



2022 Annual Report

**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, 2022

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
(State or other jurisdiction of
incorporation or organization)

38-2591828
(I.R.S. Employer
Identification No.)

1820 East Big Beaver Road, Troy, Michigan
(Address of principal executive offices)

48083
(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 Global Select 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

Non-accelerated filer

Accelerated filer

Smaller reporting company

Emerging growth company

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

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report.

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements.

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to §240.10D-1(b).

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 30, 2022, the last business day of the registrant's most recently completed second fiscal quarter, as reported on the NASDAQ stock market, was \$2.7 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 13, 2023, there were 52,393,695 shares of the registrant's Class A common stock outstanding and 27,674,574 shares of the registrant's Class B common stock outstanding.

Documents Incorporated By Reference:

Portions of the registrant's Proxy Statement relating to the 2023 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, 2022, 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, 2022
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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 enhanced business model by customers and investors;
- our susceptibility to factors affecting the automotive, aerospace, and banking, financial services, and insurance (BFSI) 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 and fluctuations that arise because of our substantial international operations;
- the significant quarterly fluctuations of our results; and
- the uncertain effect of cyberattacks, data security incidents, COVID-19 or other future pandemics or events on our business, operating results and financial condition, including disruption to our customers, our employees, the global economy and financial markets.

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 leader in computational science and artificial intelligence enabling organizations across broad industry segments to drive smarter decisions in an increasingly connected world. We deliver software and cloud solutions in the areas of simulation, high-performance computing (“HPC”), data analytics, and artificial intelligence (“AI”). Our products and services leverage computational science to drive innovation and intelligent decisions for a more connected, safe, and sustainable future.

Throughout this document we refer to AI as a term to encompass sub-disciplines including data analytics, data science, data preparation, and machine learning (ML). Altair has been incorporating AI technologies into our products for several years and we believe the evolving broad use of the term is appropriate for our product offerings, customer applications, and market opportunities.

Our simulation and AI-driven approach to innovation is powered by our broad portfolio of high-fidelity and high-performance physics solvers, our market leading technology for optimization and HPC, and our end-to-end platform for developing AI and digital twin solutions. Our integrated suite of software optimizes design performance across multiple disciplines encompassing structures, motion, fluids, thermal, electromagnetics, system modeling, and embedded systems, while also providing AI solutions and true-to-life visualization and rendering. Our HPC solutions maximize the efficient utilization of complex compute resources and streamline the workflow management of compute-intensive tasks for applications including AI, modeling and simulation, and visualization. Our data analytics, AI, and Internet of Things (IoT) products include data preparation, data science, MLOps, orchestration, 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 expanding the use of advanced simulation, data analytics, and AI across many industry verticals. Altair’s thirty-eight year heritage is in solving some of the most challenging problems faced by engineers and scientists. We help companies use digital twins, intelligent models, and the convergence of simulation, HPC, and AI to predict and optimize system outcomes.

Altair is a leading provider of design and simulation software enabling customers to enhance product performance, compress development time, and reduce costs. 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 HPC, cloud infrastructures, and AI technology.

Our high-performance and cloud computing workload and workflow tools 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, BFSI companies, weather prediction agencies, and electronics design companies.

We are a leading provider of low-code AI technology for data preparation, data science, MLOps, data management, and visualization. BFSI customers as well as finance and engineering departments in various industries including manufacturing, retail, and life sciences use our software to capture disparate data streams and apply analytics to make more informed business decisions.

Software Products

Altair’s software products represent a comprehensive, open architecture solution for computational science and AI to empower decision making for improved product design and development, manufacturing, energy management and exploration, financial services, health care, and retail operations. We believe Altair’s solutions are compelling due to their openness and usability.

Altair’s 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:

- Physics Simulation and Concept Design
- High Performance and Cloud Computing
- Data Analytics, AI, IoT, and Smart Product Development

Altair and Altair partner applications are also available through Altair One, our modern, secure, cloud innovation gateway, to download software, execute interactive applications or batch compute intensive jobs. Altair One also enables users to easily create, compute clusters on the fly, manage files and data between the cloud and on-prem storage, and develop web applications.

Physics Simulation and Concept Design

At the core of Altair’s simulation software portfolios 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, discrete elements, systems and manufacturing simulation. We invest continuously to improve the speed and accuracy of our solvers by leveraging the latest mathematical techniques and computer hardware available.

We believe the breakthrough technology of SimSolid is game-changing and delivers extremely easy to model, fast, and accurate simulation results for complex designs. SimSolid is especially relevant for simulation-driven design and seeing rapid adoption in many customer environments. We are investing significantly in SimSolid and have released numerous new features and solution types including non-linear structural and thermal analysis.

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.

Altair’s design, modeling, and visualization tools 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, design engineers, and manufacturing 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 for mechanical design and Pollex for electronic systems and printed circuit board design.

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 (CAD) in both the mechanical and electronics worlds.

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.

We believe Altair’s 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.” By employing varying degrees of fidelity, we aid the modeling process where computational requirements or data availability might otherwise prove to be obstacles.

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.

We believe 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.

High-Performance Computing

Altair’s high-performance computing software applications are designed to maximize the efficient utilization of customers’ complex compute resources and streamline the workflow management of compute-intensive tasks. The quantity of data collected, stored, and processed is growing significantly, and our HPC technology has evolved to support big data and input/output (IO) intensive environments with storage-aware scheduling. We support applications such as modeling, simulation, artificial intelligence, and visualization in fields such as banking, financial services, insurance, weather prediction, bio-informatics, electronic design analysis, product development and lifecycle management.

Altair’s high-performance tools manage and optimize where and when jobs are running and how storage is accessed and managed for customers and research institutes. We believe that HPC is increasingly mission critical for organizations around the world. Predictive modeling and analysis are computationally intensive and computing environments increasingly rely 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. Altair’s HPC solutions are designed to enable seamless shifting of workloads from on-premise data centers to the cloud, and between different cloud providers, depending on cost or resource availability including managing spot computing purchases. We also deliver powerful orchestration capabilities to manage extremely large-scale workflows with complex dependency management for applications in electronic design automation, artificial intelligence and others.

Data Analytics, AI, IoT, and Smart Product Development

Altair’s data analytics, AI, and smart product development offerings include code free and code friendly solutions for data preparation, data science, MLOps, and visualization that fuel engineering, scientific, and business decisions. that are extensively used by banks, credit unions, health care, and other financial services organizations. They are also used in engineering and finance departments across many industries, including manufacturing.

Altair’s broad range of data analytics solutions uniquely support legacy code created over the last forty years using the SAS language, while also developing, integrating, and deploying modern code written in Python or other newer languages, and leveraging state-of-the-art, open source technology, critical for companies to remain competitive.

We have been actively integrating machine learning technologies in our broad product portfolio to capitalize on the significant momentum toward applying AI across a substantial number of companies and in many different industries.

