	(133)	(769)	(159)
Total other comprehensive (loss) income	1,762	(6,218)	2,192
Comprehensive (loss) income	$ (5,780)	$ 9,317	$ (99,749)

See accompanying notes to consolidated financial statements.

ALTAIR ENGINEERING INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CHANGES IN STOCKHOLDERS' EQUITY (DEFICIT)

	Common stock									
	Class A		Class B		Additional		Accumulated other	Total Altair Engineering Inc.	Non-	Total
(in thousands)	Shares	Amount	Shares	Amount	paid-in capital	Accumulated deficit	comprehensive loss	stockholders' equity (deficit)	controlling interest	stockholders' equity (deficit)
Balance at January 1, 2017	8,900	$ 1	41,204	$ 4	$ 39,688	$ (66,201)	$ (7,264)	$ (33,772)	$ 10	$ (33,762)
Net loss	—	—	—	—	—	(101,941)	—	(101,941)	—	(101,941)
Initial public offering, net of issuance costs of $4,830	13,800	1	(2,200)	—	114,437	—	—	114,438	—	114,438
Shares converted upon Delaware incorporation	2,496	—	(2,496)	—	—	—	—	—	—	—
2001 ISO Plan modification	—	—	—	—	66,510	—	—	66,510	—	66,510
Issuance of common stock for acquisitions	988	—	—	—	8,712	—	—	8,712	—	8,712
Purchase of noncontrolling interests	—	—	—	—	(19)	—	—	(19)	(10)	(29)
Amortization of mezzanine equity	—	—	—	—	(8)	—	—	(8)	—	(8)
Exercise of stock options	541	—	—	—	1,792	—	—	1,792	—	1,792
Stock-based compensation	—	—	—	—	1,044	—	—	1,044	—	1,044
Foreign currency translation, net of tax	—	—	—	—	—	—	2,351	2,351	—	2,351
Retirement related benefit plans, net of tax	—	—	—	—	—	—	(159)	(159)	—	(159)
Balance at December 31, 2017	26,725	2	36,508	4	232,156	(168,142)	(5,072)	58,948	—	58,948
Cumulative effect of an accounting change	—	—	—	—	—	77,744	—	77,744	—	77,744
Net income	—	—	—	—	—	15,535	—	15,535	—	15,535
Follow-on public offering, net of offering costs of $370	5,731	1	(1,675)	(1)	135,201	—	—	135,201	—	135,201
Adjustment for acquisitions	—	—	—	—	(96)	—	—	(96)	—	(96)
Issuance of common stock for acquisitions	145	—	—	—	8,681	—	—	8,681	—	8,681
Exercise of stock options	3,086	1	—	—	2,076	—	—	2,077	—	2,077
Conversion from Class B to Class A common stock	2,662	—	(2,662)	—	—	—	—	—	—	—
Stock-based compensation	—	—	—	—	1,814	—	—	1,814	—	1,814
Foreign currency translation, net of tax	—	—	—	—	—	—	(5,449)	(5,449)	—	(5,449)
Retirement related benefit plans, net of tax	—	—	—	—	—	—	(769)	(769)	—	(769)
Balance at December 31, 2018	38,349	4	32,171	3	379,832	(74,863)	(11,290)	293,686	—	293,686
Net loss	—	—	—	—	—	(7,542)	—	(7,542)	—	(7,542)
Equity component of convertible senior notes, net of issuance costs	—	—	—	—	50,009	—	—	50,009	—	50,009
Issuance of common stock for acquisitions	250	—	—	—	7,637	—	—	7,637	—	7,637
Exercise of stock options and other	1,571	—	—	—	1,510	—	—	1,510	—	1,510
Vesting of restricted stock	61		—	—	—	—	—	—	—	—
Conversion from Class B to Class A common stock	1,040	—	(1,040)	—	—	—	—	—	—	—
Stock-based compensation	—	—	—	—	7,645	—	—	7,645	—	7,645
Foreign currency translation, net of tax	—	—	—	—	—	—	1,895	1,895	—	1,895
Retirement related benefit plans, net of tax	—	—	—	—	—	—	(133)	(133)	—	(133)
Balance at December 31, 2019	41,271	$ 4	31,131	$ 3	$ 446,633	$ (82,405)	$ (9,528)	$ 354,707	$ —	$ 354,707

See accompanying notes to consolidated financial statements.

ALTAIR ENGINEERING INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOWS

(in thousands)	Year Ended December 31, 2019	2018	2017
OPERATING ACTIVITIES:			
Net (loss) income	$ (7,542)	$ 15,535	$ (101,941)
Adjustments to reconcile net (loss) income to net cash provided by operating activities:			
Depreciation and amortization	21,522	14,734	11,747
Provision for bad debt	671	394	610
Amortization of debt discount and issuance costs	5,663	23	148
Stock-based compensation expense	8,528	3,339	47,281
Loss (gain) on sale of assets held for sale and other	6	(4,503)	(244)
Impairment of intangible assets	—	608	—
Deferred income taxes	(950)	(1,057)	55,105
Other, net	—	(206)	394
Changes in assets and liabilities:			
Accounts receivable	(7,901)	(1,394)	(10,397)
Prepaid expenses and other current assets	(2,396)	204	1,559
Other long-term assets	(2,591)	(1,660)	(11,288)
Accounts payable	(426)	1,647	(1,087)
Accrued compensation and benefits	(1,232)	5,678	2,060
Other accrued expenses and current liabilities	513	(6,667)	6,207
Operating lease right of use assets and liabilities, net	102	—	—
Deferred revenue	17,426	9,555	15,937
Net cash provided by operating activities	31,393	36,230	16,091
INVESTING ACTIVITIES:			
Payments for acquisition of businesses, net of cash acquired	(25,720)	(203,438)	(15,582)
Capital expenditures	(9,660)	(6,659)	(7,522)
Proceeds from sale of assets held for sale and other	—	6,614	446
Payments for acquisition of developed technology	(473)	(2,727)	(2,120)
Other investing activities, net	14	—	(73)
Net cash used in investing activities	(35,839)	(206,210)	(24,851)
FINANCING ACTIVITIES:			
Proceeds from issuance of convertible senior notes, net of underwriters' discounts and commissions	223,101	—	—
Proceeds from issuance of Class A common stock in follow-on public offering, net of underwriters' discounts and commissions	—	135,572	—
Borrowings under revolving commitment	96,992	37,041	126,832
Payments on revolving commitment	(127,941)	(6,091)	(154,187)
Proceeds from issuance of common stock	1,510	2,077	1,792
Payments for issuance costs of convertible senior notes	(1,233)	—	—
Payments for follow-on public offering and IPO offering costs	—	(556)	(4,644)
Principal payments on long-term debt	—	(126)	(59,869)
Payments for redemption of common stock	—	(119)	(1,045)
Proceeds from issuance of Class A common stock in initial public offering, net of underwriters' commissions	—	—	119,268
Proceeds from issuance of debt	—	—	1,541
Other financing activities	(513)	(268)	(130)
Net cash provided by financing activities	191,916	167,530	29,558
Effect of exchange rate changes on cash, cash equivalents and restricted cash	342	(1,443)	1,641
Net increase (decrease) in cash, cash equivalents and restricted cash	187,812	(3,893)	22,439
Cash, cash equivalents and restricted cash at beginning of year	35,685	39,578	17,139
Cash, cash equivalents and restricted cash at end of period	$ 223,497	$ 35,685	$ 39,578
Supplemental disclosures of cash flow:			
Interest paid	$ 664	$ 223	$ 2,092
Income taxes paid	$ 7,686	$ 6,735	$ 5,893
Supplemental disclosure of non-cash investing and financing activities:			
Issuance of common stock in connection with acquisitions	$ 7,637	$ 8,681	$ 8,712
Promissory notes issued and deferred payment obligations for acquisitions	$ 497	$ 1,729	$ 12,352
Finance leases	$ 632	$ 895	$ 124
Property and equipment in accounts payable, other accrued expenses and current liabilities, and other liabilities	$ 259	$ 330	$ 582
Issuance of common stock with put rights	$ —	$ —	$ 2,352
Initial public offering costs in accounts payable	$ —	$ —	$ 186

See accompanying notes to consolidated financial statements.

1. Description of business

Altair Engineering Inc. ("Altair" or the "Company") incorporated in the state of Michigan in 1985 and became a Delaware corporation in October 2017. The Company is a global technology company providing software and cloud solutions in the areas of product design and development, high performance computing and data analytics. Altair enables organizations across broad industry segments to compete more effectively in a connected world while creating a more sustainable future. The Company is based in Troy, Michigan.

The Company's simulation-driven approach to innovation is powered by the Company's broad portfolio of high-fidelity and high-performance physics solvers. The Company's integrated suite of software optimizes design performance across multiple disciplines encompassing structures, motion, fluids, thermal management, electromagnetics, system modeling, and embedded systems, while also providing data analytics and true-to-life visualization and rendering.

Altair's software products represent a comprehensive, open architecture solution for simulation, data analytics and cloud computing to empower decision making for improved product development, manufacturing, energy management and exploration, financial services, health care, and retail operations. Altair believes its products offer a comprehensive set of technologies to design and optimize high performance, efficient, innovative and sustainable products and processes in an increasingly connected world.

Altair also provides Client Engineering Services to support its customers with long-term ongoing product design and development expertise. This has the benefit of embedding the Company within customers, deepening its understanding of their processes, and allowing the Company to more quickly perceive trends in the overall market, helping the Company to better tailor its research and development and sales initiatives. The Company hires engineers and data scientists for placement at a customer site for specific customer-directed assignments.

Initial public offering

In November 2017, the Company closed its initial public offering ("IPO"), in which the Company issued and sold 9,865,004 shares of Class A common stock inclusive of the underwriters' option to purchase additional shares that was exercised in full. The price per share to the public was $13.00. The Company received aggregate proceeds of $119.3 million from the IPO, net of underwriters' discounts and commissions, before deducting offering costs of approximately $4.8 million.

The IPO also included the sale of 3,934,996 shares of Class A common stock by certain stockholders, giving effect to the conversion of 2,200,000 shares of the Company's Class B common stock into an equivalent number of shares of Class A common stock, and 1,734,996 stock options for Class A common stock exercised by the Company's chief executive officer. The Company did not receive any proceeds from the sale of shares of Class A common stock by the selling stockholders.

Follow-on public offering

In June 2018, the Company closed its follow-on public offering (the "Offering"), in which the Company issued and sold 4,056,004 shares of Class A common stock (inclusive of 763,424 shares sold upon the exercise by the underwriters of their option to purchase additional shares of our Class A common stock). The price per share to the public was $35.00. The Company received aggregate proceeds of $135.6 million from the Offering, net of underwriters' discounts and commissions, before deducting offering costs of approximately $0.4 million.

The Offering also included the sale of 2,307,420 shares of Class A common stock by selling stockholders, giving effect to the conversion of 1,675,420 shares of the Company's Class B common stock into an equivalent number of shares of Class A common stock and the exercise of 257,000 options to purchase Class A common stock. The Company did not receive any proceeds from the sale of shares of Class A common stock by the selling stockholders other than the $0.5 million in proceeds from exercises of stock options by certain selling stockholders.

2. Summary of significant accounting policies

Immaterial corrections of prior period financial statements

In connection with the preparation of its financial statements for the quarter ended June 30, 2019, the Company identified and corrected certain errors that were immaterial to previously-reported consolidated financial statements. No such adjustments are necessary for the year ended December 31, 2019, nor does the Company anticipate any further adjustments based on these errors. These historical errors related primarily to i) the cumulative effective adjustment for the income tax effect of intercompany transactions resulting from the adoption of Accounting Standards Codification ("ASC") No. 606, *Revenue from Contracts with Customers* (ASC 606) on January 1, 2018, and ii) income tax accounting for acquisitions. The Company evaluated the materiality of these errors both qualitatively and quantitatively in accordance with Staff Accounting Bulletin ("SAB") No. 99, *Materiality*, and SAB No. 108, *Considering the Effects of Prior Year Misstatements When Quantifying Misstatements in Current Year Financial Statements*, and determined the effect of these corrections was not material to the previously issued financial statements. However, the effect of correcting these errors in the current period would be material to the current period financial statements. Therefore, the amounts in the previous periods have been revised to reflect the correction of these errors. These revisions do not impact amounts previously reported in the consolidated statements of operations for the three months ended March 31, 2019 and 2018, the three and six months ended June 30, 2018, the three and nine months ended September 30, 2018, or for total operating, investing, or financing activities on the consolidated statements of cash flows for any previously reported period.

The following table presents the effect of the error corrections on the Company's consolidated balance sheet for the period indicated (in thousands):

	As of December 31, 2018		
	As Reported	Adjustments	As Corrected
Deferred tax assets	$ 1,373	$ 3,981	$ 5,354
Total assets	$ 483,216	$ 3,981	$ 487,197
Other accrued expenses and current liabilities	$ 27,565	$ (526)	$ 27,039
Total current liabilities	$ 127,758	$ (526)	$ 127,232
Other long-term liabilities	$ 28,153	$ (2,397)	$ 25,756
Total liabilities	$ 194,082	$ (2,923)	$ 191,159
Accumulated deficit	$ (82,005)	$ 7,142	$ (74,863)
Accumulated other comprehensive loss	$ (11,052)	$ (238)	$ (11,290)
Total stockholders' equity	$ 286,782	$ 6,904	$ 293,686
Total liabilities, mezzanine equity and stockholders' equity	$ 483,216	$ 3,981	$ 487,197

The adjustments for amounts similar to the above were also made to the Company's consolidated balance sheets as of March 31, 2018, June 30, 2018, September 30, 2018, and March 31, 2019, respectively. Additionally, the Company revised goodwill, total assets, and total liabilities, mezzanine equity and stockholders' equity on the consolidated balance sheet as of December 31, 2017 and 2016, to correct these errors, resulting in a decrease of $1.6 million and $0.9 million, respectively, from the previously reported amounts. The consolidated statements of changes in stockholders' equity (deficit) for the three month periods ended March 31, 2018 and 2019 have been corrected to reflect the adjustments described herein.

The following tables present the effect of the error corrections on the consolidated statements of operations for the periods indicated (in thousands, except per share data):

	Year Ended December 31, 2018		
	As Reported	Adjustments	As Corrected
Income before income taxes	$ 27,024	$ —	$ 27,024
Income tax expense	$ 13,309	$ (1,820)	$ 11,489
Net income	$ 13,715	$ 1,820	$ 15,535
Net income per share attributable to common stockholders, basic	$ 0.20	$ 0.03	$ 0.23
Net income per share attributable to common stockholders, diluted	$ 0.18	$ 0.03	$ 0.21

	Year Ended December 31, 2017		
	As Reported	Adjustments	As Corrected
Loss before income taxes	$ (36,411)	$ —	$ (36,411)
Income tax expense	$ 62,996	$ 2,534	$ 65,530
Net loss	$ (99,407)	$ (2,534)	$ (101,941)
Net loss per share attributable to common stockholders, basic	$ (1.89)	$ (0.05)	$ (1.94)
Net loss per share attributable to common stockholders, diluted	$ (1.89)	$ (0.05)	$ (1.94)

Additionally, the Company revised income tax expense, net income, and net income per share attributable to common stockholders (basic and diluted) on the consolidated statement of operations for the year ended December 31, 2016, to correct these errors, resulting in an increase of $0.2 million, a decrease of $0.2 million and a decrease of $0.01, respectively, from the previously reported amounts.

Principles of consolidation

The accompanying consolidated financial statements have been prepared using accounting principles generally accepted in the United States of America ("GAAP"). The consolidated financial statements include the results of the Company and its controlled subsidiaries. Third-party holdings of equity interests in the Company's subsidiaries that are less than controlled represent noncontrolling interests. Intercompany accounts and transactions have been eliminated in the consolidated financial statements.

Reclassifications

Certain prior period amounts included in the 2018 consolidated balance sheet has been reclassified to conform to the current year presentation. Specifically, in the 2018 consolidated balance sheet Inventory, net has been combined with Prepaid expenses and other current assets and Obligations for acquisition of businesses has been combined with Other accrued expenses and current liabilities.

Use of estimates

The preparation of the consolidated financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosures of contingent assets and liabilities at the date of the financial statements, and reported amounts of revenue and expenses during the reporting periods. On an ongoing basis, management evaluates its significant estimates including the stand alone selling price, or SSP, for each distinct performance obligation included in customer contracts with multiple performance obligations, the incremental borrowing rate used in the valuation of lease liabilities, fair value of convertible senior notes, provision for doubtful accounts, tax valuation allowances, liabilities for uncertain tax provisions, impairment of goodwill and intangible assets, retirement obligations, useful lives of intangible assets, revenue for fixed price contracts, valuation of common stock, and stock-based compensation. Actual results could differ from those estimates.

Delaware Conversion

On October 5, 2017, the Company became a Delaware corporation and effected a four-for-one stock split of its common stock. On the effective date of the Company becoming a Delaware corporation, (i) each share of outstanding common stock was increased to four shares of common stock, par value $0.0001 per share, (ii) the number of shares of common stock issuable under each outstanding option to purchase common stock was increased on a four-for-one basis, (iii) the exercise price of each outstanding option to purchase common stock was reduced on a four-for-one basis, and (iv) the redemption price of each outstanding put option was reduced on a four-for-one basis. All share and per share information referenced throughout the consolidated financial statements and notes thereto have been retroactively adjusted to reflect this stock split.

In connection with the Company becoming a Delaware corporation, 2,495,752 shares of Class B common stock, held by holders of less than 3% of Class B common stock immediately prior to the conversion, converted into Class A common stock.

Pursuant to the Company's Delaware certificate of incorporation, the Company's authorized capital consists of 513,796,572 shares of Class A common stock, 41,203,428 shares of Class B common stock and 45,000,000 shares of preferred stock.

Foreign currency translation

The functional currency of the Company's foreign subsidiaries is their respective local currency. The assets and liabilities of the subsidiaries are translated to U.S. dollars at the exchange rate on the balance sheet date. Equity balances and transactions are translated using historical exchange rates. Revenues and expenses are translated at the average exchange rate during the period. Translation adjustments arising from the use of differing exchange rates from period to period are recorded as a component of accumulated other comprehensive loss within stockholders' equity.

All assets and liabilities denominated in a currency other than the functional currency are remeasured into the functional currency with gains and losses recognized in foreign currency losses, net, in the consolidated statements of operations. The Company has no transactions which hedge purchase commitments and no intercompany balances which are designated as being of a long-term investment in nature.