Our data preparation tools allow users to import, clean and organize structured and unstructured data for use in reporting and in data science applications. Altair’s data science solutions allow users to develop machine learning workflows with market-leading decision tree technology and scoring algorithms, and innovative approaches to AutoML, automatic feature selection, and explainable AI. Our visualization tools allow users to gain deep insights quickly with both live-streamed and historical data.

Altair’s tools also include solutions to support smart connected product development including device enablement, data capture and management, edge orchestration, digital twins, and application development for connected devices. Our software is used to design IoT solutions and monitor and optimize their performance.

Going forward, we believe that development lifecycles will include digital replicas of complex processes, services and physical assets and systems, or what is known as “digital twins”, which leverage the convergence of simulation and AI and are essential to creating better products, marketing them efficiently, and optimizing their performance. In our view, AI technology is transforming engineering design and process development, leveraging both synthetic data from simulations and rapidly growing databases of sensor data from field operations. Altair’s customers are using AI not only to create better products but also to lower scrap rates, reduce warranty issues, and derive other business benefits.

Altair Partner Alliance

The Altair Partner Alliance, or APA, provides access to a broad spectrum of complementary software products using customers’ existing Altair 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 enable 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.

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 services revenues are included within Software – Maintenance and other services on the Consolidated Statement of Operations.

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. Software related services revenues are included within Software related services on the Consolidated Statement of Operations.

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 robust candidate database of highly qualified engineers, designers and data scientists.

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. Most 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 1,200 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 three areas:

- **Physics Simulation and Concept Design:** 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 our solvers are now a comprehensive set of fast, scalable and reliable physics algorithms for complex problems in linear and non-linear mechanics, fluid dynamics, electromagnetics, motion, discrete elements, systems and manufacturing simulation. Altair also invests to "couple" our solvers to simulate multiple physics domains simultaneously and is considered a market 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 HPC technology for these compute intensive applications. Solver and optimization development is conducted principally by researchers with advanced degrees in engineering, physics, computer science, and mathematics.

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 will enable the democratization of simulation capabilities for designers and engineers who are not simulation specialists.

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.

- **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, AI, modeling and simulation, and visualization in fields such as financial services, weather prediction, bioinformatics, 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 also develop powerful orchestration capabilities to manage extremely large-scale workflows with complex dependency management for applications in electronic design automation, artificial intelligence and other areas.

We develop solutions for both CPU and GPU architectures and support all 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.

The quantity of data collected, stored and processed is growing significantly, and our HPC technology has evolved to support big data and IO intensive environments with storage-aware scheduling. We also develop and deliver powerful orchestration capabilities to manage extremely large-scale workflows with complex dependency management for applications in electronic design automation, artificial intelligence and others.

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

- **Data Analytics, AI, IoT, and Smart Product Development:** Altair's data analytics, AI, IoT, and smart product development offerings support business analysts with low-code solutions as well as programmers with a rich development environment including support for modern languages like Python and traditional languages like SAS and SQL. We deliver a rich toolset for data preparation, data science, MLOps, and visualization that fuel engineering, scientific, and business decisions. We develop solutions allowing users to develop machine learning workflows with best-in-class decision tree technology and scoring algorithms, and innovative approaches to AutoML and explainable AI. We develop and release new software on a regular basis to support customers with enhancements and other requested features and technologies for data preparation, data science and visualization. In addition, we have integrated our data analytics capabilities into a modern, cloud-based solution to deliver a more unified user experience. This solution includes important enterprise level capabilities such as security, data discovery, collaboration, and operationalization of user developed machine learning workflows to gain deep insights quickly.

Altair's solutions support smart connected product development including device enablement, data capture and management, edge orchestration, digital twins, and application development for connected devices. 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 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 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 believe that AI technology is transforming engineering design and process development, leveraging both synthetic data from simulations and rapidly growing databases of sensor data from field operations.

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, AI, and high-performance computing markets. Our primary users are highly educated and technical engineers and data scientists.

We engage with our enterprise customers through Altair's experienced direct sales force. We are increasing our use of inside sales and indirect channels to more efficiently address a broader set of customers in consumer products, electronics, energy and other industries. We organize cross functional teams globally to focus on our largest vertical markets such as Automotive, Aerospace, Technology and BFSI, and the largest customers in these vertical markets.

Approximately 86% of our 2022 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. Approximately 14% of our 2022 software revenue was generated through our growing network of indirect channel partners, resellers, and system integrators.

Data Analytics, AI, IoT, and Smart Product Development

The data analytics and AI market is segmented by industry verticals where specific domain expertise is important for success. Altair's primary data analytics and AI customer base is BFSI organizations along with finance departments across most industries including manufacturing. As we cross sell into Altair traditional manufacturing customer accounts, we are targeting finance departments, leveraging the expertise of our financial markets sales and technical teams, as well as engineering departments looking to apply data analytics and AI to improve designs, manufacturing, warranty, and in-service operations. We are leveraging our existing direct and indirect sales channels 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 Altair Units, 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 high-performance computing solutions.

Altair pioneered Altair Units, 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 more than 150 partner products. Our customers license a pool of units for their organizations giving individual users access to our 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 90% over the past five years. Historically, approximately 60% of new software revenue comes from expansion within existing customers.

Marketing

Altair's global marketing team of approximately 95 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, 2022, we had more than 13,000 customers worldwide. Our simulation and HPC customers are primarily large manufacturing enterprises, with a growing presence in small and mid-size companies. Our data analytics and AI customers include banks, credit unions, BFSI, and health care organizations along with finance and engineering departments across most industries including manufacturing.

Automotive and aerospace combined account for approximately 39% of our 2022 billings, including 15 of the world's leading automotive manufacturers and 10 of the world's leading aerospace manufacturers. Other important industries include heavy machinery, rail and ship design, energy, government, life and earth sciences, BFSI, and consumer electronics. No single customer, nor any of our resellers and OEMs, accounted for more than 2% of our 2022 software billings. In 2022, 32%, 34% and 34% of our software billings were attributed to the Americas, EMEA, and APAC, respectively. Our global billings allocation is based on usage across each geography. 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 *Non-GAAP Financial Measures* included in Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations of this Annual Report on Form 10-K.

For a summary of our financial information by geographic location, see Note 17 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, HPC, data analytics, and AI software is highly fragmented. Our primary competitors include companies such as Dassault Systèmes, Siemens, Ansys, MSC Software (a Hexagon company), SAS Institute, 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, data science and AI are extremely strong, easy to use, powerful, and broadly adopted and have several unique capabilities including handling large, complex data sets coupled with our ability to intelligently import unstructured data.

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, 2022, we have 287 issued patents worldwide and 66 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, 2022, we had more than 3,000 in-house employees and more than 200 on-site Client Engineering Services employees globally. More than two-thirds of our employees are in the United States, India, France and Germany. None of our employees in the United States are represented by a labor organization or are party to any collective bargaining arrangement. In some 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 councils. We have never experienced a work stoppage and we believe our employee relations are good. We continually recruit for top talent and invest in our global workforce to fuel diversity, professional and personal growth, and innovation.