Revenue recognition

The Company generates revenue from our Software and CES segments and our other businesses. Revenue is recognized by identifying a contract with a customer, identifying the performance obligations in the contract, determining the transaction price, allocating the transaction price to the performance obligations in the contract, and recognizing revenue when (or as) the Company satisfies a performance obligation.

Software

Software revenue includes product revenue from software product licensing arrangements, related services consisting of software maintenance and support in the form of post-contract customer support (PCS or maintenance) and professional services such as consulting and training services. To a much lesser extent, software revenue also includes revenue from the sale of hardware products, primarily as a result of business acquisitions.

Software products are sold to customers primarily under a term-based software licensing model and to a lesser degree, perpetual software licenses. The Company enters into contracts that include combinations of products, maintenance and services, which are accounted for as separate performance obligations with differing revenue recognition patterns.

Most term-based software license agreements include the Company’s patented units-based subscription model which allows customers to license a pool of units for their organizations, providing individual users flexible access to the Company’s entire portfolio of engineering software applications as well as to its growing portfolio of partner products. The amount of software usage is limited by the number of the units licensed by the customer. Revenue from these arrangements is fixed (based on the units licensed) and is not based on actual customer usage of each software product.

Revenue from term-based software licenses is classified as license software revenue. Term-based licenses are sold only as a bundled arrangement that includes the rights to a term software license and PCS, which includes unspecified technical enhancements and customer support. Maximizing the use of observable inputs, the Company determined that a majority of the estimated standalone selling price of the term-based license is attributable to the term license and a minority is attributable to the PCS. The license component is recognized as revenue upon the later of delivery of the licensed product or the beginning of the license period. The PCS is classified as maintenance revenue and is recognized ratably over the term of the contract, as the Company provides the PCS benefit over time.

In addition to term-based software licenses, the Company sells perpetual licenses. Typically, the Company’s perpetual licenses are sold with PCS, which includes unspecified technical enhancements and customer support. Revenue from the software component is classified as license software revenue and is recognized upon the later of delivery of the licensed product or the beginning of the license period. The Company allocates value in bundled perpetual and PCS arrangements based on the standalone selling prices of the perpetual license and PCS. Revenue from PCS is classified as maintenance revenue and is recognized ratably over the term of the contract, as the Company satisfies the PCS performance obligation over time.

Revenue from training, consulting and other services is recognized as the services are performed. For contracts in which the service consists of a single performance obligation, such as providing a training class to a customer, the Company recognizes revenue upon completion of the performance obligation. For service contracts that are longer in duration and often include multiple performance obligations (for example, both training and consulting), the Company measures the progress toward completion of the obligations and recognizes revenue accordingly. In measuring progress towards the completion of performance obligations, the Company typically utilizes output-based estimates for services with contractual billing arrangements that are not based on time and materials, and estimates output based on the total tasks completed as compared to the total tasks required for each work contract. Input-based estimates are utilized for services that involve general consultations with contractual billing arrangements based on time and materials, utilizing direct labor as the input measure.

The Company also executes arrangements through indirect channel partners in which the channel partners are authorized to market and distribute the Company's software products to end users of the Company's products and services in specified territories. In sales facilitated by channel partners, the channel partner generally bears the risk of collection from the end-user customer. The Company recognizes revenue from transactions with channel partners when the channel partner submits a purchase commitment, collectability from the channel partner is probable, and the performance obligation was met, at a point in time or over time as appropriate, provided that all other revenue recognition criteria are satisfied. Revenue from channel partner transactions is the amount remitted to the Company by the channel partners. This amount includes a fee for PCS that is compensation for providing technical enhancements and the second level of technical support to the end user, which is recognized over the period that PCS is to be provided. The Company does not offer right of return, product rotation or price protection to any of its channel partners.

Non-income related taxes collected from customers and remitted to governmental authorities are recorded on the consolidated balance sheet as accounts receivable, net and other accrued expenses and current liabilities. These amounts are reported on a net basis in the consolidated statements of operations and do not impact reported revenues or expenses. Certain hardware revenue is included within software revenue and is recognized when all revenue recognition criteria stated above are met, which is generally when the products are delivered to end customers.

Software related services

Consulting services from product design and development projects are considered distinct performance obligations and are provided to customers on a time-and-materials, or T&M, or fixed-price basis. Altair recognizes services revenue from our T&M contracts using input-based estimates, utilizing direct labor and contractually agreed-upon hourly rates as the input measure. For fixed-price contracts, software services revenue is recognized over time using a method that measures the extent of progress towards completion of a performance obligation, generally using a cost-input method where revenue is recognized based on the proportion of total cost incurred to estimated total costs at completion. If output or input measures are not available or cannot be reasonably estimated, revenue is recognized upon completion of the services.

Client engineering services

CES revenue is derived from our hiring of engineers and data scientists for placement at a customer site for specific customer-directed assignments. These professional services are considered distinct performance obligations and are provided to customers on a T&M basis. We recognize client engineering services revenue based upon hours worked and contractually agreed-upon hourly rates.

Other

Other revenue includes product revenue from the sale of LED products primarily for the replacement of fluorescent tubes. Revenue from the sale of LED products for the replacement of fluorescent tubes is recognized when all revenue recognition criteria stated above are met, which is generally when the products are delivered to resellers or to end customers. Sales returns, which reduce revenue, are estimated using historical experience.

Cost of revenue

Cost of software

Cost of software revenue consist of expenses related to software licensing, hardware sales and customer support. Significant expenses include employee related costs for support team members, travel costs, and royalties for third-party software products available to customers through the Company's products or as part of the Company's Partner Alliance Program, or APA.

Cost of client engineering services

Cost of engineering services revenue consists primarily of employee compensation and related costs. We employ and pay them only for the duration of the placement.

Cost of other

Cost of other revenue includes the cost of LED lighting products and freight related to products sold to retail and commercial sales channels.

Cash, cash equivalents and restricted cash

The Company considers all highly liquid investments with original or remaining maturities of 90 days or less at the date of purchase to be cash equivalents. Cash and cash equivalents are recorded at cost, which approximates fair value.

Restricted cash is included in other long-term assets on the consolidated balance sheets. The following table provides a reconciliation of cash, cash equivalents and restricted cash reported in the consolidated balance sheets that sum to the total of the amounts reported in the consolidated statements of cash flows (in thousands):

	December 31,	
	2019	2018
Cash and cash equivalents	$ 223,117	$ 35,345
Restricted cash included in other long-term assets	380	340
Total cash, cash equivalents, and restricted cash	$ 223,497	$ 35,685

Restricted cash represents amounts required for a contractual agreement with an insurer for the payment of potential health insurance claims, and term deposits for bank guarantees.

Accounts receivable, net

Accounts receivable, net consisted of the following (in thousands):

	December 31,	
	2019	2018
Accounts receivable, trade	$ 100,461	$ 93,073
Contract assets	4,523	3,730
Accounts receivable, net	$ 104,984	$ 96,803

An allowance for doubtful accounts is recorded when amounts are determined to be uncollectible based on specific identification of customer circumstances, age of the receivable and other available information. Accounts are written off when it becomes apparent that such amounts will not be collected. Generally, the Company does not require collateral or charge interest on accounts receivable. Accounts receivable were reported net of an allowance for doubtful accounts of $1.4 million and $1.2 million at December 31, 2019 and 2018, respectively. Activity in the allowance for doubtful accounts was as follows (in thousands):

	For the year ended December 31,		
	2019	2018	2017
Balance, beginning of year	$ (1,150)	$ (798)	$ (565)
Provision charged to expense	(671)	(394)	(610)
Write-offs, net of recoveries	413	3	414
Effects of foreign currency translation	(7)	39	(37)
Balance, end of year	$ (1,415)	$ (1,150)	$ (798)

Concentrations of credit risk

The Company’s financial instruments that are potentially subject to concentrations of credit risk consist primarily of cash and trade receivables. The risk with respect to trade receivables is partially mitigated by the diversity, both by geography and by industry, of the Company’s customer base. The Company’s accounts receivable is derived from sales to a large number of direct customers and resellers around the world. Sales to customers within the automotive industry accounted for approximately 40%, 45%, and 50% of the Company’s 2019, 2018 and 2017 revenue, respectively, with no other industry representing more than 10% of revenue. No individual customer accounted for 10% or more of revenue in the years ended December 31, 2019, 2018 or 2017.

Inventory

Inventory consist of finished goods and is stated at the lower of cost and net realizable value. Cost is determined using the first-in, first-out method. Net realizable value is the estimated selling prices in the ordinary course of business, less reasonable predictable costs of completion, disposal and transportation. The valuation of inventory requires management to estimate excess inventory as well as inventory that is not of saleable quality. The determination of obsolete or excess inventory requires management to estimate market conditions and future demand for the Company’s products. Inventory was $2.4 million and $2.0 million at December 31, 2019 and 2018, respectively, and is included in prepaid expenses and other current assets in the consolidated balance sheets.

Property and equipment, net

Property and equipment are stated at cost, less accumulated depreciation and amortization. Equipment held under capital leases are stated at the present value of minimum lease payments less accumulated amortization. Depreciation is calculated using the straight-line method over the estimated useful lives of the assets. Leasehold improvements and assets acquired under capital leases are amortized over the lease term or the estimated useful life of the related asset or improvement, whichever is shorter.

Expenditures for maintenance and repairs are charged to expense in the period incurred. Major expenditures for betterments are capitalized when they meet the criteria for capitalization. When assets are retired or otherwise disposed of, the cost and accumulated depreciation are removed from the accounts and any resulting gain or loss is reflected in the consolidated statements of operations in the period realized.

Software development costs

Software development costs incurred prior to the establishment of technological feasibility are expensed as incurred. Technological feasibility is established upon the completion of a detailed program design. Capitalization of software development costs begins upon the establishment of technological feasibility and ends when the product is available for general release. Generally, the time between the establishment of technological feasibility and commercial release of software is short. As such, all internal software development costs have been expensed as incurred and included in research and development expense in the accompanying consolidated statements of operations.

Impairment of long-lived assets

Long-lived assets, such as property and equipment, and definite-lived intangible assets, including developed technology and customer relationships, are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. If circumstances require a long-lived asset or asset group to be tested for possible impairment, the Company compares the undiscounted future cash flows expected to be generated by that asset or asset group to its carrying amount. If the carrying amount of the long-lived asset or asset group is not recoverable on an undiscounted cash flow basis, an impairment charge is recognized to the extent that the carrying amount exceeds its fair value. Fair value is determined through various valuation techniques, including discounted cash flow models and third-party independent appraisals. No impairment losses were recognized in 2019, 2018, or 2017.

Goodwill and other indefinite-lived intangible assets

Goodwill represents the excess of the consideration transferred for an acquired entity over the estimated fair values of the net tangible assets and the identifiable assets acquired. As described in Note 4—Acquisitions and disposals, the Company has recorded goodwill in connection with certain acquisitions. Goodwill and other indefinite-lived intangible assets are not amortized, but rather are reviewed for impairment annually or more frequently if facts or circumstances indicate that the carrying value may not be recoverable.

The Company has determined that there is one reporting unit with goodwill subject to goodwill impairment testing. An entity has the option to perform a qualitative assessment to determine whether it is more likely than not that the fair value of the reporting unit is less than its carrying amount prior to performing the quantitative two-step impairment test.

The Company has the option to first assess qualitative factors to determine whether the existence of events or circumstances leads to a determination that it is more likely than not that the fair value of a reporting unit is less than its carrying amount prior to performing the quantitative two-step impairment test. The qualitative assessment evaluates various events and circumstances, such as macro-economic conditions, industry and market conditions, cost factors, relevant events and financial trends that may impact a reporting unit's fair value. If, after assessing the totality of events or circumstances, an entity determines it is not more likely than not that the fair value of a reporting unit is less than its carrying amount, including goodwill, then additional impairment testing is not required. However, if an entity concludes otherwise, then it is required to perform the two-step goodwill impairment test.

The impairment test involves comparing the estimated fair value of a reporting unit with its book value, including goodwill. If the estimated fair value exceeds book value, goodwill is considered not to be impaired. If, however, the fair value of the reporting unit is less than book value, then an impairment loss is recognized in an amount equal to the amount that the book value of the reporting unit exceeds its fair value, not to exceed the total amount of goodwill allocated to the reporting unit.

The Company performs its annual impairment review of goodwill in the fourth quarter of each year and when a triggering event occurs between annual impairment dates. For 2018, the Company performed a quantitative assessment of goodwill and determined that the fair value of the reporting unit exceeded its carrying amount, as such, step two does not need to be performed. Accordingly, the Company determined that its goodwill was not impaired. For 2019, the Company performed a qualitative assessment of goodwill and determined that it was not more likely than not that the fair value of its reporting unit with goodwill was less than the carrying amounts. Accordingly, the Company determined that its goodwill was not impaired.

The Company performs its annual impairment review of indefinite-lived intangibles in the fourth quarter of each year and when a triggering event occurs between annual reporting dates. In 2019, the Company performed a qualitative assessment of indefinite-lived trade names and determined there was no indication of impairment. Accordingly, no impairment charges were recognized in 2019. During the quarter ended September 30, 2018, the Company performed a test of indefinite-lived trade names. This test was triggered by the Company's decision during the quarter to rename and rebrand certain products in the Software segment. Upon completion of the impairment test, the Company recorded an impairment charge of $0.6 million which is included in other operating income for the year ended December 31, 2018.

Receivable for R&D credit

The French government provides a research and development ("R&D") tax credit known as Credit Impôt Recherche, or CIR, in order to encourage Companies to invest in R&D. The tax credit is deductible from the French income tax and any excess is carried forward for three years. After three years, any unused credit may be reimbursed to the Company by the French government. As of December 31, 2019, the Company had approximately $12.1 million receivable from the French government related to CIR, of which $2.5 million is recorded in income tax receivable and the remaining $9.6 million is recorded in other long-term assets. As of December 31, 2018, the Company had approximately $11.7 million receivable from the French government related to CIR, of which $2.6 million was recorded in income tax receivable and the remaining $9.1 million was recorded in other long-term assets. CIR is subject to customary audit by the French tax authorities.

Derivative financial instruments

The Company may use derivative financial instruments, primarily interest rate swap contracts or foreign currency contracts, to hedge its exposure to interest rate or foreign exchange risk. Such derivative financial instruments are initially recorded at fair value on the date on which a derivative contract is entered into and are subsequently remeasured to fair value at period end. Any gains or losses arising from changes in fair value on derivative contracts during the year are recorded in other (income) expense, net in the consolidated statement of operations. Hedge accounting has not been applied.

Income taxes

The Company accounts for income taxes under the asset and liability method. Deferred tax assets and liabilities are recognized for the future tax consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax basis and for operating loss and tax credit carryforwards. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. The effect of a change in tax rates on deferred tax assets and liabilities is recognized in income in the period that includes the enactment date. The Company records net deferred tax assets to the extent it believes that these assets will more likely than not be realized. These deferred tax assets are subject to periodic assessments as to recoverability and if it is determined that it is more likely than not that the benefits will not be realized, valuation allowances are recorded which increase the provision for income taxes. In making such determination, the Company considers all available positive and negative evidence, including historical taxable income, projected future taxable income, the expected timing and reversal of existing temporary differences, ability to carryback losses, and tax planning strategies. If based upon the evidence, it is more likely than not that the deferred tax asset will not be realized, a valuation allowance is recorded. A valuation allowance is recognized to reduce deferred tax assets to the amount that management believes is more likely than not to be realized.

The Company applies a more-likely-than-not recognition threshold to its accounting for tax uncertainties. The Company reviews all of its tax positions and makes determinations as to whether its tax positions are more likely than not to be sustained upon examination by the relevant taxing authorities. Only those benefits that have a greater than fifty percent likelihood of being sustained upon examination by taxing authorities are recognized. Interest and penalties related to uncertain tax positions are recorded in the provision for income taxes in the consolidated statements of operations.

Research and development costs

Research and development costs are expensed as incurred. Research and development expenses consist primarily of salaries and benefits of research and development employees and costs incurred related to the development of new software products and significant enhancements and engineering changes to existing software products. Research and development expenses were $117.5 million, $97.6 million, and $93.2 million for the years ended December 31, 2019, 2018 and 2017, respectively.

Advertising costs

Advertising costs are expensed as incurred. Advertising expenses were $4.5 million, $4.4 million and $3.5 million for the years ended December 31, 2019, 2018, and 2017, respectively.

Mezzanine equity

In 2017, the Company issued 200,000 shares of Class A common stock to a third party as partial consideration for the purchase of developed technology. These shares have a put right that can be exercised by the holder five years from date of purchase at $12.50 per share that requires the shares to be recorded at fair value and classified as mezzanine equity in the consolidated balance sheet. As of December 31, 2017, the Company concluded that it is no longer probable that the put option will be exercised as the put value is substantially below market value and subsequent adjustment is not required.

Classification of the instrument shall remain as mezzanine equity until one of the following three events take place; 1) shares are sold on open market; 2) a redemption feature lapses; or 3) there is a modification of the terms of the instrument. As none of these events have taken place as of December 31, 2019, the classification remains as mezzanine equity.

Leases

The Company determines if an arrangement is a lease at inception. Operating leases are included in operating lease right-of-use (“ROU”) assets, current portion of operating lease liabilities, and operating lease liabilities, net of current portion on the Company’s consolidated balance sheets. Finance leases are included in property and equipment, current portion of long-term debt, and long-term debt, net of current portion on the consolidated balance sheets.

Stock-based compensation

Employee stock-based awards, consisting of stock options or restricted stock units (RSUs) expected to be settled by issuing shares of Class A common stock, are recorded as equity awards. The fair value of these awards on the date of grant is measured using the Black-Scholes option pricing model. The Company expenses the grant date fair value of its time-vested stock options subject to graded vesting using the straight-line method over the applicable service period. The fair value of RSUs, is measured using the fair value of the Company’s Class A common stock on the date of the grant. The fair value of RSUs is recognized as expense on a straight-line basis over the requisite service period, which is generally four years.

Employee stock-based awards, which consisted of stock options with repurchase features that allowed them to be settled in cash at a purchase price that was less than the current fair value, were considered liability-based awards. These awards were initially recorded at fair value and remeasured to fair value at the end of each reporting period until settled. During 2017, the Company changed its accounting policy to measure the fair value of its liability awards using the Black-Scholes option pricing model as a result of the Company no longer meeting the definition of a non-public entity. The impact of the change in accounting policy was immaterial to the financial statements. Upon IPO effectiveness later in 2017, the repurchase feature was terminated and resulted in a modification of the option awards and these options were accounted for as equity awards post the Company’s IPO.

Other income, net

Other income, net consists of the following (in thousands):

	Year ended December 31,		
	2019	2018	2017
Foreign exchange loss (gain)	$ 745	$ (626)	$ 1,254
Other	(2,297)	(1,954)	(260)
Other (income) expense, net	$ (1,552)	$ (2,580)	$ 994

Recent accounting guidance

Accounting standards adopted

Leases —In February 2016, the Financial Accounting Standard Board, or "FASB", issued Accounting Standards Update, or "ASU", No. 2016-02, *Leases (ASC 842)*. This standard amends various aspects of existing accounting guidance for leases, including the recognition of a right-of-use (ROU) asset and a lease liability on the balance sheet for all leases with terms longer than 12 months. The Company adopted ASU 2016-02 and its related amendments, on January 1, 2019 and elected the optional transition method and the package of practical expedients on adoption. Accordingly, the prior period comparative information has not been restated and continues to be reported under the accounting guidance in effect for those periods, including the disclosure requirements. The most significant impact of the adoption of ASC 842 was the recognition of ROU assets and lease liabilities for operating leases on the Company's consolidated balance sheet. On adoption, the Company recognized operating liabilities associated with leases of $30.1 million and corresponding ROU assets of $29.1 million, based on the present value of the remaining minimum rental payments under current leasing standards for existing operating leases. See Note 8 – Leases for further discussion. The Company's accounting for finance leases (previously referred to as capital leases prior to the adoption of ASC 842) remained substantially unchanged. The standard had no impact on the Company's consolidated net income or cash flows.

Goodwill Impairment —In January 2017, the FASB issued ASU No. 2017-04, *Intangibles – Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment*, which simplifies accounting for goodwill impairments by eliminating step two from the goodwill impairment test. This guidance is effective for annual or interim goodwill impairment tests in fiscal years beginning after December 15, 2019. Early adoption is permitted for interim and annual goodwill impairment tests performed on testing dates after January 1, 2017. The Company early adopted this guidance on October 1, 2019, and it did not have a material effect on the Company's consolidated financial statements.

Derivatives and Hedging – In August 2017, the FASB issued ASU 2017-12, *Derivatives and Hedging (Topic 815): Targeted Improvements to Accounting for Hedging Activities.* This ASU amends the guidance with the objective of improving the financial reporting of hedging relationships to better portray the economic results of an entity's risk management activities in its financial statements. In addition, this ASU amends the current guidance to simplify the application of the hedge accounting guidance. The Company adopted ASU 2017-12 on January 1, 2019. The adoption of this guidance did not have a material effect on the Company's consolidated financial statements.

Comprehensive Income – In February 2018, the FASB issued ASU 2018-02, *Income Statement — Reporting Comprehensive Income (Topic 220): Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income (AOCI)*, which gives entities the option to reclassify to retained earnings the tax effects resulting from the Tax Cuts and Jobs Act, or the "Tax Act", related to items in AOCI that the FASB refers to as having been stranded in AOCI. The Company adopted this guidance on January 1, 2019 and elected not to reclassify amounts stranded in AOCI. The Company reclassifies taxes from AOCI to earnings as the items to which the tax effects relate are similarly reclassified. The adoption of ASU 2018-02 did not have a material effect on the Company's consolidated financial statements.

Stock Compensation – In June 2018, the FASB issued ASU 2018-07, *Compensation – Stock Compensation (Topic 718): Improvements to Nonemployee Share-Based Payment Accounting.* This ASU simplifies the accounting for share-based payments to nonemployees by aligning it with the accounting for share-based payments to employees, with certain exceptions. The Company adopted this guidance on January 1, 2019, and it did not have a material effect on the Company's consolidated financial statements.

Accounting standards not yet adopted

Credit Losses – In June 2016, the FASB issued ASU 2016-13, *Financial Instruments — Credit Losses* (Topic 326): Measurement of Credit Losses on Financial Instruments. The ASU significantly changes how entities will measure credit losses on most financial assets. This guidance is effective for annual periods beginning after December 15, 2019, and interim periods therein; early adoption is permitted. The Company is currently evaluating the impact of this new guidance on its consolidated financial statements and related disclosures and does not expect this guidance to have a material effect on its consolidated financial statements.

Fair Value – In August 2018, the FASB issued ASU 2018-13, *Fair Value Measurement (Topic 820): Disclosure Framework – Changes to the Disclosure Requirements for Fair Value Measurement.* This ASU modifies the disclosure requirements for fair value measurements, by removing, modifying, or adding certain disclosures. The amendments are effective for fiscal years, and interim reporting periods within those fiscal years, beginning after December 15, 2019. Early adoption is permitted for any removed or modified disclosures. The Company is currently evaluating the impact of the new guidance on its consolidated financial statements and related disclosures and does not expect this guidance to have a material effect on its consolidated financial statements.

Retirement Benefits – In August 2018, the FASB issued ASU 2018-14, *Compensation – Retirement Benefits- Defined Benefit Plans – General (Subtopic 715-20): Disclosure Framework – Changes to the Disclosure Requirements for Defined Benefit Plans.* This ASU modifies the disclosure requirements for defined benefit pension or other postretirement plans. The amendments are effective for fiscal years ending after December 15, 2020; early adoption is permitted. The Company is currently evaluating the impact of the new guidance on its consolidated financial statements and related disclosures and does not expect this guidance to have a material effect on its consolidated financial statements.

Intangibles – In August 2018, the FASB issued ASU 2018-15, *Intangibles – Goodwill and Other – Internal-Use Software (Subtopic 350-40): Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That is a Service Contract.* This ASU clarifies and aligns the requirements for capitalizing implementation costs incurred in a hosting arrangement that is a service contract with the requirements for capitalizing implementation costs incurred to develop or obtain internal-use software. The amendments are effective for fiscal years beginning after December 15, 2019, and interim periods within those fiscal years; early adoption is permitted. The Company is currently evaluating the impact of the new guidance on its consolidated financial statements and related disclosures.

Income Taxes – In December 2019, the FASB issued ASU 2019-12, *Income Taxes (Topic 740): Simplifying the Accounting for Income Taxes.* This ASU simplifies the accounting for income taxes by removing certain exceptions to the general principles in Topic 740 and improves consistent application of GAAP for other areas of Topic 740 by clarifying and amending existing guidance. The amendments are effective for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2020; early adoption is permitted. The Company is currently evaluating the impact of the new guidance on its consolidated financial statements and related disclosures and does not expect this guidance to have a material effect on its consolidated financial statements.

3. Revenue from contracts with customers

Revenue recognition

Software revenue

Revenue is derived principally from the licensing of software products and from related maintenance contracts. The Company enters into contracts that include combinations of products, maintenance and services, which are accounted for as separate performance obligations with differing revenue recognition patterns.

Revenue from term-based software licenses is classified as software revenue. Term-based licenses are sold only as a bundled arrangement that includes the rights to a term software license and post-contract customer support (PCS), which includes unspecified technical enhancements and customer support. Maximizing the use of observable inputs, the Company determined that a majority of the estimated standalone selling prices of the term-based license is attributable to the term license and a minority is attributable to the PCS. The license component is classified as software revenue and recognized as revenue upon the later of delivery of the licensed product or the beginning of the license period. PCS is classified as software revenue and is recognized ratably over the term of the contract, as the Company provides the PCS benefit over time as a stand ready to perform obligation.

In addition to term-based software licenses, the Company sells perpetual licenses. Software revenue is recognized upon the later of delivery of the licensed product or the beginning of the license period. Typically, the Company's perpetual licenses are sold with PCS. The Company allocates value in bundled perpetual and PCS arrangements based on the value relationship between the software license and maintenance. Revenue from PCS is classified as software revenue and is recognized ratably over the term of the contract, as the Company satisfies the PCS performance obligation over time as a stand ready to perform obligation.

Revenue from training, consulting and other services is recognized as the services are performed. For contracts in which the service consists of a single performance obligation, such as providing a training class to a customer, the Company recognizes revenue upon completion of the performance obligation. For service contracts that are longer in duration and often include multiple performance obligations (for example, point-in-time training and consulting), the Company measures the progress toward completion of the obligations and recognizes revenue accordingly. In measuring progress towards the completion of performance obligations, the Company typically utilizes output-based estimates for services with fixed fee arrangements, and estimates output based on the total tasks completed as compared to the total tasks required for each contract. Input-based estimates are utilized for services that involve general consultations with contractual billing arrangements based on time and materials, utilizing direct labor as the input measure.

The Company also executes arrangements through indirect channel partners in which the channel partners are authorized to market and distribute the Company's software products to end users of the Company's products and services in specified territories. In sales facilitated by channel partners, the channel partner bears the risk of collection from the end-user customer. The Company recognizes revenue from transactions with channel partners when the channel partner submits a purchase commitment, collectability from the channel partner is probable, and the performance obligation is met, at a point in time or over time as appropriate, provided that all other revenue recognition criteria are satisfied. Revenue from channel partner transactions is the amount remitted to the Company by the channel partners. This amount includes a fee for PCS that is compensation for providing technical enhancements and the second level of technical support to the end user, which is recognized over the period that PCS is to be provided. The Company does not offer right of return, product rotation, or price protection to any of its channel partners.

Non-income related taxes collected from customers and remitted to governmental authorities are recorded on the consolidated balance sheet as Accounts receivable, net and Other accrued expenses and current liabilities. These amounts are reported on a net basis in the Consolidated statements of operations and do not impact reported revenues or expenses. Certain hardware revenue is included within software revenue and is recognized when all revenue recognition criteria stated above are met, which is generally when the products are delivered to end customers.

Significant judgments

Software revenue

The Company’s contracts with customers typically include promises to transfer licenses and services to a customer. Judgment is required to determine if the promises are separate performance obligations within the context of the arrangement, and if so, the allocation of the transaction price to each performance obligation. The Company’s determination of standalone selling price for performance obligations is based on the midpoint of the range of historical observable prices for goods and services sold separately. In addition, the Company estimates the standalone selling price for certain performance obligations where observable prices are not directly available or a significant portion of historical prices are not within the range. The Company estimates standalone selling price at contract inception considering all information that is reasonably available and is based on the amount of consideration for which the Company expects to be entitled in exchange for transferring the promised good or service to the customer. The corresponding revenues are recognized as the related performance obligations are satisfied.

The Company’s contracts do not include a significant financing component requiring adjustment to the transaction price. Payment terms vary by contract type, however, arrangements typically stipulate a requirement for the customer to pay within 30 to 60 days.

The Company rarely enters into agreements to modify previously executed contracts, which constitute contract modifications. The Company 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, the Company’s contract modifications meet both criteria and are accounted for as a separate contract, as adjusted for contract-specific circumstances.

Software related services revenue

Consulting services from product design and development projects are considered distinct performance obligations and are provided to customers on a time-and-materials (“T&M”) or fixed-price basis. Altair recognizes software services revenue for T&M contracts based upon hours worked and contractually agreed-upon hourly rates using the input method. Revenue from fixed-price engagements is recognized using the output method based on the ratio of costs incurred, to the total estimated project costs.

Client engineering services and Other revenue

Client engineering services revenue are derived from professional services for staffing primarily representing engineers and data scientists located at a customer site. These professional services are considered distinct performance obligations and are provided to customers on a T&M basis. The Company recognizes this revenue for T&M contracts based upon hours worked and contractually agreed-upon hourly rates using the input method. No significant judgments were made for revenue recognition related to businesses included within Other revenue.

Adoption of ASC 606, *Revenue from Contracts with Customers*

The Company adopted ASC 606 on January 1, 2018, using the modified retrospective approach for all contracts not completed as of the date of adoption. Results for reporting periods beginning on or after January 1, 2018, are presented under ASC 606, while prior period amounts are not adjusted and continue to be reported in accordance with ASC 605, and other industry specific guidance. The adoption of ASC 606 represents a change in accounting principle that will more closely align revenue recognition with the transfer of promised goods or services to a customer in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. ASC 606 requires an entity to evaluate revenue recognition by identifying a contract with a customer, identifying the performance obligations in the contract, determining the transaction price, allocating the transaction price to the performance obligations in the contract, and recognizing revenue when (or as) the entity satisfies a performance obligation. Topic 606 also includes Subtopic 340-40 which provides accounting guidance for incremental costs of obtaining a contract with a customer. The Company refers to Topic 606 and Subtopic 340-40 collectively as “ASC 606.” The Company elected not to apply any of the practical expedients which were allowed in the application of this new guidance.

The Company recorded a decrease to accumulated deficit of $84.6 million, or $77.7 million net of tax, on January 1, 2018, due to the cumulative effect of the ASC 606 adoption, with the impact primarily derived from revenue related to software licenses recognized at a point in time under ASC 606 that were historically recognized over time. There was no impact on Client Engineering Services or Other revenue upon the adoption of ASC 606.

The following table presents the effect of the adoption of ASC 606 on the consolidated statement of operations (in thousands):

	Year Ended December 31, 2018		
	Prior to adoption of ASC 606	Adjustments for ASC 606	As Reported
Revenue			
Licenses	$ 195,847	$ 11,317	$ 207,164
Gross profit	$ 269,089	$ 11,317	$ 280,406
Operating expenses			
Sales and marketing	$ 80,613	$ (336)	$ 80,277
Total operating expenses	$ 256,098	$ (336)	$ 255,762
Operating income	$ 12,991	$ 11,653	$ 24,644
Income before income taxes	$ 15,371	$ 11,653	$ 27,024
Income tax expense	$ 10,829	$ 660	$ 11,489
Net income	$ 4,542	$ 10,993	$ 15,535
Income per share:			
Basic	$ 0.07	$ 0.16	$ 0.23
Diluted	$ 0.06	$ 0.15	$ 0.21

The increase to software revenue was primarily due to the upfront recognition of license revenue, which would have been recognized ratably over the contract under prior guidance. The decrease in sales and marketing expense was due to the capitalization of costs to obtain a contract that were expensed as incurred under prior guidance. The increase to tax expense was due to the tax impact of the increase in operating income.

The Company recorded $82.9 million of deferred revenue to accumulated deficit upon the adoption of ASC 606 on January 1, 2018. The adoption of ASC 606 accelerated the recognition of revenues compared to ASC 605. Under ASC 605, the Company did not have vendor-specific objective evidence (“VSOE”) of fair value for post-contract customer support (“PCS”) sold along with software products licenses; therefore, revenues for the software products licenses (including perpetual licenses), PCS and professional services, if applicable, were considered to be one accounting unit and, once all services have commenced, were recognized ratably over the remaining period of the arrangement (the longer of the contractual service term or PCS term). Under ASC 606, the concept of assessing VSOE has been eliminated and the Company determined standalone selling price and allocated transaction price associated with each performance obligation within an arrangement. As a result, the pattern of software license revenue recognition has changed under ASC

606. Software license revenue was typically recognized ratably over the term of the contract under the previous guidance; however, a majority of the contract is recognized upon the later of delivery of the licensed product or the beginning of the license period under ASC 606.

The adoption of ASC 606 had no impact on the Company's cash flows from operations.

Disaggregation of revenue

The Company disaggregates its software revenue by type of performance obligation and timing of revenue recognition as follows (in thousands):

	Year Ended December 31,		
	2019 (ASC 606)	2018 (ASC 606)	2017 (ASC 605) (1)
Software revenue:			
Term licenses	$ 201,881	$ 168,909	
Perpetual licenses	42,440	38,255	
Maintenance	103,699	86,150	
Professional services and other	18,682	11,047	
Total software revenue	$ 366,702	$ 304,361	$ 244,817

(1) As noted above, prior period amounts have not been adjusted under the modified retrospective approach of ASC 606.

Under ASC 606, the Company derived approximately 10% of its total revenue through indirect sales channels for the year ended December 31, 2019 and 2018.

For the year ended December 31, 2019, software related services revenue, client engineering services revenue, and other revenue were categorized based on the nature and timing of revenue and cash flows.

Costs to obtain a contract

The Company pays commissions for new software product and PCS sales as well as for renewals of existing software and PCS 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.

The Company accounts for new product sales commissions using a portfolio approach and allocates the cost of commissions in proportion to the allocation of transaction price of license and PCS performance obligations. Commissions allocated to the license and license renewal components are expensed at the time the license revenue is recognized. Commissions allocated to PCS are capitalized and amortized on a straight-line basis over a period of four years, reflecting the Company's estimate of the expected period that it will benefit from those commissions. As of December 31, 2019 and 2018, respectively, capitalized costs to obtain a contract were $2.3 million and $2.0 million recorded in Prepaid and other current assets and $0.8 million and $0.2 million recorded in Other long-term assets. Amortization expense was $4.5 million and $0.3 million for the years ended December 31, 2019 and 2018, respectively, and were included in sales and marketing expense in the Company's consolidated statement of operations.

Contract assets

At December 31, 2019 and 2018, contract assets were $4.5 million and $3.7 million, respectively, recorded in accounts receivable, and $2.7 million and $2.7 million, respectively, recorded in prepaid expenses and other current assets.

Deferred revenue

Deferred revenue consists of billings made or payments received in advance of revenue recognition from software license, PCS and professional services agreements. The timing of revenue recognition may differ from the timing of billings to customers. Payment terms vary by the type and location of customer and the products or services offered. The term between invoicing and when payment is due is not significant. The Company generally invoices its customers annually for the forthcoming year of software licenses, and more frequently for other products and services. Accordingly, the Company's deferred revenue balance does not include revenue for future years of multiple year non-cancellable contracts that have not yet been billed. At December 31, 2019, the Company expects to recognize its remaining contractual obligations over the next 12 – 24 months. Approximately $57.8 million of revenue was recognized during 2019 was included in the deferred revenue balances at the beginning of the year.

4. Acquisitions and disposals

Polliwog

In October 2019, the Company entered into a stock purchase agreement (the "Stock Purchase Agreement") and simultaneously acquired 97% of the outstanding capital stock of Polliwog Co. Ltd. ("Polliwog"), a software company based near Seoul, Korea. The Company will pay an additional $0.3 million in cash and issue an additional 14,213 shares of its Class A Common Stock in October 2022, subject to a Second Stock Purchase Agreement, to complete the purchase of the remaining three percent of Polliwog's outstanding capital stock. Polliwog is a supplier of Electronic Design Automation software to the global electronics industry, which will expand Altair's ability to provide software for system-level design decisions. The Company believes Polliwog's printed circuit board solvers and verification tools will integrate well with Altair's existing HyperWorks software solutions.