Diversity

We believe that empowering each individual authentic voice encourages an entrepreneurial mindset. We have worked to create a culture of inclusion where diversity and experiences are embraced and essential to our success and long-term growth. We recognize and believe that everyone deserves respect and equal treatment. We believe that we comply in all material respects with all applicable U.S. Federal, state, local and international laws governing nondiscrimination in employment in every location in which the Company operates. Our goal is to assure that all applicants and employees are treated with the same high level of respect regardless of their gender, ethnicity, religion, national origin, age, marital status, political affiliation, sexual orientation, gender identity, disability, or protected status.

Human capital metrics

We monitor human capital metrics such as recruitment, attrition, development, and diversity. Our strong brand, innovative product portfolio, cross-industry expertise, and culture support our ability to recruit and retain top talent. Our executive staff, including the CEO, are highly engaged with our workforce through podcasts, town halls, and other methods of outreach enabled by the accelerated adoption of virtual communication platforms.

Information technology and cybersecurity

Our business and support functions utilize information systems that provide critical services to our employees and customers. Led by our Chief Information Security Officer, our team of professionals manage and support our communication platforms, transaction-management systems, and analytics and reporting capabilities. We use both third-party cloud services and off-site, secure data centers in North America and Europe for our core applications.

Information security and privacy are important concerns, with an escalating cyber-threat environment and evolving regulatory requirements driving continued investment in this area. We continue to evaluate and assess our systems in the changing regulatory environment.

We have in place, and seek to continuously improve, a comprehensive system of security controls, managed by a dedicated staff. Periodically, we engage the services of third parties to perform security penetration testing and may update our security controls in response. We also provide our staff with regular security risk awareness, education, and training. Despite these efforts computer viruses, hackers, employee misuse or misconduct, and other internal or external hazards including natural disasters could expose our data systems to security breaches, cyber-attacks, or other disruptions.

We have incident response and business continuity plans for our operations. Our recovery plans include arrangements with our off-site secure data centers and cloud infrastructure. We believe we will be able to utilize these plans to efficiently recover key system functionality in the event that our primary systems are unavailable.

COVID-19

Altair's culture has historically embraced flexible work arrangements. As the COVID-19 pandemic continued to affect many global regions through 2022, our workforce remained in a hybrid mode of remote and in-person working. Our culture, technology and people allowed us to react quickly when the crisis initially emerged. As a result, we maintained high levels of productivity and employee engagement. We have adopted global and local COVID-19 safety protocols and guidelines to ensure the safety, health and wellness of our employees, families, and local communities. We also provide virtual health and wellness programs, such as meditation, mental health tips, and information sessions by medical professionals to educate and answer questions about COVID-19.

Sustainability and environment

As the world is demanding safer, more efficient, and innovative products and processes, our vision is to help customers drive decisions leveraging the convergence of simulation, HPC, and AI. By helping our customers, we help to reduce the environmental impact of goods and services across a broad array of industries worldwide. Altair published its most recent Sustainability report in April 2022.

We believe that our software technology and consulting services are by their very essence at the core of designing a healthier and more sustainable future for humanity. These efforts include:

- Enabling structural optimization to inspire and refine product designs that minimize material usage and maximize performance
- Conducting HPC workload management to ensure efficiency of energy usage and run time
- Utilizing simulation- and AI-driven innovation to rapidly develop products, processes, and experiences in a virtual world without the carbon and waste stream impact of multiple physical prototypes
- Supporting additive manufacturing and other advanced manufacturing techniques to embody the most optimal designs developed from simulation methodologies at the lowest cost

- Offering cloud-based applications which allow efficiently scaled shared infrastructure to be used by multiple organizations, thus eliminating countless independent compute server installations, and giving access to a broad range of applications relevant to sustainable design

We also are committed to conducting our business in a manner that manages environmental issues responsibly. We fulfill this commitment by our efforts to:

- Comply with local environmental regulations across all our global offices
- Conduct operations in an environmentally sound manner
- Manage our supply chains toward appropriate environmental practices

Acquisitions

We have acquired 48 companies or strategic technologies since 1996, including 23 in the last five years. These acquisitions brought strategic IP assets, and talented developers with expertise in disciplines in the areas of electronics, material science, crash and safety, manufacturing simulation, industrial design, photorealistic rendering and data analytics. Products that are commercially available as a result of these acquisitions include Altair PBS Works, Radioss, Evolve, AcuSolve, SimLab, Embed, Multiscale Designer, FEKO, FLUX, Thea Render, SmartWorks, ESAComp, SimSolid, Monarch, Panopticon, EDEM, PolIEx, PolyFoam, Grid Engine, Mistral, Breeze, S-FRAME, WPS Analytics, EEvision, StarVision, and RapidMiner.

Our 2022 acquisitions include the following:

- **RapidMiner:** In September 2022, we acquired RapidMiner, a leader in advanced data analytics and machine learning software. RapidMiner will be integrated with existing tools, such as Altair Knowledge Studio, Altair SmartWorks, and Altair SLC, to provide a comprehensive, code-optional, multi-language, SaaS-ready, cloud-scale platform for enterprise data analytics and data science available via Altair Units.
- **Concept Engineering:** In June 2022, we acquired Concept Engineering, a leading provider of electronic system visualization software that accelerates the development, manufacture, and service of complex electrical and electronic systems. Most of Concept Engineering's software will be integrated into Altair's Electronic System Design suite and will be available via Altair Units.
- **Gen3D:** In June 2022, we acquired Gen3D, a startup out of the University of Bath, U.K. Gen3D is a technology company providing design software that uses an implicit geometry method for describing highly complex geometries such as lattice structures in additive manufacturing. The technology is being integrated into Altair Inspire, an intuitive and powerful family of software products that enables simulation-driven design throughout the entire product lifecycle, and is available via Altair Units.
- **Powersim:** In March 2022, we acquired Powersim, a market-leading provider of simulation and design tools for power electronics, including power supplies, motor drives, control systems, and microgrids. This acquisition expanded Altair's electronic system design technology into the domain of power electronics. Powersim's software was integrated into Altair's Electronic System Design suite and is available via Altair Units.
- **Cassini:** In February 2022, we acquired Cassini, a next-generation cloud native technology for Industry 4.0. With this acquisition, we deepen our expertise and strengthen our ability to offer digital thread solutions via the Altair One cloud platform.

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.

Governmental Regulation

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. We strive to maintain compliance with all applicable laws and regulations and to anticipate future regulatory developments. For additional information, see “Risk Factors - Risks related to legal or regulatory matters.”

Segments

We have identified two reportable segments: Software and Client Engineering Services. For additional information about our reportable segments, see Note 17 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 refer 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,” “Altair PBS Works,” “Altair PBS Professional,” “Altair PBS Cloud,” “MotionView,” “MotionSolve,” “Altair PBS Access,” “SimSolid,” “Knowledge Studio,” “Monarch,” “Panopticon,” “EDEM,” “Pollex,” “P-FRAME,” “S-FRAME,” “World Programming,” “RapidMiner,” 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.

SUMMARY

The following summarizes key risks and uncertainties that could materially adversely affect us. You should read this summary together with the more detailed description of each risk factor contained below.

Risks relating to our business and industry, including risks relating to:

- the sustainability of our revenue growth rate and the impact of our revenue mix;
- the sustainability of our culture of innovation, teamwork and communications;
- our ability to expand the usage of our software by existing customers;
- our ability to introduce our software to new customers;
- the length of our sales cycle;
- our customers’ ability and plans to spend on product design and development;
- our customers’ software license renewal rates;
- the impact that acquisitions of businesses and products may have upon us;
- the impact of competition;
- the strength of the markets into which we sell, including automotive and BFSI;
- the impact of COVID-19 and other global conditions outside our control;
- fluctuations in our quarterly results;
- fluctuations in foreign currency exchange rates;
- the extent to which software vendors participate in our APA program;
- the performance of our distributors and resellers;
- our ability to adapt to and lead technology changes;
- the impact on profitability of our focus on growth and research & development;
- the impact of any unanticipated departures by key employees;
- the impact of our global presence;
- the impact of any impairments of goodwill or intangible assets; and
- the impact of any product liability claims or other legal proceedings.

Risks relating to our intellectual property, including risks relating to:

- the impact of potential defects or errors in our software;
- our ability to protect and enforce our technology and intellectual property rights;
- the impact of intellectual property disputes;
- the impact of any security breaches, computer malware, computer hacking attacks and other security incidents;
- any failure of software to work seamlessly with our customers’ existing software, hardware, or network environment;

- product liability claims that may arise as a result of our customers' use of our software or services;
- any failures by us to adequately train our customers regarding the use and benefits of our software; and
- our use of open source software and open source technology.

Risks relating to legal or regulatory matters, including risks relating to:

- the difficulties associated with complying with a wide range of complex regulations, including in relation to sales to government agencies, and in a variety of jurisdictions and the impact of any non-compliance;
- the impact of changes in laws, regulations, regulatory policies and regulatory practices and uncertainties resulting from potential changes, including potential tax law changes;
- the impact of export and import controls on our ability to operate and compete in international markets;
- the breadth of data privacy and anti-bribery laws and regulations;
- our ability to use our deferred tax assets in the United States; and
- the impact of any challenges to our global tax methodology.

Risks relating to ownership of our Class A Common Stock, including risks relating to:

- the sustainability of an active public trading market for our stock;
- the volatility of the market price of our stock;
- our expectations that we will not pay dividends in the foreseeable future;
- the impact of any failure to maintain effective internal controls;
- the difficulty of predicting the impact of our dual class common stock structure;
- the nature and content of public research or reports about our company;
- the potential dilutive impact of future sales of our Class A Common Stock, including upon conversion of our Convertible Notes; and
- the impact of antitakeover provisions in our governing documents and under Delaware law.

Risks relating to our indebtedness, including risks relating to:

- the effective subordination of our Convertible Notes to our secured debt and to our subsidiaries' liabilities;
- the impact of our organizational structure, pursuant to which a substantial portion of our operations are conducted through, and a substantial portion of our assets are held by, our subsidiaries;
- our current debt service obligations and potential future debt service obligations;
- limitations on our ability to pay cash in whole or in part upon conversion of our Convertible Notes;
- the dilutive impact of issuing our Class A Common Stock upon such conversions;
- the potential that our Convertible Notes may become convertible sooner than the mandatory convertibility date as a result of increases in the market price of our Class A Common Stock;
- limitations that may deter or prevent a business combination; and
- the impact of operating and financial covenants in our loan agreements.

General risks, including risks relating to:

- our ability to attract and retain key personnel;
- any need we may have to raise additional capital;
- the difficulties associated with predicting our growth;

- business interruptions; and
- the impact of potential changes in accounting principles.

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 sales of our simulation, high-performance computing and data analytics technologies to enhance decision making, 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 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 comprehensive open architecture solution for simulation, high-performance computing, data analytics, and artificial intelligence.

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, AI, computing and analytical needs; and/or
- number of our applications and functionalities accessed by users and customers through our licensing model.

Our future success may also depend upon the degree to which the evolution of our units licensing model is accepted by our current and potential customers.

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' needs. 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 29% of our 2022 billings. An adverse occurrence, including industry slowdown, due to the continuing impacts of COVID-19 or otherwise, recession, political instability, costly or constraining regulations, rapid technological obsolescence, excessive inflation, rising interest rates, prolonged disruptions in one or more of our automotive customers' production schedules, supply disruptions, 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 rising 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.

Global conditions, dislocations in the financial markets, 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, inflation, or rising interest rates, 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.

In addition, the global macroeconomic environment could be negatively affected by, among other things, the COVID-19 pandemic or other epidemics, instability in global economic markets, increased U.S. trade tariffs and trade disputes with other countries, instability in the global credit markets, supply chain weaknesses, instability in the geopolitical environment as a result of the withdrawal of the United Kingdom from the European Union, the Russian invasion of the Ukraine and other political tensions, and foreign governmental debt concerns. Such challenges have caused, and may continue to cause, uncertainty and instability in local economies and in global financial markets.

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 and Free Cash Flow, may vary significantly in the future and seasonally. Many customers make purchase decisions based on their fiscal year budgets, which often coincide with the calendar year. These seasonal trends materially affect our financial results, 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. 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:

- seasonal variations in customer purchasing patterns;
- 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.

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 dollar sales and a reduction in billings and revenue not denominated in United States dollars. Weakening of the United States dollar could result in an increase of foreign denominated expenses when reported in United States dollars. A reduction in revenue or an increase in operating expenses due to economic volatility or 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 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.

The COVID-19 pandemic, or other potential future pandemics or events, may cause severe business interruptions either globally or regionally, that could have a negative impact on our financial results.

In March 2020, the World Health Organization declared the outbreak of a novel coronavirus (COVID-19) pandemic. This pandemic has infected populations within the United States and other regions at fluctuating rates, a phenomenon often characterized as “waves” of infection. The pandemic continues to evolve, as evidenced by the occurrence of COVID-19 variants. Vaccines for COVID-19 have been developed and are administered in the United States and other countries around the world, but the expansion of administering these vaccines to additional people within these and other countries, the long-term efficacy of these vaccines, and the receptivity of many people to receiving these vaccines all remain uncertain.

The future progression of the COVID-19 pandemic and its effects on our business and operations are uncertain.

Parts of our business have been and could continue to be adversely affected by the COVID-19 pandemic. Global health concerns relating to the COVID-19 pandemic continue to adversely affect the macroeconomic environment, and the pandemic has increased economic and stock market volatility and uncertainty. In response to the pandemic, government authorities have, at times, implemented measures to try to contain the virus or mitigate the harm, such as travel bans and restrictions, quarantines, shelter-in-place or stay-at-home orders, and mandatory shutdowns of non-essential businesses. Some of the most severe, temporary measures by government authorities have been lifted in many jurisdictions but could be reinstated at any time, and they have and may continue to adversely affect our sales activities, operations and growth prospects. These restrictions, and changes in consumer and business spending behavior prompted by the pandemic, have forced businesses in the United States and other jurisdictions to reduce or suspend their operations, lay-off employees, and in some cases shutdown operations.