The closing consideration per the Stock Purchase Agreement of $19.3 million consisted of cash in the amount of $10.7 million, subject to a customary working capital adjustment, $2.2 million of cash paid on the day of closing to settle all of Polliwog's outstanding debt and an aggregate of 199,360 shares of the Company's Class A Common Stock, par value $0.0001 per share (the "SPA Stock Consideration"), 183,815 shares of which were issued at closing (which occurred concurrently with the execution of the Stock Purchase Agreement) and are subject to customary securities law restrictions on transferability for the first six months after the closing. The remaining 15,545 shares of the SPA Stock Consideration will be issuable in installments of 88,323 shares on the first anniversary of the closing and 91,908 shares on the second and third year anniversaries of the closing, subject to potential reduction in certain circumstances and subject to customary securities law restrictions on transferability. In addition, per the Stock Purchase Agreement, 256,594 shares of Class A Common Stock will be issued subject to the continuing employment of certain key employees and are not reflected in aggregate consideration but will be recognized as stock-based compensation over the employment period. The closing consideration per the Second Stock Purchase Agreement of $0.8 million consists of $0.3 million in cash and an additional 14,213 shares of the Company's Class A Common Stock to be issued in October 2022.

The purchase price was allocated to assets and liabilities of Polliwog based on the fair value of the assets acquired and liabilities assumed. The allocation included $2.9 million to land and building, $0.5 million to customer relationships, $0.5 million to tradenames, $0.4 million to developed technology, and $15.4 million to goodwill, which is not tax deductible. The financial results of Polliwog have been included in the consolidated financial statements since the acquisition date.

The allocation of fair value of purchase consideration is subject to change within the measurement period (up to one year from the acquisition date). The primary areas that remain preliminary relate to the fair value of intangible assets acquired, certain tangible assets and liabilities acquired, income taxes and residual goodwill.

DEM Solutions Limited

In November 2019, the Company entered into a stock purchase agreement and simultaneously acquired 100% of the outstanding capital stock of DEM Solutions Limited ("DEM Solutions"), a company that provides market-leading Discrete Element Method software for bulk material simulation, based in Edinburgh, UK, for aggregate consideration of $13.1 million. The acquisition of DEM Solutions enables Altair to provide new technology and solutions to customers in the agricultural, mining, material handling, construction and heavy machinery, chemical and pharmaceutical industries.

The purchase price was allocated to assets and liabilities of DEM Solutions based on the fair value of the assets acquired and liabilities assumed. The purchase price fair value was primarily allocated to $3.7 million to developed technology, $3.1 million to customer relationships, $0.6 million to tradenames and $5.6 million to goodwill, which is not tax deductible. The financial results of DEM Solutions have been included in the consolidated financial statements since the acquisition date.

The allocation of fair value of purchase consideration is subject to change within the measurement period (up to one year from the acquisition date). The primary areas that remain preliminary relate to the fair value of intangible assets acquired, certain tangible assets and liabilities acquired, income taxes and residual goodwill.

Datawatch Corporation

On November 5, 2018, the Company entered into an Agreement and Plan of Merger ("Merger Agreement") with Datawatch Corporation, a Delaware corporation ("Datawatch"), and Dallas Merger Sub, Inc., a Delaware corporation ("Purchaser") and a wholly owned subsidiary of the Company.

Pursuant to the Merger Agreement, the Purchaser commenced a tender offer to purchase all of the issued and outstanding shares of Datawatch common stock, (the "Shares") at a purchase price of $13.10 per share, net to seller in cash, without interest and less any applicable withholding taxes (the "Offer").

On December 13, 2018, the Company accepted and paid for all Shares that were validly tendered and completed the acquisition of Datawatch through the merger of Purchaser with and into Datawatch, with Datawatch surviving as a wholly owned subsidiary of the Company.

Altair completed the acquisition of Datawatch for consideration of approximately $183.4 million which consisted of consideration paid to former holders of common stock of Datawatch at $13.10 a share, or $168.2 million and approximately $6.7 million to former holders of outstanding Datawatch equity awards. In addition, Altair paid $8.0 million on the day of closing to settle all of Datawatch's outstanding debt and incurred a liability of approximately $0.5 million payable to former holders of certain unvested Datawatch equity awards for which service had been rendered at the acquisition date. Altair financed the acquisition with cash on hand and a drawdown from its existing credit facility.

In connection with the acquisition of Datawatch, the Company incurred $10.4 million of transaction related costs, which consisted primarily of fees paid to investment bankers' and employee severance, which were recorded to general and administrative, sales and marketing, and research and development expenses in the consolidated statement of operations for the year ended December 31, 2018.

The financial results of Datawatch have been included in the consolidated financial statements since the acquisition date.

The acquisition of Datawatch has been accounted for as a business combination, under the acquisition method of accounting, which results in acquired assets and assumed liabilities being measured at their estimated fair values as of December 13, 2018, the acquisition date. As of the acquisition date, goodwill is measured as the excess of consideration transferred, which is also generally measured at fair value of the net acquisition date fair values of the assets acquired and liabilities assumed. The allocation of fair value of purchase consideration was finalized in 2019.

The following table summarizes the purchase consideration transferred to acquire Datawatch and the amounts of identified assets acquired and liabilities assumed at the acquisition date (in thousands):

Fair value of consideration transferred	$	183,427
Recognized amounts of identifiable assets acquired and liabilities assumed:		
Cash	$	8,278
Accounts receivable		10,384
Other assets		2,522
Property and equipment		980
Trade names		7,400
Developed technology (6-year life)		22,600
Customer relationships (10-year life)		16,700
Accounts payable and other liabilities		(5,041)
Deferred revenue		(3,649)
Other long-term liabilities		(8,340)
Total net identifiable assets acquired and liabilities assumed		51,834
Goodwill (1)	$	131,593

(1) Goodwill is primarily attributable to market synergies expected to arise after the acquisition and approximately $0.8 million is deductible for tax purposes. All goodwill is recorded in the Software segment.

The consummation of the merger resulted in a change in control which accelerated vesting for certain restricted stock units ("RSUs") of Datawatch. These RSUs were converted into the right to receive merger consideration in the amount of $6.7 million, which is included in total consideration transferred.

The consummation of the merger also modified certain Datawatch RSUs without change in control provisions. These RSUs were modified such that the holder has the right to receive cash payments upon vesting at $13.10 per share in the amount of $3.9 million, of which $0.5 million was allocated to pre-combination expense and consideration transferred as it relates to service prior to the acquisition date. The remaining $3.4 million was preliminarily allocated to future services and will be expensed over the remaining service periods on a straight-line basis.

The excess of preliminary purchase consideration over the fair value of net tangible and identifiable intangible assets acquired was recorded as goodwill.

SIMSOLID Corporation

In October 2018, the Company acquired all of the outstanding capital stock of SIMSOLID Corporation, a Canadian corporation, for aggregate consideration of $22.1 million. The allocation of fair value of purchase consideration was finalized in the first quarter of 2019, and there were no changes to the fair value of assets acquired and liabilities assumed, as previously reported.

Other business acquisitions

During the years ended December 31, 2019 and 2018, the Company completed other business acquisitions that were individually and in the aggregate insignificant. The Company has accounted for all of its acquisitions using the acquisition method. The operating results of each acquisition have been included in the consolidated financial statements since the respective dates of acquisition.

For significant acquisitions the Company engaged a third-party valuation firm to assist the Company in valuing certain assets and liabilities acquired.

WEYV

In July 2019, the Company decided to sunset operations of its WEYV business, a consumer music and content service. The Company concluded that this decision was not a strategic shift that has or will have a major effect on its operations and financial results, and therefore did not meet the accounting criteria to be classified as a discontinued operation.

The operations of WEYV terminated in the third quarter of 2019. The loss on disposal was not material, and is included in other operating income in the consolidated statement of operations. WEYV had a loss before income tax of $3.0 million and $4.2 million for the years ended December 31, 2019 and 2018, respectively. The WEYV business is reported in All Other within the Company's segment information in Note 19.

5. Property and equipment, net

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

	Estimated useful lives	December 31, 2019	December 31, 2018
Land	Indefinite	$ 9,942	$ 7,994
Building and improvements	5-39 years	15,512	13,120
Computer equipment and software	3-5 years	37,361	34,582
Office furniture and equipment	5-15 years	8,029	7,958
Leasehold improvements	(1)	9,014	6,926
Right of use assets under finance leases	(1)	2,745	—
Total property and equipment		82,603	70,580
Less: accumulated depreciation and amortization		46,306	40,427
Property and equipment, net		$ 36,297	$ 30,153

(1) Shorter of lease term or estimated useful life, generally ranging from five to ten years.

The Company allocated $1.9 million to land and $1.0 million to building and improvements in connection with the acquisition of Polliwog in October 2019, as described in Note 4 – Acquisitions and disposals.

In August 2018, the Company consummated the sale of the building that was used as the headquarters for its toggled subsidiary. The building was previously recorded as a held for sale asset and had a book value of $2.1 million as of June 30, 2018. In connection with the sale of the building, the Company entered into a three-year lease back of part of the building, primarily for continued use as a distribution center for toggled's operational needs. The Company recognized a gain of $4.4 million which is included in other operating income for the year ended December 31, 2018.

Depreciation expense, including amortization of ROU assets under finance leases, was $7.1 million, $7.0 million and $6.3 million for the years ended December 31, 2019, 2018 and 2017, respectively.

6. Goodwill and other intangible assets

Goodwill

The changes in the carrying amount of goodwill, which is attributable to the Software reportable segment, are as follows (in thousands):

Balance at December 31, 2017	$	62,706
Acquisitions		152,630
Effects of foreign currency translation and other		(4,804)
Balance at December 31, 2018		210,532
Acquisitions		21,922
Effects of foreign currency translation and other		1,229
Balance at December 31, 2019	$	233,683

Other intangible assets

A summary of other intangible assets is shown below (in thousands):

	December 31, 2019						
	Weighted average amortization period		Gross carrying amount		Accumulated amortization		Net carrying amount
Definite-lived intangible assets:							
Developed technology	4-6 years	$	60,916	$	25,838	$	35,078
Customer relationships	7-10 years		32,582		11,575		21,007
Other intangibles	10 years		111		62		49
Total definite-lived intangible assets			93,609		37,475		56,134
Indefinite-lived intangible assets:							
Trade names			10,941				10,941
Total other intangible assets		$	104,550	$	37,475	$	67,075

	December 31, 2018						
	Weighted average amortization period		Gross carrying amount		Accumulated amortization		Net carrying amount
Definite-lived intangible assets:							
Developed technology	4-6 years	$	54,530	$	15,517	$	39,013
Customer relationships	7-10 years		28,422		7,309		21,113
Other intangibles	10 years		109		56		53
Total definite-lived intangible assets			83,061		22,882		60,179
Indefinite-lived intangible assets:							
Trade names			9,657				9,657
Total other intangible assets		$	92,718	$	22,882	$	69,836

Amortization expense related to amortizing intangible assets was $14.4 million, $7.7 million and $5.4 million for the years ended December 31, 2019, 2018 and 2017, respectively.

Estimated amortization expense for the next five years as of December 31, 2019 is as follows (in thousands):

Year ending		
December 31, 2020	$	15,004
December 31, 2021	$	12,664
December 31, 2022	$	9,466
December 31, 2023	$	8,276
December 31, 2024	$	6,490
Thereafter	$	4,234
Total	$	56,134

7. Debt

The carrying value of debt is as follows (in thousands):

	December 31, 2019	December 31, 2018
Convertible senior notes	$ 230,000	$ —
Revolving credit facility	—	30,950
Obligations for finance leases	1,174	813
Other borrowings	—	75
Total debt	231,174	31,838
Less: unamortized debt discount	46,820	—
Less: unamortized debt issuance costs	5,686	90
Less: current portion of long-term debt	430	331
Long-term debt, net of current portion	$ 178,238	$ 31,417

Convertible senior notes

In June 2019, the Company issued $230.0 million aggregate principal amount of 0.25% convertible senior notes due in 2024 (the "Convertible Notes"), which includes the underwriters' exercise in full of their option to purchase an additional $30.0 million principal amount of the Convertible Notes, in a public offering. The net proceeds from the issuance of the Convertible Notes were $221.9 million after deducting the underwriting discounts and commissions and issuance costs.

The Company entered into a First Supplemental Indenture relating to the issuance by the Company of the Convertible Notes (the "Supplemental Indenture") supplementing the Indenture, dated June 10, 2019 (the "Base Indenture," and together with the Supplemental Indenture, the "Indenture"), by and between the Company and U.S. Bank National Association, as trustee (the "Trustee"). The Indenture includes customary covenants and sets forth certain events of default after which the Convertible Notes may be declared immediately due and payable and sets forth certain types of bankruptcy or insolvency events of default involving the Company after which the Convertible Notes become automatically due and payable. The Convertible Notes are senior unsecured obligations of the Company.

The Convertible Notes bear interest at a rate of 0.25% per year, payable semi-annually in arrears on June 1 and December 1 of each year, commencing December 1, 2019. The Convertible Notes will mature on June 1, 2024, unless, earlier repurchased or redeemed by the Company or converted pursuant to their terms.

The Convertible Notes have an initial conversion rate of 21.5049 shares of the Company's Class A common stock per $1,000 principal amount of Convertible Notes, which is equivalent to an initial conversion price of approximately $46.50 per share of its Class A common stock. The conversion rate will be subject to adjustment upon the occurrence of certain events specified in the Indenture but will not be adjusted for any accrued and unpaid interest. In addition, upon the occurrence of a make whole fundamental change or a redemption period (each as defined in the Indenture), the Company will, in certain circumstances, increase the conversion rate by a specified number of additional shares for a holder who elects to convert its Convertible Notes in connection with such make whole fundamental change or during the relevant redemption period.

Holders of the Convertible Notes may convert all or any portion of their Convertible Notes at any time prior to the close of business on December 1, 2023, in integral multiples of $1,000 principal amount, only under the following circumstances:

- During any calendar quarter commencing after the calendar quarter ending on September 30, 2019 (and only during such calendar quarter), if the last reported sale price of the Class A Common Stock for at least 20 trading days (whether or not consecutive) during a period of 30 consecutive trading days ending on, and including, the last trading day of the immediately preceding calendar quarter is greater than or equal to 130% of the conversion price on each applicable trading day;
- During the five business day period after any five consecutive trading day period (the "measurement period") in which the trading price (as defined in the Indenture) per $1,000 principal amount of Convertible Notes for each trading day of the measurement period was less than 98% of the product of the last reported sale price of the Class A Common Stock and the conversion rate on each such trading day;
- If the Company calls any or all of the Convertible Notes for redemption (which the Company may not do prior to June 6, 2022), at any time prior to the close of business on the scheduled trading day immediately preceding the redemption date; or
- Upon the occurrence of specified corporate events.

On or after December 1, 2023 until the close of business on the business day immediately preceding the maturity date, holders may convert their Convertible Notes at any time, regardless of the foregoing circumstances. Upon conversion, the Company may satisfy its conversion obligation by paying and/or delivering, as the case may be, cash, shares of Class A Common Stock or a combination of cash and shares of the Class A Common Stock, at the Company's election, in the manner and subject to the terms and conditions provided in the Indenture.

During the quarter ended December 31, 2019, the conditions allowing holders of the Convertible Notes to convert were not met. Therefore, the Convertible Notes were classified as long-term debt on the consolidated balance sheet as of December 31, 2019.

As of December 31, 2019, the "if converted value" did not exceed the principal amount of the Convertible Notes since the closing sales price of the Company's common stock was less than the conversion price of the Convertible Notes.

The Company accounts for the Convertible Notes as separate liability and equity components. The carrying amount of the liability component of the Convertible Notes was calculated by measuring the fair value of similar debt instruments that do not have an associated convertible feature. The Company determined the carrying amount of the liability component as the present value of its cash flows using a discount rate of approximately 5.5%. The estimated interest rate was applied to the Convertible Notes, which resulted in a fair value of the liability component of $178.2 million upon issuance, calculated as the present value of future contractual payments based on the $230.0 million aggregate principal amount. The excess of the principal amount of the liability component over its carrying amount, or the debt discount, is amortized to interest expense over the term of the Convertible Notes using the effective interest method. The $51.8 million difference between the gross proceeds received from issuance of the Convertible Notes of $230.0 million and the estimated fair value of the liability component represents the equity component, or the "Conversion Option", of the Convertible Notes and was recorded in additional paid-in capital. The equity component is not remeasured as long as it continues to meet the conditions for equity classification.

The Company allocated issuance costs related to the issuance of the Convertible Notes to the liability and equity components using the same proportions as the initial carrying value of the Convertible Notes. Issuance costs attributable to the liability component were $6.3 million and are being amortized to interest expense using the effective interest method over the term of the Convertible Notes. Issuance costs attributable to the equity components were $1.8 million and are netted with the equity component of the Convertible Notes in stockholders' equity on the condensed consolidated balance sheets.

The net carrying value of the liability component of the Convertible Notes was as follows (in thousands):

		December 31, 2019
Principal	$	230,000
Less: unamortized debt discount		46,820
Less: unamortized debt issuance costs		5,686
Net carrying amount	$	177,494

The net carrying value of the equity component of the Convertible Notes was as follows (in thousands):

		December 31, 2019
Proceeds allocated to the conversion option (debt discount)	$	51,842
Less: issuance costs		1,833
Net carrying amount	$	50,009

The interest expense related to the Convertible Notes was as follows (in thousands):

		For the Year Ended December 31, 2019
Contractual interest expense	$	313
Amortization of debt issuance cost and discount		5,635
Total	$	5,948

Credit agreement

Revolving credit facility

The Company has a $150.0 million credit agreement that was amended on June 5, 2019, to permit the issuance of the Convertible Notes and extend the maturity date of the credit facility to December 15, 2023 ("2019 Amended Credit Agreement"). The 2019 Amended Credit Agreement provides for an accordion feature that allows the Company to expand the size of the revolving line of credit by an additional $50.0 million, subject to certain conditions, by obtaining additional commitments from the existing lenders or by causing a person acceptable to the administrative agent to become a lender (in each case subject to the terms and conditions set forth in the 2019 Amended Credit Agreement).

As of December 31, 2019, the Company had no outstanding borrowings under the 2019 Amended Credit Agreement and there was $150.0 million available for future borrowing. The 2019 Amended Credit Agreement is available for general corporate purposes, including working capital, capital expenditures, and permitted acquisitions.

Borrowings under the 2019 Amended Credit Agreement bear interest at a rate per annum equal to an agreed upon applicable margin plus, at the Company's option, either the Alternate Base Rate (defined as the greatest of (1) the Prime Rate (as defined in the 2019 Amended Credit Agreement) in effect on such day, (2) the Federal Funds Effective Rate (as defined in the 2019 Amended Credit Agreement) in effect on such day plus 1/2 of 1.00% or (3) the Adjusted LIBO Rate (as defined in the 2019 Amended Credit Agreement) for a one month interest period on such day (or if such day is not a business day, the immediately preceding business day) plus 1.00%) or the Adjusted LIBO Rate. The applicable margin for borrowings under the 2019 Amended Credit Agreement is based on the Company's most recently tested consolidated total net leverage ratio and will vary from (a) in the case of Eurodollar loans, 1.25% to 2.00%, and (b) in the case of ABR loans or swingline loans, 0.25% to 1.00%. The Company pays a commitment fee ranging from 0.15% to 0.30% on the unused portion of the 2019 Amended Credit Agreement. The weighted average interest rate on borrowings under the 2019 Amended Credit Agreement was 3.6% for the year ended December 31, 2019.

Collateral and guarantees

The 2019 Amended Credit Agreement is secured by collateral including (i) substantially all of the Company's properties and assets, and the properties and assets of the Company's domestic subsidiaries but excluding any patents, copyrights, patent applications or copyright applications or any trade secrets or software products and (ii) pledges of the equity interests in all present and future domestic subsidiaries (subject to certain exceptions as provided for under the 2019 Amended Credit Agreement). The Company's direct and indirect domestic subsidiaries are guarantors of all the obligations under the 2019 Amended Credit Agreement.

Debt covenants

The 2019 Amended Credit Agreement requires the Company to maintain the following financial covenants:

- *Maximum Net Leverage Ratio* : On the last day of each fiscal quarter, the Company on a consolidated basis will not permit the ratio of total indebtedness (net of unrestricted domestic cash in excess of $20.0 million) to EBITDA, as such terms are defined in the 2019 Amended Credit Agreement, for the rolling four quarter period ending on such date to be greater than 5.00 to 1.00 as of the last day of each fiscal quarter.
- *Senior Secured Leverage Ratio* : On the last day of each fiscal quarter, the Company on a consolidated basis will not permit the ratio of total indebtedness secured by a lien (net of unrestricted domestic cash in excess of $20.0 million) to EBITDA, as such terms are defined in the 2019 Amended Credit Agreement, for the rolling four quarter period ending on such date to be greater than 3.00 to 1.00 as of the last day of each fiscal quarter.

- *Consolidated Interest Coverage Ratio* : On the last day of each fiscal quarter, the Company on a consolidated basis will not permit the ratio of (x) EBITDA to (y) cash Consolidated Interest Expense, as such terms are defined in the 2019 Amended Credit Agreement, in each case for the rolling four quarter period ending on such date, to be less than 3.00 to 1.00 as of the last day of each fiscal quarter.

At December 31, 2019, the Company was in compliance with all of the above financial covenants.

Other

The Company has available overdraft and line of credit facilities in several countries in which it operates. These credit facilities are with various domestic and international banks and are at quoted market rates. At both December 31, 2019 and 2018, the Company had $3.5 million of availability under these facilities and there were no outstanding commitments.

8. Leases

The Company determines if an arrangement is a lease at inception. Operating leases are included in operating lease assets and operating lease obligations on the Company's consolidated balance sheets. Finance leases are included in property and equipment, current portion of long-term debt, and long-term debt on the consolidated balance sheets.

ROU assets represent the Company's right to use an underlying asset for the lease term and lease liabilities represent the Company's obligation to make lease payments under the lease. Operating lease ROU assets and operating lease liabilities are recognized based on the present value of the future minimum lease payments over the lease term at commencement date. At commencement date, the ROU asset also includes adjustments for lease prepayments, lease incentives received and the lessee's initial direct costs, if applicable. As most of the Company's leases do not provide an implicit rate, the Company uses its incremental borrowing rate based on the information available at commencement date in determining the present value of future payments. The incremental borrowing rates are determined using rates specific to the term of the lease, economic environments where lease activity is concentrated, value of lease portfolio, and assuming full collateralization of the loans. Subsequent to the commencement date, the operating ROU asset is equal to the remeasured lease liability adjusted for cumulative prepaid or accrued rent if the lease payments are uneven throughout the lease term, unamortized lease incentives, unamortized initial direct costs and any impairment of the ROU assets. The lease terms may include options to extend or terminate the lease when it is reasonably certain that the Company will exercise that option. Lease cost for minimum lease payments is recognized on a straight-line basis over the lease term.

The Company has elected not to recognize a lease liability or ROU asset for short-term leases (leases with a term of twelve months or less). For contracts with lease and non-lease components, the Company has elected not to allocate the contract consideration, and account for the lease and non-lease components as a single lease component.

The Company's operating leases consist of office facilities, office equipment and cars and the Company's finance leases consist of office equipment and cars. The Company's leases have remaining terms of less than one year to 7.9 years, some of which include one or more options to renew, with renewal terms up to six years and some of which include options to terminate the leases within the next four years.

The components of lease cost were as follows (in thousands):

	For the Year Ended December 31, 2019
Operating lease cost	$ 13,287
Finance lease cost:	
Amortization of ROU assets	$ 525
Interest on lease liabilities	21
Total finance lease cost	$ 546

Operating lease cost includes short-term leases and variable lease costs, which are immaterial. Rent cost related to operating leases for office facilities was $11.8 million, $11.0 million and $9.9 million for the years ended December 31, 2019, 2018 and 2017, respectively.

Supplemental balance sheet information related to lease liabilities at December 31, 2019, was as follows:

(in thousands, except lease term and discount rate)		
Operating leases:		
Operating lease ROU assets	$	28,134
Current portion of operating lease liabilities	$	9,141
Operating lease liabilities, net of current portion		20,174
Total operating lease liabilities	$	29,315
Weighted average remaining lease term		4.2
Weighted average discount rate		5.6%
Finance leases:		
Property and equipment	$	2,745
Accumulated depreciation		(1,447)
Property and equipment, net	$	1,298
Current portion of long-term debt	$	430
Long-term debt, net of current portion		744
Total finance lease liabilities	$	1,174
Weighted average remaining lease term		2.7
Weighted average discount rate		3.5%

Supplemental cash flow information related to leases for the year ended December 31, 2019, was as follows (in thousands):

Cash paid for amounts included in the measurement of lease liabilities:		
Operating cash flows from operating leases	$	(11,355)
Operating cash flows from finance leases	$	(46)
Financing cash flows from finance leases	$	(438)
ROU assets obtained in exchange for lease obligations:		
Operating leases	$	11,251
Finance leases	$	632

Maturities of operating lease liabilities at December 31, 2019, were as follows (in thousands):

Year ending December 31,		
2020	$	10,444
2021		8,177
2022		5,768
2023		3,684
2024		1,730
Thereafter		3,055
Total lease payments		32,858
Less: imputed interest		3,543
Total operating lease liabilities	$	29,315

Total obligations for finance leases, previously referred to as capital leases prior to the adoption of Topic 842 on January 1, 2019, were $0.8 million at December 31, 2018.

9. Other liabilities

The following table provides the details of other accrued expenses and current liabilities (in thousands):

	December 31, 2019	December 31, 2018
Income taxes payable	$ 6,008	$ 3,932
Accrued VAT	5,312	4,536
Accrued professional fees	2,581	3,165
Accrued royalties	2,314	2,613
Defined contribution plan liabilities	1,593	1,376
Obligations for acquisition of businesses	1,362	1,218
Non-income tax liabilities	1,253	853
Billings in excess of cost	879	1,504
Other current liabilities	7,301	7,842
Total	$ 28,603	$ 27,039

The following table provides the details of other long-term liabilities (in thousands):

	December 31, 2019	December 31, 2018
Pension and other post retirement liabilities	$ 10,379	$ 9,111
Deferred tax liabilities	6,275	5,339
Other liabilities	10,018	11,306
Total	$ 26,672	$ 25,756

10. Fair value measurements

The accounting guidance for fair value, among other things, defines fair value, establishes a consistent framework for measuring fair value and expands disclosure for each major asset and liability category measured at fair value on either a recurring or nonrecurring basis. Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability (an exit price) in an orderly transaction between market participants at the reporting date. The framework for measuring fair value consists of a three-level valuation hierarchy that prioritizes the inputs to valuation techniques used to measure fair value based upon whether such inputs are observable or unobservable. Observable inputs reflect market data obtained from independent sources, while unobservable inputs reflect market assumptions made by the reporting entity. The three-level hierarchy for the inputs to valuation techniques is briefly summarized as follows:

Level 1— Quoted prices in active markets for identical assets and liabilities at the measurement date;

Level 2— Observable inputs, other than the quoted prices in active markets, that are observable either directly or indirectly; and

Level 3— Unobservable inputs in which there is little or no market data, which require the reporting entity to develop its own assumptions.

An asset’s or liability’s fair value measurement level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement. Valuation techniques used need to maximize the use of observable inputs and minimize the use of unobservable inputs.

The carrying value of cash and cash equivalents, accounts receivable and accounts payable approximate fair value due to their short maturities. Interest on the Company’s long-term debt is at a variable rate, and as such the debt obligation outstanding approximates fair value.

The carrying value of the Company’s derivative financial instruments are measured at fair value on a recurring basis. The fair value of derivatives is determined based on inputs derived from or corroborated by observable market data pertaining to relevant interest rates and is considered a level 2 fair value measurement. See Note 11—Financial instruments for additional information regarding the use and fair value of derivatives.

The carrying value of the Company's Convertible Notes are at face value less unamortized debt discount and issuance costs. The estimated fair values of the Convertible Notes, which the Company has classified as Level 2 financial instruments, were determined based on quoted bid prices of the Convertible Notes on the last trading day of each reporting period. At December 31, 2019, the fair value of the Convertible Notes was $236.1 million, and is presented for required disclosure purposes only. For further information on the Convertible Notes see Note 7. – Debt.

11. Financial instruments

The Company is exposed to certain financial market risks related to its ongoing business operations. The primary risks the Company can manage through derivative financial instruments and hedging activities are foreign currency exchange rate risk and interest rate risk. Derivative financial instruments and hedging activities can be utilized to protect the Company's cash flow from adverse movements in foreign currency exchange rates and to manage interest costs. Although the Company is exposed to credit loss in the event of nonperformance by the counterparty to the derivative financial instruments, the Company attempts to limit this exposure by entering into agreements directly with major financial institutions that meet the Company's credit standards and that are expected to fully satisfy their obligations under the contracts.

Interest rate swaps

Interest rate exposures are reviewed periodically, and the Company may enter into interest rate swap agreements to manage its exposure. The Company's exposure to interest rate risk arises primarily from changes in the LIBOR rate. The Company will hold these derivatives for economic purposes but does not designate these derivatives to obtain hedge accounting treatment. As such, gains or losses on these contracts (including contracts that do not qualify for hedge accounting under ASC 815), are reported in earnings immediately as Other (income) expense, net. These contracts limit exposure to changes in interest payments associated with variable rate debt. However, as the change in the fair value of the interest rate swaps is impacted by both realized and unrealized gains and losses on the contracts, the amount recognized in earnings may not offset the changes in the variability of interest expense during a given period.

As of December 31, 2019, the Company had no interest rate swaps outstanding. As of December 31, 2018, the Company had an interest rate swap outstanding with a $4.5 million notional value which matured on December 23, 2019.

Foreign currency derivatives

The Company sells its products (and incurs costs) in countries throughout the world. As a result, it is exposed to fluctuations in foreign currency exchange rates. Foreign currency exposures are reviewed on a periodic basis and any natural offsets are considered prior to entering into a derivative financial instrument. The Company could enter into foreign exchange contracts to hedge portions of its foreign currency denominated forecasted revenues, purchases and the subsequent cash flows after considering natural offsets within the consolidated group. The Company will hold these derivatives for economic purposes but does not designate these derivatives to obtain hedge accounting treatment. As such, gains or losses on these contracts (including contracts that do not qualify for hedge accounting under ASC 815), are reported in earnings immediately and are substantially offset by the effect of the revaluation of the underlying foreign currency denominated transactions. There were no foreign exchange contracts outstanding at December 31, 2019 or 2018.

Credit-risk-related contingent features

The Company has entered into International Swaps and Derivatives Association ("ISDA") agreements with its significant derivative counterparty. These agreements provide bilateral netting and offsetting of accounts that are in a liability position with those that are in an asset position. These agreements do not require the Company to maintain a minimum credit rating in order to be in compliance and do not contain any margin call provisions or collateral requirements that could be triggered by derivative instruments in a net liability position. The Company did not have any outstanding derivative instruments at December 31, 2019.

12. Stockholders' equity

Preferred stock

As of December 31, 2019, the Company had authorized 45,000,000 shares of preferred stock, par value $0.0001, of which no shares were issued or outstanding. The Board of Directors has the authority to issue the preferred stock in one or more series and to fix rights, preferences, privileges, and restrictions, including dividends and the number of shares constituting any series or the designation of such series, without any further vote or action by the stockholders.

Common stock

As of December 31, 2019, the Company had authorized 513,796,572 shares of Class A common stock, par value $0.0001, and 41,203,428 shares of Class B common stock, par value $0.0001. The rights of the holders of Class A common stock and Class B common stock are identical, except with respect to voting and conversion rights. Each share of Class A common stock is entitled to one vote per share. Each share of Class B common stock is entitled to ten votes per share and is convertible into one share of Class A common stock.

The holders of Class A and Class B common stock are entitled to dividends at the sole discretion of the Board of Directors. No common stock dividends were declared or paid in 2019, 2018, or 2017.

13. Stock-based compensation

2001 stock-based compensation plans

Nonqualified stock option plan

In 2001, the Company established the Nonqualified Stock Option Plan ("NSO Plan") under which 3,557,436 stock options with an exercise price of $.000025 remain outstanding at December 31, 2019. The NSO Plan was terminated in 2003. Stock options under the NSO plan were immediately vested and have a contractual term of 35 years from the date of grant. The outstanding awards will continue to be governed by their existing terms under the NSO Plan. The NSO Plan is accounted for as an equity plan.

The following table summarizes the stock option activity under the NSO Plan:

	Number of options	Weighted average exercise price per share	Weighted average remaining contractual term (years)	Aggregate intrinsic value (in millions)
Outstanding at January 1, 2019	4,337,856	$ 0.000025	18.0	$ 119.6
Exercised	(780,420)	$ 0.000025		
Forfeited	—	$ —		
Outstanding and exercisable at December 31, 2019	3,557,436	$ 0.000025	17.0	$ 127.8

The total intrinsic value of the NSO Plan stock options exercised during the years ended December 31, 2019, 2018 and 2017, was $28.8 million, $68.4 million and $0.4 million, respectively.

Incentive and nonqualified stock-based plan

Also, in 2001, the Company established the Incentive and Nonqualified Stock-based Plan ("ISO Plan") which was terminated in 2011 and was authorized to issue nonqualified stock options ("NQSO") and incentive stock options ("ISO") totaling 11,153,872 shares of Class A common stock. The NQSO grants could be issued at less than the fair market value at date of grant under the terms of the ISO Plan, while ISO grants were issued at a price equal to or greater than the fair market value at date of grant. Options generally vest over a two to three-year period. All options have a contractual term of ten years from the date of grant. At December 31, 2019 and 2018, there were 103,000 and 532,220 options outstanding, respectively, under the ISO Plan.

As a result of the Company's IPO in the fourth quarter 2017, the call feature terminated which resulted in the $66.5 million liability valued immediately prior to the IPO associated with the Company's Class A redeemable common shares and with the stock options outstanding under the 2001 ISO and NQSO Plan to be reclassified to equity as of December 31, 2017 in accordance with ASC 718.

The following table summarizes the stock option activity under the 2001 Stock-based compensation plans for the periods indicated as follows:

	Number of options	Weighted average exercise price per share	Weighted average remaining contractual term (years)	Aggregate intrinsic value (in millions)
Outstanding at January 1, 2019	532,220	$ 0.65	1.4	$ 14.3
Exercised	(429,220)	$ 0.66		
Forfeited	—	$ —		
Outstanding and exercisable at December 31, 2019	103,000	$ 0.64	1.0	$ 3.6

The total intrinsic value of the ISO Plan stock options exercised during the years ended December 31, 2019, 2018 and 2017, was $14.4 million, $5.2 million, and $25.6 million, respectively.

2012 stock-based compensation plans

During 2012, the Company established the 2012 Incentive and Nonqualified Stock Option Plan ("2012 Plan") which permits the issuance of 5,200,000 shares of Class A common stock for the grant of nonqualified stock options ("NQSO") and incentive stock options ("ISO") for management, other employees, and board members of the Company. The options are issued at a price equal to or greater than fair market value at date of grant. All options have a contractual term of 10 years from date of grant.

The 2012 Plan is accounted for as an equity plan. For those options expected to vest, compensation expense is recognized on a straight-line basis over a four-year period, the total requisite service period of the awards. Compensation expense related to the 2012 Plan was $0.4 million, $0.6 million and $0.7 million for the years ended December 31, 2019, 2018 and 2017, respectively.

The following table summarizes the stock option activity under the 2012 Plan for the periods indicated as follows:

	Number of options	Weighted average exercise price per share	Weighted average remaining contractual term (years)	Aggregate intrinsic value (in millions)
Outstanding at January 1, 2019	1,541,165	$ 4.12	6.9	$ 36.2
Granted	—	$ —		
Exercised	(348,376)	$ 3.73		
Forfeited	(8,972)	$ 4.64		
Outstanding at December 31, 2019	1,183,817	$ 4.23	6.1	
Exercisable at December 31, 2019	893,349	$ 3.96	5.7	$ 37.5

The total intrinsic value of the 2012 Plan stock options exercised during the year ended December 31, 2019, was $11.2 million. Total compensation cost related to nonvested awards not yet recognized as of December 31, 2019 totaled $0.4 million and is expected to be recognized over a weighted average period of 1.1 years.

2017 stock-based compensation plan

In 2017, the Company's board of directors adopted the 2017 Equity Incentive Plan ("2017 Plan"), which was approved by the Company's stockholders. The 2017 Plan provides for the grant of incentive stock options to the Company's employees and any parent and subsidiary corporations' employees, and for the grant of nonstatutory stock options, stock appreciation rights, restricted stock, restricted stock units, performance units, performance shares, other cash-based awards and other stock-based awards to the Company's employees, directors and consultants and the Company's parent, subsidiary, and affiliate corporations' employees and consultants. The 2017 Plan has 8,104,971 authorized shares of the Company's Class A common stock reserved for issuance.

The following table summarizes the restricted stock units, or RSUs, awarded under the 2017 Plan for the period:

	Number of RSUs
Outstanding at January 1, 2019	206,061
Granted	694,690
Vested	(60,388)
Forfeited	(59,062)
Outstanding at December 31, 2019	781,301

The weighted average grant date fair value of the RSUs was $37.23 and the RSUs generally vest in four equal annual installments. Total compensation cost related to nonvested awards not yet recognized as of December 31, 2019, totaled $22.9 million, and is expected to be recognized over a weighted average period of 3.3 years. The fair value of RSUs that vested during the year ended December 31, 2019, was $2.2 million.