Additional risks from COVID-19 may include the inability of businesses upon which we rely for operations to carry out their responsibilities at levels of performance necessary to maintain our performance undisturbed as a result of measures taken by governmental authorities to limit the spread of COVID-19. COVID-19 may also affect our operating and financial results in a manner that is not presently known to us, or that we currently do not consider presenting significant risks to our operations.

The impact of COVID-19 on some of our customers has primarily contributed to the decrease in revenue for client engineering services. While we continue to robustly engage with our customers, primarily virtually, to mitigate the uncertain extent of the negative impact of COVID-19 on our customers, our ability to attract, serve, retain, or expand customers will continue to be uncertain. A negative impact on our customers may cause them to delay entering into new or expanded software licenses, request extended payment terms, delayed invoicing, higher discounts, lower renewal amounts or cancelations, and a reduction in demand for software related and client engineering services. Existing and potential customers may choose to reduce or delay technology spending in response to COVID-19, or attempt to renegotiate contracts and obtain concessions, which may materially and negatively impact our operating results, financial condition and prospects.

Since we have substantial international operations that arise from our normal business operations, our financial results in 2023 may be impacted by COVID-19 driven variations in foreign currency exchange rates, apart from the traditional elements that underlie foreign currency exchange rate changes.

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 of our software is dependent, in part, on performance of our distributors and resellers.

We have historically licensed our software primarily through our direct sales force. We have enhanced our units licensing model such that it is able to be 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 the distributor and reseller channels 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 focus on innovation and invest significantly in research and development to create new software and enhance our existing software to address additional applications and serve new markets, both internally and through acquisitions. 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.

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.

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.

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 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, trade, 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.

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, CES staff to meet the requirements of our customers and to maintain ongoing relationships with these customers. Our CES business constituted approximately 5% and 7% of our total revenues for the year ended December 31, 2022 and 2021, respectively. Some of our customers satisfy 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 CES staff because of competitive factors or immigration laws, or otherwise fail to match CES staff 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.

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 impacted 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.

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 the Generally Accepted Accounting Principles ("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, 2022 and 2021, respectively, we had \$449.0 million and \$370.2 million of goodwill and \$107.6 million and \$99.0 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.

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, in part, 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.

Risks related to our intellectual property

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.

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. Further, the risk of cyber-attacks or other privacy or data security incidents may be heightened due to common, external attempts to attack our information technology systems and data, using means such as phishing. 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 license agreements 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, cyber-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, cyber-attacks on our information systems, 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.

Our company is a highly automated business which relies on our network infrastructure and enterprise applications, third-party providers of 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.

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, some of our software may store and transmit 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, corporate systems, and security measures may be compromised due to the actions of outside parties, employee error, malfeasance, third-party software, 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.

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.

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

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.

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.

Risks related to legal or regulatory matters

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, whistleblower, 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.

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, loss of government contracts, fines which may be imposed on us and responsible employees or managers and 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 the Crimea, Donetsk, and Luhansk regions of Ukraine. Any violations of such economic embargoes and trade sanction regulations could have negative consequences, including government investigations, civil and criminal 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.

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

As of December 31, 2022 and 2021, we had gross deferred tax assets, or DTAs, of \$179.8 million and \$153.7 million, respectively, primarily related to capitalized research and development expenses, net operating loss carryforwards, tax credits, share-based compensation, lease obligations and employee benefits. We are entitled to a United States federal tax deduction when non-qualified stock options, or NSOs, are exercised. For the 2022 tax year, we recorded an increase in the valuation allowance by \$29.5 million for the gross 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 acquisitions of Datawatch, Univa, and RapidMiner, 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.

Our NOLs may also be impaired under state laws. In addition, under the 2017 Tax Cuts and Jobs Act, or Tax Act, tax losses generated in taxable years beginning after December 31, 2017 may be utilized to offset no more than 80% of taxable income annually. There is also a risk that due to regulatory changes, such as suspensions on the use of NOLs, or other unforeseen reasons, our existing NOLs could expire or otherwise be unavailable to offset future income tax liabilities.

For tax years beginning on or after January 1, 2022, the Tax Act eliminates the option to currently deduct research and development expenses and requires taxpayers to capitalize and amortize them over five years for research activities performed in the United States and 15 years for research activities performed outside the United States pursuant to Section 174 of the Code. Although Congress is considering legislation that would repeal or defer this capitalization and amortization requirement, it is not certain that this provision will be repealed or otherwise modified. If the requirement is not repealed or replaced, it will increase our U.S. federal and state cash taxes and reduce cash flows in fiscal year 2023 and future years.

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.

We could be subject to adverse changes in tax laws, regulations and interpretations or challenges to our tax positions.

We are subject to tax laws and regulations of the U.S. federal, state and local governments as well as various non-U.S. jurisdictions. Potential changes in existing tax laws, including future regulatory guidance, may impact our effective income tax rate and tax payments. There can be no assurance that changes in tax laws or regulations, both within the U.S. and the other jurisdictions in which we operate, will not materially and adversely affect our effective income tax rate, tax payments, financial condition and results of operations. Similarly, changes in tax laws and regulations that impact our customers and counterparties or the economy generally may also impact our financial condition and results of operations.

In addition, tax laws and regulations are complex and subject to varying interpretations, and any significant failure to comply with applicable tax laws and regulations in all relevant jurisdictions could give rise to substantial penalties and liabilities. Any changes in enacted tax laws, rules or regulatory or judicial interpretations; any adverse outcome in connection with tax audits in any jurisdiction; or any change in the pronouncements relating to accounting for income taxes could materially and adversely impact our effective income tax rate, tax payments, financial condition and results of operations.

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

Companies that collect or process personal information may be regulated by data protection laws adopted by the United States, various states including California, Nevada, Virginia and Colorado, and foreign jurisdictions, including the European Union, the United Kingdom, Canada, Brazil and China. The European Union General Data Protection Regulation and implementing legislation adopted by member states of the European Economic Area (“GDPR”) in 2018, and the United Kingdom Data Protection Act 2018 (the “UK GDPR”) frequently serve as a model for other countries. All of these data protection laws regulate the collection, use, storage, disclosure and security of personal information, such as names, email addresses, Internet Protocol addresses and other online identifiers, business contact data, and customer profiles, that may be used to identify or locate an individual, including customers, employees, business contracts, website visitors and users of mobile apps.

The legal, financial and business impact of these data protection laws and regulations 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. We may be required to implement privacy and security policies, permit individuals to access and correct their own personal information that is collected, stored or maintained by us, and require us to transfer, delete or return their personal information. It may also be necessary for us to obtain individuals’ affirmative consent to collect, use or disclose their personal information for certain purposes. Governmental authorities could prohibit any personal information collected in a country from being transferred or disclosed outside of that country or condition such transfer or disclosure on compliance with specific requirements or written agreements. 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 may result in governmental actions, fines and non-monetary penalties, or civil actions, and reputational damage, which may harm our business.