The following table summarizes the stock option activity under the 2017 Plan for the period:

	Number of options	Weighted average exercise price per share		Weighted average remaining contractual term (years)	Aggregate intrinsic value (in millions)
Outstanding at January 1, 2019	—	$	—	—	—
Granted	20,000	$	38.11		
Exercised	—	$	—		
Forfeited	—	$	—		
Outstanding at December 31, 2019	20,000	$	38.11	9.2	
Exercisable at December 31, 2019	—				

Fair value of equity awards

The Company measures the fair value of its stock options on the date of grant using the Black-Scholes option pricing model. This valuation model requires the Company to make certain estimates and assumptions, including assumptions related to the expected price volatility of the Company's stock, the period under which the options will be outstanding, the rate of return on risk-free investments, and the expected dividend yield for the Company's stock.

The fair values of the Company's stock options granted during the year ended December 31, 2019 and 2017, were estimated using the following assumptions:

		2019 grants	2017 grants
Weighted average grant date fair value per share	$	38.11	$1.86 - $1.94
Expected volatility		42%	34%
Expected term (in years)		6.25	5.75-6.25
Risk-free interest rate		1.80%	2.02%
Expected dividend yield		0%	0%

These assumptions and estimates are as follows:

- *Fair Value of Common Stock*. The Company used the publicly quoted price as reported on the Nasdaq Global Select Market as the fair value of its common stock.

- *Expected Term*. The Company used the simplified method to determine the expected term.
- *Risk-Free Interest Rate*. The Company based the risk-free interest rate on U.S. Treasury zero-coupon yield curves with a remaining term equal to the expected term of the option.
- *Expected Volatility*. As the Company does not have an extensive trading history for its common stock, the expected volatility was derived using the historical volatility of the returns of comparable publicly traded companies combined with the brief trading history of the Company's common stock.

The Company did not grant any stock options during the year ended December 31, 2018.

Other

In connection with the acquisition of Polliwog, per the Stock Purchase Agreement, 256,594 shares of the Company's Class A Common Stock will be issued to existing employees, subject to continuing employment. The shares will be issued on the one-, two- and three-year anniversaries of the closing, subject to potential reduction in certain circumstances. The accounting treatment for these shares in the context of the business combination is to recognize the expense as a post-combination expense, not as transaction consideration.

The estimated post combination expense to the Company as a result of the business combination was approximately $8.7 million which will be recognized on a straight-line basis over the remaining employment period that was stipulated in the Stock Purchase Agreement. The weighted average remaining service period is 2.8 years. Once the vesting conditions of the service period are met, the Company will issue shares for each award. Stock-based compensation expense includes approximately $0.7 million expense related to these shares for the year ended December 31, 2019.

In connection with the acquisition of Datawatch, all outstanding unvested Datawatch RSUs were converted into a right to receive cash (the "Replacement Awards"). The payment to the holders of unvested Datawatch RSUs will be payable on or after the date that such RSUs would have otherwise vested in accordance with its original terms.

The accounting treatment for the outstanding unvested Datawatch RSUs in the context of the business combination is to allocate the fair value of the RSU's at the date of consummation attributable to pre-combination service to the aggregate merger consideration. The difference between the fair value of the Replacement Awards and the amount allocable to pre-combination service was considered a post-combination expense to the Company after the consummation date.

The estimated post combination expense to the Company as a result of the business combination was approximately $3.4 million which will be recognized on a straight-line basis over the remaining service period that was stipulated in each holder's original RSU agreement. The weighted average remaining service period is 0.6 years. Once the vesting conditions of the service period are met, Altair will cash-settle the Replacement Awards. The liability related to the Datawatch RSUs as of December 31, 2019 and 2018, was $0.5 million and $0.6 million, respectively, and is recorded in other accrued expenses and current liabilities.

In connection with the acquisition of Runtime Design Automation ("RTDA"), all outstanding stock options of RTDA became fully vested and exercisable prior to the date of consummation which represents an acceleration to full vesting of all unvested stock options as of the date of the business combination.

The accounting treatment for the outstanding stock options in the context of the business combination is to allocate the fair market value of RTDA's options at the date of consummation attributable to pre-combination service to the aggregate merger consideration. The difference between the fair market value of the replacement awards and the amount allocable to pre-combination service was considered a post-combination expense to the Company after the consummation date.

The estimated post combination expense to the Company as a result of the business combination was approximately $2.0 million which was immediately expensed in the post combination financial statements in the third quarter of 2017, as there were no further service conditions. The Company determined that the Black-Scholes model was an appropriate valuation model for the employee share options as all of RTDA's stock options had only service conditions.

Stock-based compensation expense

The stock-based compensation expense was recorded as follows (in thousands):

	Year ended December 31,		
	2019	2018	2017
Cost of revenue-software	$ 1,069	$ 31	$ 350
Research and development	2,917	740	12,540
Sales and marketing	2,250	910	7,693
General and administrative	2,292	1,658	26,698
Total stock-based compensation expense	$ 8,528	$ 3,339	$ 47,281

14. Income taxes

The components of income (loss) before income taxes are as follows (in thousands):

	Year ended December 31, 2019	2018	2017
U.S.	$ (14,732)	$ 4,228	$ (49,761)
Non-U.S.	18,120	22,796	13,350
	$ 3,388	$ 27,024	$ (36,411)

The significant components of the income tax expense are as follows (in thousands):

	Year ended December 31, 2019	2018	2017
Current			
U.S. Federal	$ —	$ 2	$ —
Non-U.S.	11,434	12,629	10,290
U.S. State and Local	446	(16)	135
Total current	11,880	12,615	10,425
Deferred			
U.S. Federal	193	1,714	54,130
Non-U.S.	(1,143)	(2,823)	1,228
U.S. State and Local	-	(17)	(253)
Total deferred	(950)	(1,126)	55,105
Income tax expense	$ 10,930	$ 11,489	$ 65,530

The reconciliation of income taxes calculated at the U.S. Federal statutory income tax rate to income tax expense is as follows (in thousands):

	Year ended December 31, 2019	2018	2017
U.S. federal statutory rate	21%	21%	35%
Income taxes at U.S. federal statutory rate	$ 711	$ 5,675	$ (12,744)
Foreign income taxes at rates other than the federal statutory rate	1,247	2,179	373
U.S. state and local income taxes, net of U.S. federal tax benefit	(6,836)	(3,453)	(155)
U.S. Tax Cut and Jobs Act: transition tax, net of foreign tax credits	—	—	4,187
U.S. effect of foreign operations	8,609	—	—
Change in valuation allowance	18,138	21,544	49,859
Foreign withholding taxes	5,975	5,103	4,181
U.S. foreign tax credit	(7,059)	(5,648)	(4,154)
Research and development tax credit	(2,600)	(2,819)	(2,999)
Stock-based compensation	(4,574)	(14,964)	10,871
Meals & entertainment	246	181	358
Other	(1,068)	1,206	(59)
Uncertain tax positions	(1,859)	903	446
Acquisition costs	—	503	—
Tax law changes	—	1,079	15,366
Income tax expense	$ 10,930	$ 11,489	$ 65,530

The Tax Cuts and Jobs Act, or the Tax Act, was enacted on December 22, 2017. The Tax Act reduced the U.S. federal corporate income tax rate from 35% to 21%, required companies to pay a one-time transition tax on earnings of certain foreign subsidiaries that were previously tax deferred and created new taxes on certain foreign sourced earnings. The Company applied the guidance in Staff Accounting Bulletin No. 118, Income Tax Accounting Implications of the Tax Cut and Jobs Act when accounting for the enactment-date effects of the Tax Act. At December 31, 2018, the Company had completed its accounting for the tax effects of the Tax Act; the Company did not record any adjustments to the provisional amounts recorded at December 31, 2017 related to the remeasurement of its deferred balances. At December 31, 2017, the Company originally recorded a provisional amount for its one-time transition tax of $4.2 million, which was substantially offset by available foreign tax credits. During the year ended December 31, 2018, the Company revised its estimate of the provisional amount of the one-time transition tax. Upon further analyses of certain aspects of the Tax Act and refinement of its calculations, the Company increased its provisional amount of transition tax by approximately $0.6 million for the year ended December 31, 2018. This resulted in no change to income tax expense due to the impact of foreign tax credits.

The Tax Act subjects a U.S. shareholder to current tax on global intangible low-taxed income ("GILTI") earned by certain foreign subsidiaries. The impact of GILTI resulted in no incremental tax expense for the year ended December 31, 2019 due to a full valuation allowance on U.S. net deferred tax assets. In addition, the Company has made an accounting policy election to treat taxes due under the GILTI provision as a current period expense.

Deferred income tax assets and liabilities result from differences in the basis of assets and liabilities for tax and financial statements purposes. The approximate tax effect of each type of temporary difference, and operating losses and tax credit carryforwards that give rise to a significant portion of the deferred tax assets and liabilities are as follows (in thousands):

	December 31,	
	2019	2018
Deferred tax assets:		
Deferred revenue	$ 11,408	$ 1,962
Net operating loss carryforwards	38,745	38,179
Tax credit carryforwards	38,981	31,600
Stock-based compensation	6,480	6,858
Capitalized research and development	7,162	8,266
Lease obligation	7,579	—
Employee benefits	5,189	4,756
Other	1,968	1,999
Total gross deferred tax assets	117,512	93,620
Less: valuation allowances	(84,356)	(78,155)
Net deferred tax assets (1)	33,156	15,465
Deferred tax liabilities:		
Property and equipment and intangibles	13,588	13,966
Deferred tax on investment in subsidiary	474	329
Lease right of use asset	7,247	—
Convertible debt, net of issuance costs	10,899	—
Other	1,432	1,154
Total deferred tax liabilities	33,640	15,449
Total net deferred tax (liabilities) assets	$ (484)	$ 16

(1) Reflects gross amount before jurisdictional netting of deferred tax assets and liabilities.

Deferred tax assets and liabilities are determined separately for each tax jurisdiction on a separate or on a consolidated tax filing basis, as applicable, in which the Company conducts its operations or otherwise incurs taxable income or losses. A valuation allowance is recorded when it is more likely than not that some portion or all of the gross deferred tax assets will not be realized. The realization of deferred tax assets depends on the ability to generate sufficient taxable income of the appropriate character within the carryback or carryforward periods provided for in the tax law for each applicable tax jurisdiction. The Company considers the following possible sources of taxable income when assessing the realization of deferred tax assets:

- taxable income in prior carryback years;
- future reversals of existing taxable temporary differences;
- future taxable income exclusive of reversing temporary differences and carryforwards; and
- prudent and feasible tax planning strategies that the Company would be willing to undertake to prevent a deferred tax asset from otherwise expiring.

The assessment regarding whether a valuation allowance is required or whether a change in judgment regarding the valuation allowance has occurred also considers all available positive and negative evidence, including but not limited to:

- nature, frequency, and severity of cumulative losses in recent years;
- duration of statutory carryforward and carryback periods;
- statutory limitations against utilization of tax attribute carryforwards against taxable income;
- historical experience with tax attributes expiring unused; and

- near- and medium-term financial outlook.

The weight given to the positive and negative evidence is commensurate with the extent to which the evidence may be objectively verified. Accordingly, it is generally difficult to conclude a valuation allowance is not required when there is significant objective and verifiable negative evidence, such as cumulative losses in recent years. The Company uses the actual results for the last two years and current year results as the primary measure of cumulative losses in recent years.

The evaluation of deferred tax assets requires judgment in assessing the likely future tax consequences of events recognized in the financial statements or tax returns and future profitability. The recognition of deferred tax assets represents the Company's best estimate of those future events. Changes in the current estimates, due to unanticipated events or otherwise, could have a material effect on the Company's results of operations and financial condition.

In certain tax jurisdictions, the Company's analysis indicates that it has cumulative losses in recent years. This is considered significant negative evidence, which is objective and verifiable and, therefore, difficult to overcome. However, the cumulative loss position is not solely determinative and, accordingly, the Company considers all other available positive and negative evidence in its analysis. Based on its analysis, the Company has recorded a valuation allowance for the portion of deferred tax assets where based on the weight of available evidence it is unlikely to realize those deferred tax assets.

Based on the evidence available including a lack of sustainable earnings, the Company in its judgment previously recorded a valuation allowance against substantially all of its net deferred tax assets in the United States. If a change in judgment regarding this valuation allowance were to occur in the future, the Company will record a potentially material deferred tax benefit, which could result in a favorable impact on the effective tax rate in that period.

As a result of the Tax Act, the Company has not had a change in judgement regarding the gross book-tax basis differences in its non-U.S. consolidated subsidiaries. The Tax Act required a one-time transition tax for deemed repatriation of accumulated undistributed earnings of certain foreign investments. If we determine that all or a portion of our foreign earnings are no longer indefinitely reinvested, we may be subject to additional foreign withholding taxes, U.S. taxes on foreign currency fluctuations on these accumulated undistributed earnings, and incremental U.S. state income taxes, beyond the Tax Act's one-time transition tax. The Company continues to record deferred foreign taxes on gross book-tax basis differences to the extent of foreign distributable reserves and excess cash balances for its subsidiary in India. Determining the amount of unrecognized deferred tax liability related to any remaining undistributed foreign earnings is not practicable.

The following table summarizes the changes to the valuation allowance balance at December 31, 2019, 2018 and 2017 (in thousands):

	December 31,		
	2019	2018	2017
Beginning balance	$ 78,155	$ 56,761	$ 4,153
Additions charged to expense	18,138	21,544	49,859
Other	(11,937)	(150)	2,749
Ending balance	$ 84,356	$ 78,155	$ 56,761

The tax benefit in Other for 2019 of $11.9 million is related to the issuance of convertible debt, net of issuance costs. The tax benefit in Other for 2018 of $0.2 million is related to a tax benefit from the adoption of ASC 606 of $12.6 million, and the tax benefit recorded in other comprehensive income of $0.2 million, offset by deferred tax expense recorded for business combinations of $12.6 million.

The following table summarizes the amount and expiration dates of operating loss and tax credit carryforwards at December 31, 2019 (in thousands):

	Expiration dates	Amounts
U.S. general business credits and loss carryforwards	2020-Indefinite	$ 56,073
Foreign loss carryforwards	Indefinite	9,182
U.S. foreign tax credits	2027	12,471
Total operating loss and tax credit carryforwards		$ 77,726

A reconciliation of the beginning and ending amounts of unrecognized tax benefits is as follows (in thousands):

	Year ended December 31,		
	2019	2018	2017
Unrecognized tax benefits—January 1	$ 17,097	$ 6,157	$ 5,604
Increase in unrecognized tax benefits as a result of:			
Additions for tax positions of current period	(203)	234	634
Additions for tax positions of prior periods	642	10,866	—
Reductions for tax positions of prior periods	(1,834)	(100)	(81)
Reductions due to statute of limitations	(162)	(60)	—
Unrecognized tax benefits—December 31	$ 15,540	$ 17,097	$ 6,157

At December 31, 2019, the Company had $8.2 million of gross unrecognized tax benefits that if recognized would affect the effective tax rate. The Company expects a reduction over the next 12 months in the gross unrecognized tax benefits of approximately $0.4 million which if recognized would impact the effective tax rate during 2020.

The Company operates globally but considers its more significant tax jurisdictions to include the United States, India, Germany, Japan, and China. India has tax years open for examination from 2008 through 2018. All other significant jurisdictions have open tax years from 2014 through 2018.

The Company records interest and penalties with respect to unrecognized tax benefits as a component of the provision for income taxes. For the years ended December 31, 2019 and 2018, accrued interest and penalties related to unrecognized tax benefits were insignificant.

15. (Loss) income per share

Basic (loss) income per share attributable to common stockholders is computed using the weighted average number of shares of common stock outstanding for the period, excluding stock options and restricted stock units (“RSUs”). Diluted (loss) income per share attributable to common stockholders is based upon the weighted average number of shares of common stock outstanding for the period and potentially dilutive common shares, including the effect of stock options and RSUs under the treasury stock method. The following table sets forth the computation of the numerators and denominators used in the basic and diluted (loss) income per share amounts (in thousands, except per share data):

	Year ended December 31,		
	2019	2018	2017
Numerator:			
Net (loss) income	$ (7,542)	$ 15,535	$ (101,941)
Denominator:			
Denominator for basic (loss) income per share—weighted average shares	71,544	67,468	52,466
Effect of dilutive securities, stock options and RSUs	—	7,410	—
Denominator for dilutive (loss) income per share	71,544	74,878	52,466
Net (loss) income per share attributable to common stockholders, basic	$ (0.11)	$ 0.23	$ (1.94)
Net (loss) income per share attributable to common stockholders, diluted	$ (0.11)	$ 0.21	$ (1.94)

The computation of diluted (loss) income per share does not include shares that are anti-dilutive under the treasury stock method because their exercise prices are higher than the average fair value of the Company’s stock during the year or due to a net loss in the year. For the year ended December 31, 2019, there were 5.7 million potentially anti-dilutive shares, which were excluded from the computation of (loss) income per share. For the year ended December 31, 2018, there were no anti-dilutive shares, which were excluded from the computation of (loss) income per share. For the year ended December 31, 2017, there were 10.2 million potentially anti-dilutive shares, which were excluded from the computation of (loss) income per share.

The Company expects to settle the principal amount of the Convertible Notes (as defined in Note 7 in cash, and therefore, the Company uses the treasury stock method for calculating any potential dilutive effect of the Conversion Option (as defined in Note 7) on diluted net (loss) income per share, if applicable. The Conversion Option will have a dilutive impact on net income per share of common stock when the average market price of the Company’s Class A common stock for a given period exceeds the conversion price of the Convertible Notes of $46.50 per share. During the year ended December 31, 2019, the Company's weighted average common stock price was below the conversion price of the Convertible Notes.

16. Retirement benefits

The Company sponsors a 401(k)-profit sharing plan (the "Plan") for all eligible U.S. employees. This Plan allows eligible employees to contribute up to 80% of their compensation to the Plan. The Company makes discretionary matching contributions to the Plan provided the employee is employed on the last day of the year. Such discretionary contributions vest ratably over five years of service. The Company's contributions to the Plan were $1.6 million, $1.3 million and $1.1 million for the years ended December 31, 2019, 2018 and 2017, respectively.