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

The GDPR, which became effective in May 2018, applies to all our business conducted in the European Economic Area (the “EEA”). In the post-Brexit area, our business in the United Kingdom is regulated by the U.K. GDPR. New data protection laws have just come into effect in Brazil and China, and a new Indian law is pending. In the US, the states of California, Virginia, Colorado and Nevada have enacted new data protection laws that become effective during the next calendar year, and similar laws are pending in New York, Massachusetts and Washington. These data protection laws and regulations impose many obligations, and we will need to continue dedicating financial resources and management time to compliance and training in the coming years. Data protection laws, for example, may require, that regulated entities expand disclosures about how personal data is used, mechanisms for obtaining consent from data subjects, 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. There are also restrictions on data transfers and the security of the personal data, frequently with substantial fines and penalties associated with violations. The GDPR, for example, provides that supervisory authorities in the European Union may impose administrative fines for certain infringements of the GDPR (up to EUR 20,000,000, or 4% of an undertaking’s total, worldwide, annual revenue, whichever is higher). Individuals who sustain damages because a regulated entity fails to comply with the GDPR have the right to seek compensation from such entity directly. Compliance with data protection laws, the rapid pace of adopting new and amended laws, and necessary monitoring and training will 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 violations of such laws, cyber-attacks, governmental actions or civil proceedings. Given the potential fines, liabilities and damage to our reputation in the event of an actual or perceived violation of data protection laws, any violation may have an adverse effect on our business and operations.

As the number of jurisdictions with data privacy regulations increase and our global footprint expands, we anticipate that it will be necessary for us to increase the amount we expend on compliance and training in this area.

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.

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 volume of shares of our Class A common stock available for public sale;
- sales of shares of our Class A common stock;
- 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.

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 the Sarbanes-Oxley Act of 2002, or 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. 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. 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. In the past, we have identified material weaknesses in our controls which we subsequently remediated. We cannot assure investors that we will not have 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. 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 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, 2022, we had an aggregate of 52,277,170 shares of Class A common stock and 27,744,574 shares of Class B common stock outstanding.

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 29,939,594 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, who hold in aggregate approximately 84% 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, hold, in aggregate approximately 84% 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 Convertible Senior Notes due 2024, and our Convertible Notes due in 2027, or collectively 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, the credit agreement governing our revolving credit facility contains, and 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 those restrictions are waived, or 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.

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 \$200 million, with a sublimit for the issuance of letters of credit of up to \$5.0 million and a sublimit for swing line loans of up to \$5.0 million and matures on December 31, 2025 (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 maximum senior secured leverage ratio of 3.0 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.

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.

Provisions in the indenture governing the Convertible Notes may deter or prevent a business combination that may be favorable to you.

As stated above, if a fundamental change occurs prior to the maturity date, holders of the Convertible Notes will have the right, at their option, to require us to repurchase all or a portion of their Convertible Notes. In addition, if a make-whole fundamental change occurs prior to the maturity date, we will, in some cases, be required to increase the conversion rate for a holder that elects to convert its Convertible Notes in connection with such make-whole fundamental change. Furthermore, the indenture governing the Convertible Notes will prohibit us from engaging in certain mergers or acquisitions unless, among other things, the surviving entity assumes our obligations under the Convertible Notes. These and other provisions in the indenture governing the Convertible Notes could deter or prevent a third-party from acquiring us even when the acquisition may be favorable to you.

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.

General Risk Factors

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, data scientists, 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.

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.

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.

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, pandemics, 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.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

Our corporate headquarters are located in Troy, Michigan. We own our corporate headquarters facility, and an undeveloped parcel of land adjacent to our headquarters, which we may 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 do not manage our facilities by segment because they may be used for multiple purposes, such as administration, sales, and development. 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

World Programming

We acquired World Programming Limited and a related company (collectively, “World Programming”) in December 2021. In 2010, SAS Institute, Inc. (“SAS”) filed an action against World Programming in the United States District Court for the Eastern District of North Carolina (the “NC Court”) alleging copyright infringement, breach of contract, fraudulent inducement to contract, and violations of the North Carolina Unfair and Deceptive Trade Practices Act (UDTPA). SAS was unsuccessful on its copyright claims but prevailed on its breach of contract, fraudulent inducement, and UDTPA claims and was awarded damages of \$79.1 million in 2016 (the “NC Judgment”). The NC Court subsequently enjoined World Programming from licensing its WPS Analytics software to new customers for use in the United States until the NC Judgment was satisfied. At the time that we acquired World Programming, World Programming had partially paid the NC Judgment.

In relation to the NC Court order that enjoined World Programming from licensing its WPS Analytics Software to new customers for use in the United States, SAS filed a related matter in California, which resulted in the California court issuing an order that required certain then existing customers of World Programming to direct payment (of their licensing fees for WPS Analytics software) to SAS until the NC Judgment was satisfied.

On January 3, 2022, we paid the outstanding balance of \$65.9 million on the NC Judgment. Despite payment in full, SAS asserted that we had not satisfied the NC Judgment. The NC Court held a hearing to address this issue on March 3, 2022 (the “March Hearing”). At the March Hearing, the NC Court confirmed that our January 3, 2022 payment fully satisfied the NC Judgment, and lifted the injunction that had enjoined World Programming from licensing its WPS Analytics software to new customers for use in the United States. On March 7, 2022, SAS agreed that the California court order was no longer necessary and together with World Programming, filed a joint notice of satisfaction of the NC Judgment with the California court, thereby allowing customers of World Programming to resume payment of their licensing fees to World Programming directly.

In 2018, SAS filed litigation in the United States District Court for the Eastern District of Texas asserting that World Programming infringed SAS copyrights and patents. SAS voluntarily dismissed with prejudice its patent claims, and the Texas court entered judgment in favor of World Programming on the copyright claims. SAS appealed this judgment to the United States Court of Appeals for the Federal Circuit (the “Court of Appeals”). Oral arguments were held before the Court of Appeals on January 13, 2022. A decision from the Court of Appeals is pending.

Other legal proceedings

From time to time, we may be subject to other 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.

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.

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

Holders

As of February 10, 2023, there were approximately 300 registered stockholders of our Class A common stock and 4 registered stockholders of our Class B common stock. We are unable to estimate the total number of stockholders because many of our shares of Class A common stock are held by brokers, banks or other institutions on behalf of stockholders.

Dividends

We have never declared or paid any cash dividends on our common stock. We currently 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.

Purchases of Equity Securities by the Issuer

In February 2022, our Board of Directors approved a stock repurchase program. Under the program, we are authorized to repurchase up to \$50.0 million of the our outstanding Class A Common Stock. As permitted by securities laws and other legal requirements and subject to market conditions and other factors, purchases under the program may be made from time to time in the open market at prevailing prices, or through privately negotiated transactions. We are not obligated to repurchase any dollar amount or number of shares, and the stock repurchase program may be suspended or terminated at any time. All shares repurchased under the stock repurchase program are retired.