The Company also participates in government-mandated retirement and/or termination indemnity plans, benefiting certain non-U.S. employees. Termination benefits are generally lump sum payments based upon an individual's years of credited service and annual salary at retirement. These plans are generally unfunded, and employees receive payments at the time of retirement or termination under applicable labor laws or agreements. The amount of net benefit cost recorded in the consolidated statements of operations for these plans was $1.8 million, $1.2 million and $1.2 million in 2019, 2018 and 2017, respectively. The amount of benefits paid under these plans was $0.4 million, $0.4 million and $0.2 million in 2019, 2018 and 2017, respectively. The accumulated benefit obligation, unlike the projected benefit obligation, does not reflect expected benefit increases from future salary levels, and was $6.8 million and $6.0 million at December 31, 2019 and 2018, respectively, under these plans. The projected benefit obligation, net of plan assets of $0.9 million, was $11.0 million and $9.6 million at December 31, 2019 and 2018, respectively.

A summary of the components of the pension benefits obligation recorded in the consolidated balance sheets are as follows (in thousands):

	December 31,	
	2019	2018
Accrued compensation and benefits	$ 596	$ 513
Other long-term liabilities	10,379	9,111
	$ 10,975	$ 9,624

The estimated future benefit payments, which reflect expected future service, that are expected to be paid for each of the next five years are as follows (in thousands):

Year ending	
December 31, 2020	$ 617
December 31, 2021	$ 292
December 31, 2022	$ 347
December 31, 2023	$ 519
December 31, 2024	$ 431
Next five years	$ 2,991

17. Accumulated other comprehensive loss

The components of accumulated other comprehensive loss are as follows (in thousands):

	Foreign currency translation	Retirement related benefit plans	Total
Balance at December 31, 2016	$ (5,725)	$ (1,539)	$ (7,264)
Other comprehensive income (loss) before reclassification	2,351	(213)	2,138
Amounts reclassified from accumulated other comprehensive loss	—	54	54
Tax effects	—	—	—
Other comprehensive income (loss)	2,351	(159)	2,192
Balance at December 31, 2017	(3,374)	(1,698)	(5,072)
Other comprehensive income (loss) before reclassification	(5,449)	90	(5,359)
Amounts reclassified from accumulated other comprehensive loss	—	(1,177)	(1,177)
Tax effects	—	318	318
Other comprehensive income (loss)	(5,449)	(769)	(6,218)
Balance at December 31, 2018	(8,823)	(2,467)	(11,290)
Other comprehensive income (loss) before reclassification	1,895	62	1,957
Amounts reclassified from accumulated other comprehensive loss	—	(179)	(179)
Tax effects	—	(16)	(16)
Other comprehensive income (loss)	1,895	(133)	1,762
Balance at December 31, 2019	$ (6,928)	$ (2,600)	$ (9,528)

18. Commitments and contingencies

Swedish Tax Litigation

The Swedish Tax Authorities, or STA, have assessed tax, penalties and interest in the amount of $6.5 million related to the acquisition of Panopticon AB by Datawatch, in 2013 for the years 2013, 2014 and 2015. The STA, upon auditing the acquisition transaction, reached a conclusion that post acquisition, certain assets were transferred from Sweden, triggering the tax obligation. The STA is also of the opinion that some services related to product development provided to the new parent company in the U.S. were performed by Panopticon AB at a price below market price triggering tax obligations. Datawatch contested the findings by the STA throughout the audit process including contesting the STA position in the first level of administrative courts. An Administrative Court hearing was held on May 16, 2019. On May 29, 2019, the Administrative Court issued its ruling in favor of Datawatch AB. On July 4, 2019, the STA filed an appeal of the Administrative Court ruling with the Administrative Court of Appeal, or the Court of Appeals, in Stockholm, effectively continuing to assert that the assessments are in fact appropriate. In late September 2019, the Company submitted its filing in response to the STA appeal with the Court of Appeals. On October 10, 2019, the STA filed an answer to the Company's defrayment, and on January 31, 2020, the Company filed a second submission to the Court. The Court of Appeals held a hearing regarding this matter on February 20, 2020. The Company continues to contest the assessment through the appeals process and no rulings have been issued by the Court of Appeals relative to the claims of the STA and the Company's response as of this point. The Company has determined that these events do not cause a change in the assessment of uncertain tax positions.

Potential Export Violation

As previously disclosed, on May 10, 2019, the Company discovered potential violations of U.S. economic sanctions and export control laws and immediately filed preliminary self-disclosure notices with the U.S. Treasury Department's Office of Foreign Assets Control ("OFAC") and the U.S. Commerce Department's Bureau of Industry & Security ("BIS").

The Company subsequently conducted an internal investigation into these issues under the direction of outside legal counsel and filed voluntary self-disclosures with both agencies on July 25, 2019. These disclosures describe the unintentional transfer of commercial software and trial software licenses to various individuals located in Iran and other restricted countries. These transfers involved freeware, trial software licenses, and volunteer software testing communities. The Company did not discover any evidence indicating any commercial transactions with restricted parties or countries.

In addition to filing voluntary self-disclosures with OFAC and BIS, the Company has implemented a series of additional compliance measures to prevent unintentional transfers of the sort described above. These measures will further enhance the Company's international trade compliance program, which is designed to assure that the Company does not conduct business directly or indirectly with any countries or parties subject to U.S. economic sanctions and export control laws.

On August 30, 2019, BIS notified the Company that it had completed its investigation of the potential violation of U.S. export control laws by the Company and concluded that no criminal or administrative prosecution was warranted and closed the matter.

On January 10, 2020, OFAC issued a Cautionary Letter to the Company stating that it had completed its investigation of the potential violation of U.S. export control laws by the Company and concluded that no criminal or administrative prosecution or fines were warranted and closed the matter.

Legal proceedings

From time to time, the Company may be subject to legal proceedings and claims in the ordinary course of business. The Company has received, and may in the future continue to receive, claims from third parties asserting, among other things, infringement of their intellectual property rights. Future litigation may be necessary to defend the Company, its partners and its customers by determining the scope, enforceability and validity of third party proprietary rights, or to establish and enforce the Company's proprietary rights. The results of any current or future litigation cannot be predicted with certainty and regardless of the outcome, litigation can have an adverse impact on the Company because of defense and settlement costs, diversion of management resources and other factors.

Royalty agreements

The Company has entered into various renewable, nonexclusive license agreements under which the Company has been granted access to the licensor's technology and the right to sell or use the technology in the Company's products. Royalties are payable to developers of the software at various rates and amounts, which generally are based upon unit sales or revenue. Royalty fees were $10.6 million, $9.7 million, and $9.3 million for the years ended December 31, 2019, 2018 and 2017, respectively, and are reported in Cost of revenue—software and Cost of revenue—other.

19. Segment information

The Company defines its operating segments as components of its business where separate financial information is available and used by the chief operating decision maker ("CODM") in deciding how to allocate resources to its segments and in assessing performance. The Company's CODM is its Chief Executive Officer.

The Company has identified two reportable segments for financial reporting purposes: Software and Client Engineering Services. The primary measure of segment operating performance is Adjusted EBITDA, which is defined as net income (loss) adjusted for income tax expense (benefit), interest expense, interest income and other, depreciation and amortization, stock-based compensation expense, restructuring charges, asset impairment charges and other special items as determined by management. Adjusted EBITDA includes an allocation of corporate headquarters costs.

The Software reportable segment derives revenue from the sale and lease of licenses for software products focused on the development and application of simulation technology to synthesize and optimize designs, processes and decisions for improved business performance. The Software segment also derives revenue from software support, upgrades, training and consulting services focused on product design and development expertise and analysis support from the component level up to complete product engineering at any stage of the lifecycle. To a much lesser extent, the Software segment also includes revenue from the sale of hardware products, primarily as a result of recent business acquisitions.

The Client Engineering Services reportable segment provides support to its customers with long-term ongoing product design and development expertise in its market segments of Solvers & Optimization, Modeling & Visualization, Industrial and Concept Design, and high performance computing. The Company hires simulation specialists, industrial designers, design engineers, materials experts, development and test specialists, manufacturing engineers and information technology specialists for placement at customer sites for specific customer-directed assignments.

The "All other" represents innovative services and products, including toggled ®, the Company's LED lighting business. toggled® is focused on developing and selling next-generation solid state lighting technology along with communication and control protocols based on intellectual property for the direct replacement of fluorescent light tubes with LED lamps. Other businesses combined within Other include the Company's WEYV business, which was terminated in the third quarter of 2019, and potential services and product concepts that are still in their development stages. See Note 4 – Acquisitions and disposals for further information about the termination of the WEYV business.

Inter-segment sales are not significant for any period presented. The CODM does not review asset information by segment when assessing performance, therefore no asset information is provided for reportable segments. The accounting policies of the segments are the same as those described in Note 2—Summary of significant accounting policies.

The following tables are in thousands:

Year ended December 31, 2019	**Software**	**CES**	**All other**	**Total**
Revenue	$ 401,278	$ 48,987	$ 8,650	$ 458,915
Adjusted EBITDA	$ 38,834	$ 5,255	$ (4,540)	$ 39,549

Year ended December 31, 2018	**Software**	**CES**	**All other**	**Total**
Revenue	$ 341,306	$ 47,852	$ 7,221	$ 396,379
Adjusted EBITDA	$ 48,643	$ 5,155	$ (3,618)	$ 50,180

Year ended December 31, 2017	**Software**	**CES**	**All other**	**Total**
Revenue	$ 280,214	$ 46,510	$ 6,609	$ 333,333
Adjusted EBITDA	$ 22,864	$ 4,966	$ (5,313)	$ 22,517

	Year ended December 31,		
	2019	**2018**	**2017**
Reconciliation of Adjusted EBITDA to GAAP income (loss) before income taxes:			
Adjusted EBITDA	$ 39,549	$ 50,180	$ 22,517
Stock-based compensation expense	(8,528)	(3,339)	(47,281)
Interest expense	(6,371)	(200)	(2,160)
Interest income and other (1)	260	(4,883)	2,260
Depreciation and amortization	(21,522)	(14,734)	(11,747)
Income (loss) before income taxes	$ 3,388	$ 27,024	$ (36,411)

(1) Includes for the year ended December 31, 2019 a) nonrecurring acquisition related costs of $0.6 million, b) nonrecurring severance expense of $0.4 million, and c) impairment charges for royalty contracts of $1.0 million of expense. Includes for the year ended December 31, 2018 a) nonrecurring costs from the acquisition of Datawatch of $10.4 million, b) gain on the sale of a building of $4.4 million, and c) impairment charges for royalty contracts and trade names of $2.8 million of expense. Includes for each of the years ended December 31, 2018 and 2017, a non-recurring adjustment for a change in estimated legal expenses of $2.0 million of income in each year.

Revenue is attributed to geographic areas based on the country of origin. The following table provides sales to external customers and long-lived assets for each of the geographic areas in which the Company operates (in thousands):

	Revenue			**Long-lived assets (1)**	
	Year ended December 31,			**December 31,**	
	2019	**2018**	**2017**	**2019**	**2018**
United States	$ 219,053	$ 186,026	$ 142,679	$ 55,319	$ 63,266
Other countries	14,753	8,604	6,404	10,190	11,447
Total Americas	233,806	194,630	149,083	65,509	74,713
Germany	50,102	45,664	43,751	3,405	4,305
France	17,210	16,154	18,128	1,224	1,583
Other countries	49,312	42,846	40,050	11,316	4,729
Total Europe, Middle East and Africa	116,624	104,664	101,929	15,945	10,617
Japan	37,757	35,478	33,686	2,036	2,045
Other countries	70,728	61,607	48,635	8,941	2,957
Total Asia Pacific	108,485	97,085	82,321	10,977	5,002
Total	$ 458,915	$ 396,379	$ 333,333	$ 92,431	$ 90,332

(1) Includes property and equipment, net and definite-lived intangible assets, net.

20. Supplemental quarterly financial information (unaudited)

The following tables set forth selected unaudited quarterly information. The information for each of these quarters has been prepared on the same basis as the audited annual consolidated financial statements and, in the opinion of management, includes all adjustments, which consist only of normal recurring adjustments, necessary for the fair presentation of the results of operations for these periods in accordance with GAAP. This data should be read in conjunction with the Company’s audited consolidated financial statements and related notes. These quarterly operating results are not necessarily indicative of the Company's operating results for a full year or any future period.

	Three months ended			
(in thousands, except per share data)	March 31, 2019	June 30, 2019	September 30, 2019	December 31, 2019
Total revenue	$ 127,859	$ 106,773	$ 100,406	$ 123,877
Gross profit	$ 94,974	$ 75,750	$ 68,665	$ 86,927
Operating income (loss)	$ 17,767	$ (3,202)	$ (10,507)	$ 4,149
Net income (loss)	$ 13,019	$ (3,120)	$ (15,939)	$ (1,502)
Net income (loss) per share, basic	$ 0.18	$ (0.04)	$ (0.22)	$ (0.02)
Net income (loss) per share, diluted	$ 0.17	$ (0.04)	$ (0.22)	$ (0.02)

	Three months ended			
(in thousands, except per share data)	March 31, 2018	June 30, 2018	September 30, 2018	December 31, 2018
Total revenue	$ 113,257	$ 93,360	$ 86,751	$ 103,011
Gross profit	$ 84,215	$ 63,904	$ 59,547	$ 72,740
Operating income (loss)	$ 26,146	$ 175	$ 1,880	$ (3,557)
Net income (loss)	$ 24,684	$ (1,080)	$ 934	$ (9,003)
Net income (loss) per share, basic	$ 0.39	$ (0.02)	$ 0.01	$ (0.13)
Net income (loss) per share, diluted	$ 0.34	$ (0.02)	$ 0.01	$ (0.13)

Operating income in the first quarter of 2018 includes a non-recurring adjustment for a change in estimated legal expenses of $2.0 million of income.

Operating income in the third quarter of 2018 includes a gain on the sale of a building for $4.4 million.

The net loss in the fourth quarter of 2018 is primarily the result of transaction costs from the acquisition of Datawatch. See Note 4 – Acquisitions and disposals.

Exhibit No.	Description	Incorporated by Reference Form	File No.	Exhibit	Filing Date	Filed Herewith
2.1	Agreement and Plan of Merger, dated as of November 5, 2018, by and among the Registrant, Dallas Merger Sub, Inc. and Datawatch Corporation	8-K	333-220710	2.1	11/5/2018	
3.1	Certificate of Incorporation, as amended and as currently in effect	S-1/A	333-220710	3.1	10/6/2017	
3.2	Bylaws, as currently in effect	S-1/A	333-220710	3.2	10/6/2017	
4.1	Description of Capital Stock					X
4.2	Indenture, dated as of June 10, 2019, b y and between Altair Engineering Inc. and U.S. Bank National Association	8-K		4.1	6/10/2019	
4.3	First Supplemental Indenture, dated as of June 10, 2019, by and between Altair Engineering Inc. and U.S. Bank National Association	8-K		4.2	6/10/2019	
4.4	Form of 0.250% Convertible Senior Note Due June 1, 2024 (included as Exhibit A to the First Supplemental Indenture, dated as of June 10, 2019, by and between Altair Engineering Inc. and U.S. Bank National Association attached as Exhibit 4.2 hereto).	8-K		4.3	6/10/2019	
10.1	Form of Indemnification Agreement between the Registrant and each of its directors and executive officers	S-1	333-220710	10.1	9/29/2017	
10.2+	2001 Incentive and Non-Qualified Stock Option Plan	S-1	333-220710	10.2	9/29/2017	
10.3+	Form of 2001 Incentive and Non-Qualified Stock Option Plan Incentive Stock Option Agreement	S-1	333-220710	10.3	9/29/2017	
10.4+	Form of 2001 Incentive and Non-Qualified Stock Option Plan Stock Restriction and Repurchase Agreement	S-1	333-220710	10.4	9/29/2017	
10.5+	2001 Non-Qualified Stock Option Plan	S-1	333-220710	10.5	9/29/2017	
10.6+	Form of 2001 Non-Qualified Stock Option Plan Non-Qualified Stock Option Agreement	S-1	333-220710	10.6	9/29/2017	
10.7+	Form of 2001 Non-Qualified Stock Option Plan Stock Restriction Agreement	S-1	333-220710	10.7	9/29/2017	
10.8+	2012 Incentive and Non-Qualified Stock Option Plan	S-1	333-220710	10.8	9/29/2017	
10.9+	Form of 2012 Incentive and Non-Qualified Stock Option Plan Option Agreement	S-1	333-220710	10.9	9/29/2017	
10.10+	Form of 2012 Incentive and Non-Qualified Stock Option Plan Stock Restriction and Repurchase Agreement	S-1	333-220710	10.10	9/29/2017	
10.11+	Form of 2012 Incentive and Non-Qualified Stock Option Plan Stock Restriction and Repurchase Agreement (Directors)	S-1	333-220710	10.11	9/29/2017	

10.12+	2017 Equity Incentive Plan and forms of equity agreements thereunder	S-1/A	333-220710	10.12	10/6/2017	
10.13+	Employment Letter, dated January 10, 2013, by and between the Registrant and Howard N. Morof as amended on July 19, 2017	S-1	333-220710	10.13	9/29/2017	
10.14+	Consulting Agreement, effective as of January 1, 2017, by and between the Registrant and Advanced Studies Holding Future SRL, an Italian Company, as amended	S-1	333-220710	10.15	9/29/2017	
10.15	2017 Third Amended and Restated Credit Agreement, dated October 18, 2017, by and among the Registrant, the foreign subsidiary borrowers, the Lenders named therein and JP Morgan Chase Bank, N.A. as administrative agent	S-1/A	333-220710	10.16	10/19/2017	
10.16	First Amendment to 2017 Third Amended and Restated Credit Agreement, dated October 31, 2018, by and among the Registrant, the foreign subsidiary borrowers, the Lenders named therein and JP Morgan Chase Bank, N.A. as administrative agent	8-K		10.1	11/5/2018	
10.17	Second Amendment to the Company's Third Amended and Restated Credit Agreement, by and among the Company, as borrower, the lenders party thereto, and JPMorgan Chase Bank, N.A., as Administrative Agent.	8-K		10.1	6/6/2019	
21.1	List of Subsidiaries of the Registrant					X
23.1	Consent of Independent Registered Public Accounting Firm					X
31.1	Certification of the Chief Executive Officer of Altair Engineering Inc. pursuant to Rule 13a-14(a)/Rule 15d-14(a) under the Securities Exchange Act of 1934, as amended					X
31.2	Certification of the Chief Financial Officer of Altair Engineering Inc. pursuant to Rule 13a-14(a)/Rule 15d-14(a) under the Securities Exchange Act of 1934, as amended					X
32.1**	Certification of the Chief Executive Officer and Chief Financial Officer of Altair Engineering Inc. 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 XBRL Instance Document – the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.					
101.SCH	Inline XBRL Taxonomy Extension Schema Document					
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document					
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document					
101.LAB	Inline XBRL Taxonomy Extension Labels Linkbase Document					
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document					

104	The cover page from the Company’s Annual Report on Form 10-K for the year ended December 31, 2019, has been formatted in Inline XBRL.

\+ Indicates management contract or compensatory plan.

** The certifications furnished in Exhibit 32.1 hereto are deemed to accompany this Annual Report on Form 10-K and will not be deemed “filed” for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, except to the extent that the registrant specifically incorporates it by reference.

Item 16. Form 10-K Summary

None.

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.

		ALTAIR ENGINEERING INC.
Date: March 2, 2020	By:	/s/ James Scapa James R. Scapa Chief Executive Officer (Principal Executive Officer)
Date: March 2, 2020	By:	/s/ Howard N. Morof Howard N. Morof Chief Financial Officer (Principal Financial and Accounting Officer)

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints James R. Scapa and Howard N. Morof, jointly and severally, his or her true and lawful attorneys-in-fact and agent, each with the power of substitution, for him in any and all capacities, to sign any amendments to this report, and to file the same, with exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, hereby ratifying and confirming all that each of said attorneys-in-fact, or his substitute or substitutes, may do or cause to be done by virtue hereof.

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

Name	Title	Date
/s/ James Scapa **James R. Scapa**	Chief Executive Officer and Director (Principal Executive Officer)	March 2, 2020
/s/ Howard N. Morof **Howard N. Morof**	Chief Financial Officer (Principal Financial and Accounting Officer)	March 2, 2020
/s/ Mary C. Boyce **Mary C. Boyce**	Director	March 2, 2020
/s/ Brett Chouinard **Brett Chouinard**	Director	March 2, 2020
/s/ Stephen Earhart **Stephen Earhart**	Director	March 2, 2020
/s/ Trace Harris **Trace Harris**	Director	March 2, 2020
/s/ Richard Hart **Richard Hart**	Director	March 2, 2020
/s/ Jan Kowal **Jan Kowal**	Director	March 2, 2020

Exhibit 4.1

Description of the Registrant's Class A Common Stock

General

The following is a summary of the rights of our Class A common stock. This summary is qualified in its entirety by the provisions of our certificate of incorporation and bylaws, copies of which are filed as exhibits to the Annual Report of which this Exhibit s is a part.

Our authorized capital stock consists of 600,000,000 shares, with a par value of $0.0001 per share, of which:

- 513,796,572 shares are designated as Class A common stock;

- 41,203,428 shares are designated as Class B common stock; and

- 45,000,000 shares are designated as preferred stock.

Our board of directors is authorized, without stockholder approval, except as required by the listing standards of the Nasdaq Global Select Market, to issue additional shares of our authorized capital stock.

As of December 31, 2019, we had 41,271,363 shares of our Class A common stock and 31,130,732 shares of our Class B common outstanding and no shares of preferred stock outstanding.

Class A and Class B Common Stock

Voting rights

Holders of our Class A common stock and Class B common stock have identical rights, provided however that, except as otherwise expressly provided in our certificate of incorporation or required by applicable law, on any matter that is submitted to a vote of our stockholders, holders of Class A common stock are entitled to one vote per share of Class A common stock and holders of Class B common stock are entitled to 10 votes per share of Class B common stock. Holders of shares of Class A common stock and Class B common stock vote together as a single class on all matters (including the election of directors) submitted to a vote of stockholders, unless otherwise required by Delaware law or our certificate of incorporation. Delaware law could require either holders of our Class A common stock or Class B common stock to vote separately as a single class in the following circumstances:

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- if we were to seek to amend our certificate of incorporation to increase or decrease the par value of a class of our capital stock, then that class would be required to vote separately to approve the proposed amendment; and

- if we were to seek to amend our certificate of incorporation in a manner that alters or changes the powers, preferences or special rights of a class of our capital stock in a manner that affected its holders adversely, then that class would be required to vote separately to approve the proposed amendment.

Under our certificate of incorporation, we may not issue any shares of Class B common stock, other than those shares issuable upon exercise of options, warrants, or similar rights to acquire Class B common stock outstanding immediately prior to the filing of the certificate of incorporation with the Secretary of State of the State of Delaware and in connection with stock dividends, unless that issuance is approved by the affirmative vote of the holders of a majority of the outstanding shares of Class A common stock and Class B common stock, each voting separately as a class.

We have not provided for cumulative voting for the election of directors in our certificate of incorporation. Our certificate of incorporation and bylaws provide for a classified board of directors consisting of three classes of approximately equal size, each class serving staggered three-year terms. Only one class will be elected at each annual meeting of our stockholders, with the other classes continuing for the remainder of their respective three-year terms.

No preemptive or similar rights

Our classes of common stock are not entitled to preemptive rights and are not subject to conversion, redemption or sinking fund provisions.

Economic rights

Except as otherwise expressly provided in our certificate of incorporation or required by applicable law, shares of Class A common stock and Class B common stock have the same rights and privileges and rank equally, share ratably and are identical in all respects as to all matters, including, without limitation those described below.

Dividends and distributions

Subject to preferences that may apply to any shares of preferred stock outstanding at the time, the holders of Class A common stock and Class B common stock are entitled to share equally, identically and ratably, on a per share basis, with respect to any dividend or distribution of cash, property or shares of our capital stock paid or distributed by us, unless different treatment of the shares of each such class is approved by the affirmative vote of the holders of a majority of the outstanding shares of Class A common stock and Class B common stock, each voting separately as a class. In the event a dividend or distribution is paid in the form of shares of Class A common stock or Class B common stock or rights to acquire shares of such stock, the holders of Class A common stock shall receive Class A common stock, or rights to acquire Class A common stock, as the case may be, and the holders of Class B common stock shall receive Class B common stock, or rights to acquire Class B common stock, as the case may be.

Liquidation rights

Upon our liquidation, dissolution or winding-up, the holders of Class A common stock and Class B common stock are entitled to share equally, identically and ratably in all assets remaining after the payment of any liabilities and the liquidation preferences and any accrued or declared but unpaid dividends, if any, with respect to any outstanding preferred stock, unless different treatment of the shares of each class is approved by the affirmative vote of the holders of a majority of the outstanding shares of Class A common stock and Class B common stock, each voting separately as a class.

Change of control transactions

Upon (A) the closing of the sale, transfer or other disposition of all or substantially all of our assets, (B) the consummation of a merger, consolidation, business combination or share transfer which results in our voting securities outstanding immediately prior to the transaction (or the voting securities issued with respect to our voting securities outstanding immediately prior to the transaction) representing less than a majority of the combined voting power of our voting securities or the voting securities of the surviving or acquiring entity, (C) the closing of the transfer (whether by merger, consolidation or otherwise), in one transaction or a series of related transactions, to a person or group of affiliated persons of securities of the Company if, after closing, the transferee person or group would hold 50% or more of our outstanding voting stock (or the outstanding voting stock of the surviving or acquiring entity), (D) any voluntary or involuntary recapitalization, liquidation, dissolution or winding-up, or (E) the issuance by us of voting securities representing more than 2% of our total voting power to a person who held 50% or less of our total voting power immediately prior to such transaction and who following such transaction holds more than 50% of our total voting power, the holders of Class A common stock and Class B common stock will be treated equally and identically with respect to shares of Class A common stock or Class B common stock owned by them, unless different treatment of the shares of each class is approved by the affirmative vote of the holders of a majority of the outstanding shares of Class A common stock and Class B common stock, each voting separately as a class.

Subdivisions and combinations

If we subdivide or combine in any manner outstanding shares of Class A common stock or Class B common stock, the outstanding shares of the other class will be subdivided or combined in the same manner, unless different treatment of the shares of each class is approved by the affirmative vote of the holders of a majority of the outstanding shares of Class A common stock and Class B common stock, each voting as a separate class.

Conversion

Each share of our Class B common stock is automatically convertible into one share of our Class A common stock pursuant to the terms of our certificate of incorporation upon the occurrence of certain events. With respect to all beneficial owners, as defined in our certificate of incorporation, of Class B common stock, each share of Class B common stock will convert automatically into one share of Class A common stock (i) upon the date specified by affirmative vote of the holders of at least 66-2/3% of the outstanding shares of Class B common stock, (ii) if the executive holder, as defined in our certificate of incorporation, is neither (x) an executive officer of the company nor (y) a director of the company, (iii) upon the date on which the executive holder has beneficial ownership of less than 10% of the capital stock of the company, or (iv) upon the 12 year anniversary of the date of filing of our certificate of incorporation in connection with our initial public offering.

With respect to each individual beneficial owner of Class B common stock, each share of Class B common stock held by a beneficial owner will convert automatically into one share of Class A common stock (i) at any time at the option of such owner, (ii) upon any transfer, whether or not for value, except for certain transfers described in our certificate of incorporation, including, without limitation, transfers from a founder, as defined in our certificate, to another founder, or certain permitted transferees, or (iii) in the event any beneficial owner owns shares of Class B common stock constituting less than 3% of the outstanding shares of Class B common stock.

Each share of Class B common stock held by all beneficial owners of Class B common stock, except the executive holder, will convert automatically into one share of Class A common stock in the event the key holders, as defined in our certificate of incorporation, beneficially own, in the aggregate, more shares of Class B common stock than the executive holder, in which event the only holder of Class B common stock will be the executive holder.

In addition, upon the death or incapacity of a beneficial owner of Class B common stock, other than the executive holder, each share of Class B common stock held by such beneficial owner will convert automatically into one share of Class A common stock, immediately upon such death or incapacity, except, with respect to the key holders, such automatic conversion will occur on the date which is nine months after the date of such death or incapacity. Upon the death or incapacity of the executive holder, each share of Class B common stock held by all beneficial owners of Class B common stock will convert automatically into one share of Class A common stock on the date which is nine months after the date of such death or incapacity.

Preferred stock

Pursuant to our certificate of incorporation, our board of directors has the authority, without further action by the stockholders, to issue from time to time up to 45,000,000 shares of preferred stock in one or more series. Our board of directors may designate the rights, preferences, privileges and restrictions of the preferred stock, including dividend rights, conversion rights, voting rights, redemption rights, liquidation preference, sinking fund terms and the number of shares constituting any series or the designation of any series. The issuance of preferred stock could have the effect of restricting dividends on the Class A and Class B common stock, diluting the voting power of the Class A and Class B common stock, impairing the liquidation rights of the Class A and Class B common stock or delaying, deterring or preventing a change in control. Such issuance could have the effect of decreasing the market price of the Class A and Class B common stock.

Anti-takeover effects of Delaware law and our certificate of incorporation and bylaws

Our certificate of incorporation and bylaws contain provisions that could have the effect of delaying, deferring or discouraging another party from acquiring control of us. These provisions and certain provisions of Delaware law, which are summarized below, could discourage takeovers, coercive or otherwise. These provisions are also designed, in part, to encourage persons seeking to acquire control of us to negotiate first with our board of directors. We believe that the benefits of increased protection of our potential ability to negotiate with an unfriendly or unsolicited acquirer outweigh the disadvantages of discouraging a proposal to acquire us.

Dual class stock. As described above, our certificate of incorporation provides for a dual class common stock structure, which provides our founders and certain others with significant influence over all matters requiring stockholder approval, including the election of directors and significant corporate transactions, such as a merger or other sale of our company or its assets.

Issuance of undesignated preferred stock. As discussed above, our board of directors has the ability to designate and issue preferred stock with voting or other rights or preferences that could deter hostile takeovers or delay changes in our control or management.

Limits on ability of stockholders to act by written consent or call a special meeting. Our certificate of incorporation provides that our stockholders may not act by written consent. This limit on the ability of stockholders to act by written consent may lengthen the amount of time required to take stockholder actions. As a result, the holders of a majority of our capital stock would not be able to amend the bylaws or remove directors without holding a meeting of stockholders called in accordance with the bylaws.

In addition, our bylaws provide that special meetings of the stockholders may be called only by the chairman of our board of directors, the chief executive officer, the president (in the absence of a chief executive officer) or a majority of our board of directors. A stockholder may not call a special meeting, which may delay the ability of our stockholders to force consideration of a proposal or for holders controlling a majority of our capital stock to take any action, including the removal of directors.

Requirements for advance notification of stockholder nominations and proposals. Our bylaws establish advance notice procedures with respect to stockholder proposals and the nomination of candidates for election as directors, other than nominations made by or at the direction of our board of directors or a committee of the board of directors. These advance notice procedures may have the effect of precluding the conduct of certain business at a meeting if the proper procedures are not followed and may also discourage or deter a potential acquirer from conducting a solicitation of proxies to elect its own slate of directors or otherwise attempt to obtain control of our company.

Board classification. Our certificate of incorporation provides that our board of directors is divided into three classes, one class of which is elected each year by our stockholders. The directors in each class serve for a three-year term. Our classified board of directors may tend to discourage a third party from making a tender offer or otherwise attempting to obtain control of us because it generally makes it more difficult for stockholders to replace a majority of the directors.

Election and removal of directors. Our certificate of incorporation and bylaws contain provisions that establish specific procedures for appointing and removing members of our board of directors. Under our certificate of incorporation and bylaws, vacancies and newly created directorships on our board of directors may be filled only by a majority of the directors then serving on our board of directors. Under our certificate of incorporation and bylaws, directors may be removed only for cause.

No cumulative voting. The Delaware General Corporation Law provides that stockholders are not entitled to the right to cumulate votes in the election of directors unless our certificate of incorporation provides otherwise. Our certificate of incorporation and bylaws do not expressly provide for cumulative voting. Without cumulative voting, a minority stockholder may not be able to gain as many seats on our board of directors as the stockholder would be able to gain if cumulative voting were permitted. The absence of cumulative voting makes it more difficult for a minority stockholder to gain a seat on our board of directors to influence our board of directors' decision regarding a takeover.

Amendment of charter provision. Amendments of certain provisions in our certificate of incorporation would require approval by holders of at least two-thirds of our then outstanding Class A and Class B common stock, voting together as a single class.

Delaware anti-takeover statute. We are subject to the provisions of Section 203 of the Delaware General Corporation Law regulating corporate takeovers. In general, Section 203 prohibits a publicly held Delaware corporation from engaging, under certain circumstances, in a business combination with an interested stockholder for a period of three years following the date the person became an interested stockholder unless:

- prior to the date of the transaction, our board of directors approved either the business combination or the transaction that resulted in the stockholder becoming an interested stockholder;

- upon completion of the transaction that resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding for purposes of determining the voting stock outstanding, but not the outstanding voting stock owned by the interested stockholder, (1) shares owned by persons who are directors and also officers and (2) shares owned by employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; or

- at or subsequent to the date of the transaction, the business combination is approved by our board of directors and authorized at an annual or special meeting of stockholders, and

  not by written consent, by the affirmative vote of at least two-thirds of the outstanding voting stock that is not owned by the interested stockholder.

Generally, a business combination includes a merger, asset or stock sale, or other transaction resulting in a financial benefit to the interested stockholder. An interested stockholder is a person who, together with affiliates and associates, owns or, within three years prior to the determination of interested stockholder status, did own 15% or more of a corporation’s outstanding voting stock. We expect the existence of this provision to have an anti-takeover effect with respect to transactions our board of directors does not approve in advance. We also anticipate that Section 203 may discourage attempts that might result in a premium over the market price for the shares of Class A common stock held by stockholders.

The provisions of Delaware law and the provisions of our certificate of incorporation and bylaws could have the effect of discouraging others from attempting hostile takeovers and as a consequence, they might also inhibit temporary fluctuations in the market price of our Class A common stock that often result from actual or rumored hostile takeover attempts. These provisions might also have the effect of preventing changes in our management. It is also possible that these provisions could make it more difficult to accomplish transactions that stockholders might otherwise deem to be in their best interests.

Exhibit 21.1

LIST OF SUBSIDIARIES

Subsidiary	Jurisdiction of Organization
Altair Product Design, Inc.	Michigan, United States
Altair Engineering India Pvt. Ltd.	India
Altair Engineering Ltd.	Japan
Altair Engineering GmbH	Germany
Altair Engineering France, Sarl	France
Altair Engineering Software Co., Ltd.	China
Altair Engineering Ltd.	United Kingdom
Datawatch Corporation	Delaware, United States
Datawatch International Limited	United Kingdom
Runtime Design Automation	California, United States
WEYV, Inc.	Michigan, United States

Exhibit 23.1

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the following Registration Statements:

(1) Registration Statement (Form S-8 No. 333-221312) pertaining to the 2001 Non-Qualified Stock Option Plan, 2001 Incentive and Non-Qualified Stock Option Plan, 2012 Incentive and Non-Qualified Stock Option Plan, and 2017 Equity Incentive Plan of Altair Engineering Inc., and

(2) Registration Statement (Form S-8 No. 333-223833) pertaining to the 2017 Equity Incentive Plan of Altair Engineering Inc.

(3) Registration Statement (Form S-8 No. 333-230019) pertaining to the 2017 Equity Incentive Plan of Altair Engineering Inc.

of our reports dated March 2, 2020, with respect to the consolidated financial statements and schedule of Altair Engineering Inc., and the effectiveness of internal control over financial reporting of Altair Engineering Inc. included in this Annual Report (Form 10-K) for the year ended December 31, 2019.

/s/ Ernst & Young LLP

Detroit, Michigan
March 2, 2020

Exhibit 31.1

CERTIFICATION PURSUANT TO
RULES 13a-14(a) AND 15d-14(a) UNDER THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, James R. Scapa, certify that:

1. I have reviewed this annual report on Form 10-K of Altair Engineering Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of 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.

/s/ James Scapa
James R. Scapa
Chief Executive Officer
(Principal Executive Officer)

March 2, 2020

Exhibit 31.2

**CERTIFICATION PURSUANT TO
RULES 13a-14(a) AND 15d-14(a) UNDER THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, Howard N. Morof, certify that:

1. I have reviewed this annual report on Form 10-K of Altair Engineering Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant’s other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

c) Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

d) Disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and

5. The registrant’s other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of 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.

/s/ Howard N. Morof
Howard N. Morof
Chief Financial Officer
(Principal Financial and Accounting Officer)

March 2, 2020

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 of Altair Engineering Inc. (the "Company"), on Form 10-K for the period ended December 31, 2019, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), the undersigned officers of the Company certify to their knowledge and in their respective capacities, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that:

(1) The Report fully complies with the requirements of section 13(a) or 15(d), as applicable, of the Securities Exchange Act of 1934, as amended; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ James Scapa
James R. Scapa
Chief Executive Officer
(Principal Executive Officer)

/s/ Howard N. Morof
Howard N. Morof
Chief Financial Officer
(Principal Financial and Accounting Officer)

March 2, 2020