The following table presents information regarding our purchases of Class A Common Stock during the quarter ended December 31, 2022:

	Total Number of Shares Purchased (1)	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs	Approximate dollar value of Shares that may yet be Purchased under the Plans or Programs
October 1, 2022 through October 31, 2022	—	\$ —	—	\$ 45,612,733
November 1, 2022 through November 30, 2022	—	\$ —	—	\$ 45,612,733
December 1, 2022 through December 31, 2022	375,831	\$ 45.95	375,831	\$ 28,341,822
Total	<u>375,831</u>	<u>\$ 45.95</u>	<u>375,831</u>	<u>\$ 28,341,822</u>

- (1) All shares were repurchased in open market transactions pursuant to the \$50.0 million share repurchase program authorized by our Board of Directors and publicly announced on February 24, 2022. Shares repurchased under this program may be repurchased in open market transactions, by block purchase, in privately negotiated transactions or otherwise.

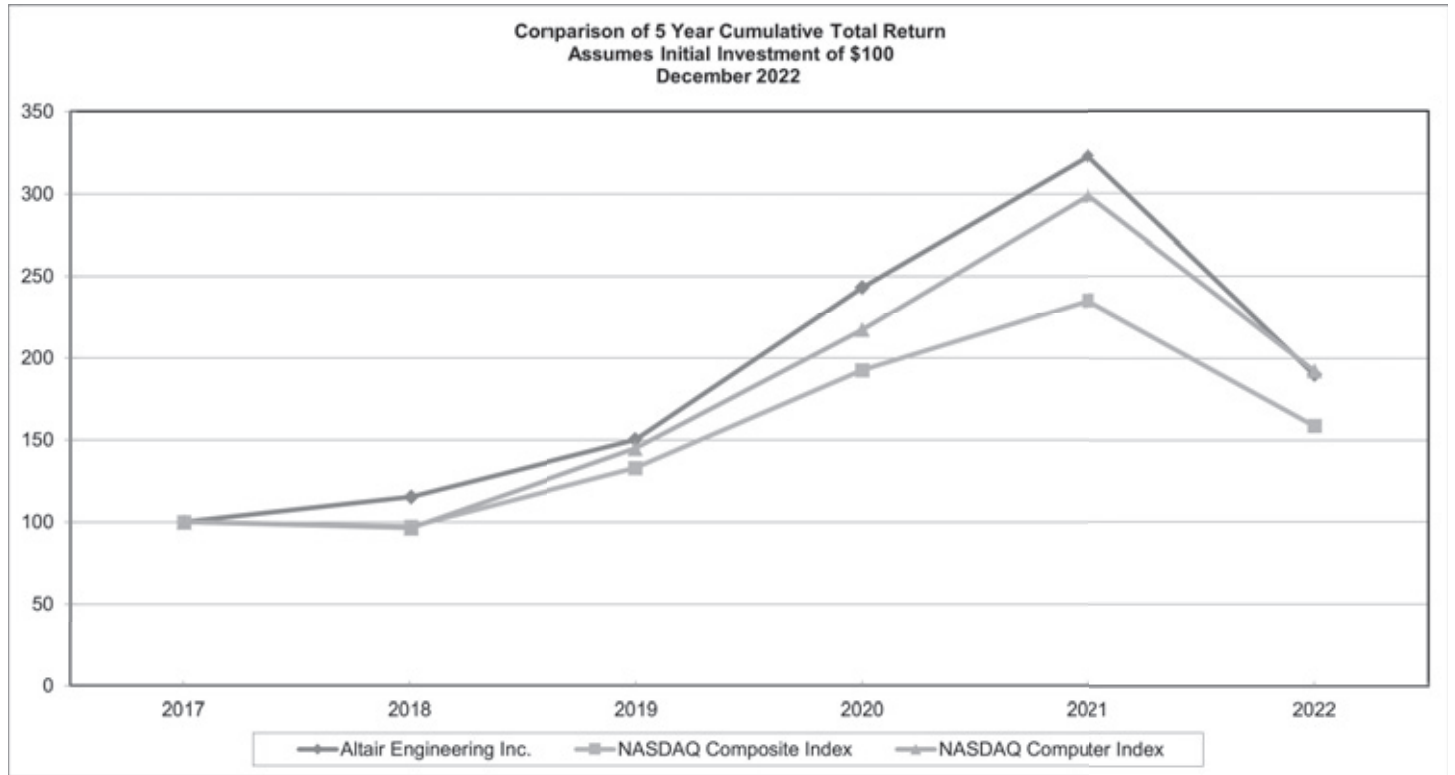
Performance Graph

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 December 31, 2017, 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 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.



NOTE: Index Data: Copyright NASDAQ OMX, Inc. Used with permission. All rights reserved.

Item 6. Reserved

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, 2022 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 leader in computational science and artificial intelligence enabling organizations across broad industry segments to drive smarter decisions in an increasingly connected world. We deliver software and cloud solutions in the areas of simulation, high-performance computing (“HPC”), data analytics, and artificial intelligence (“AI”). Our products and services leverage computational science to drive innovation and intelligent decisions for a more connected, safe, and sustainable future.

Our simulation and AI-driven approach to innovation is powered by our broad portfolio of high-fidelity and high-performance physics solvers, our market-leading technology for optimization and HPC, and our end-to-end platform for developing AI and Internet of Things (“IoT”) solutions. Our integrated suite of software optimizes design performance across multiple disciplines encompassing structures, motion, fluids, thermal, electromagnetics, system modeling, and embedded systems, while also providing AI solutions and true-to-life visualization and rendering. Our HPC solutions maximize the efficient utilization of complex compute resources and streamline the workflow management of compute-intensive tasks for applications including AI, modeling and simulation, and visualization. Our data analytics, AI and IoT products include data preparation, data science, MLOps, orchestration, and visualization solutions that fuel engineering, scientific, and business decisions.

Altair’s software products represent a comprehensive, open architecture solution for simulation, HPC, data analytics, and AI to empower decision making for improved product design and development, manufacturing, energy management and exploration, financial services, health care, and retail operations. We believe Altair’s solutions are compelling due to their openness and usability.

Altair’s 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:

- Physics Simulation and Concept Design;
- High Performance and Cloud Computing; and
- Data Analytics, AI, IoT and Smart Product Development.

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.

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 known as Altair Units.
- 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 high-performance computing solutions.

Altair pioneered Altair Units, 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 more than 150 partner products. Our customers license a pool of units for their organizations giving individual users access to our 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 90% over the past five years. Historically, approximately 60% of new software revenue comes from expansion within existing customers.

Recent Business Developments

Business combinations

In September 2022, we acquired RapidMiner, a leader in advanced data analytics and machine learning software. RapidMiner will be integrated with existing tools, such as Altair Knowledge Studio, Altair SmartWorks, and Altair SLC, to provide a comprehensive, code-optional, multi-language, SaaS-ready, cloud-scale platform for enterprise data analytics and data science.

RapidMiner's low-code platform is used to develop production-scale data pipelines and ML models, putting advanced data analytics into the hands of those who know the domain problems best. It provides powerful, drag-and-drop building blocks to transform and augment data, and its flexible delivery models provide users and enterprises with the scale they need, from a user's desktop to on-premises servers to secure, multi-tenant cloud. The acquisition of RapidMiner strengthens our end-to-end data analytics portfolio.

In June 2022, we acquired Concept Engineering, a leading provider of electronic system visualization software that accelerates the development, manufacture, and service of complex electrical and electronic systems. Most of Concept Engineering's software will be integrated into Altair's Electronic System Design suite and is available via Altair Units.

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.

Convertible Senior Notes

2027 Notes

In June 2022, we issued \$230.0 million aggregate principal amount of 1.750% convertible senior notes due in 2027 (the "2027 Notes"), which includes the initial purchaser's exercise in full of its option to purchase an additional \$30.0 million principal amount of the 2027 Notes, in a private offering. The net proceeds from the issuance of the 2027 Notes was approximately \$224.3 million after deducting discounts, commissions and estimated issuance costs.

We entered into an Indenture relating to the issuance of the 2027 Notes dated June 14, 2022 (the "Indenture"), by and between the Company and U.S. Bank Trust Company, National Association, as trustee. The Indenture includes customary covenants and sets forth certain events of default after which the 2027 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 2027 Notes become automatically due and payable. The 2027 Notes are senior unsecured obligations of the Company.

The 2027 Notes mature on June 15, 2027, unless earlier repurchased, redeemed or converted. We may redeem for cash all or, subject to certain limitations, any portion of the 2027 Notes, at our option, on or after June 20, 2025, if the last reported sale price of our Class A Common Stock has been at least 130% of the conversion price then in effect for at least 20 trading days (whether or not consecutive) during any 30 consecutive trading day period, at a redemption price equal to 100% of the principal amount of the notes to be redeemed, plus accrued and unpaid interest to, but excluding, the redemption date. The 2027 Notes bear interest at a rate of 1.750% per year, payable semiannually in arrears on June 15 and December 15 of each year, which commenced on December 15, 2022.

The 2027 Notes have an initial conversion rate of 13.9505 shares of our Class A common stock per \$1,000 principal amount of 2027 Notes, which is equivalent to an initial conversion price of approximately \$71.68 per share of 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 2027 Notes in connection with such make whole fundamental change or during the relevant redemption period.

Holder of the 2027 Notes may convert all or any portion of their 2027 Notes at any time prior to the close of business on the business day immediately preceding December 15, 2026, in integral multiples of \$1,000 principal amount, only under the following circumstances:

- during any 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 the 2027 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 the 2027 Notes for redemption (which we may not do prior to June 20, 2025), at any time prior to the close of business on the scheduled trading day immediately preceding the redemption date but only with respect to the 2027 Notes called (or deemed called) for redemption; or
- upon the occurrence of specified corporate events.

On or after December 15, 2026, until the close of business on the business day immediately preceding the maturity date, holders may convert their 2027 Notes at any time, regardless of the foregoing circumstances. Upon conversion, we will pay or deliver, as the case may be, cash, shares of Class A Common Stock or a combination of cash and shares of Class A Common Stock, at our election, in the manner and subject to the terms and conditions provided in the Indenture.

2024 Notes

In June 2022, using proceeds from the issuance of the 2027 Notes, we retired approximately \$148.2 million principal amount of our convertible senior notes which mature in 2024 (the “2024 Notes” and together with the 2027 Notes, the “Convertible Notes”), by paying cash of approximately \$192.4 million including accrued and unpaid interest.

Credit Agreement

On November 7, 2022, we exercised the \$50.0 million accordion feature of our credit facility in accordance with the terms and conditions set forth in the credit agreement, for an aggregate revolving commitment of \$200.0 million available to us (“2019 Amended Credit Agreement”). In June 2022, we amended our credit facility to, among other things, permit the issuance of the 2027 Notes and extend the maturity date of the credit facility to December 15, 2025.

Impact of COVID-19

In March 2020, The World Health Organization declared the outbreak of COVID-19, a pandemic and a public health emergency of international concern. The global spread of COVID-19, including new and emerging variants, has created significant volatility and uncertainty since March 2020 and may continue into the future.

We have converted our business to being capable of operating nearly 100% remote as required or recommended under COVID-19 restrictions, leveraging our global technology infrastructure. Our culture, technology, and people allowed us to react quickly when the crisis initially emerged. As a result, we maintained high levels of productivity and employee engagement. As the COVID-19 pandemic continued to affect many global regions through 2022, our workforce remained in a hybrid mode of remote and in-person working. We have gradually resumed normal operations, when permitted, based on local conditions and restrictions, with the primary focus of preserving employee welfare, while continuing to support customers.

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. Furthermore, we may choose to grow our business for the long-term rather than 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.

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 identify 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. Our 2022 revenue and profit were adversely affected relative to the prior year by changes in foreign currency rates and we anticipate that this may continue in 2023.

Business segments

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

- *Software* —Our Software segment includes software, software services, and software related services. The software component of this segment includes our portfolio of software products including our solvers and optimization technology products, high-performance computing software applications and hardware products, modeling and visualization tools, data analytics and analysis 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 services and 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 potential services and product concepts that are still in their development stages.

For additional information about our reportable segments and other businesses, see Note 17 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 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 are 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. We generally recognize revenue for software 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 engineers, manufacturing engineers, and information technology specialists. 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

Cost of 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 hardware costs, travel 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.

Cost of 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.

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 aggregate.

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 expense resulting from future strategic acquisitions.

Other operating income, net

Other operating income, net consists primarily of government subsidies, primarily in France, in the form of grant income associated with certain of our research and development activities, mark-to-market adjustments for contingent consideration, and other items as disclosed.

Interest expense

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

Other expense, net

Other 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, expense on the repurchase of our 2024 Notes, 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. 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, and Foreign Derived Intangible Income, or FDII, regimes, 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, 2022 and 2021, we had gross deferred tax assets, or DTAs, of \$179.8 million and \$153.7 million, respectively, primarily related to capitalized research and development expenses, net operating loss carryforwards, tax credits, share-based compensation, lease obligations and employee benefits. We are entitled to a United States federal tax deduction when non-qualified stock options, or NSOs, are exercised. For 2022 tax year, we recorded an increase in the valuation allowance by \$29.5 million for the gross 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 acquisitions of Datawatch, Univa, and RapidMiner, 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.

For tax years beginning on or after January 1, 2022, the Tax Act eliminates the option to currently deduct research and development expenses and requires taxpayers to capitalize and amortize them over five years for research activities performed in the United States and 15 years for research activities performed outside the United States pursuant to Section 174 of the Code. Although Congress is considering legislation that would repeal or defer this capitalization and amortization requirement, it is not certain that this provision will be repealed or otherwise modified. If the requirement is not repealed or replaced, it will increase our U.S. federal and state cash taxes and reduce cash flows in fiscal year 2023 and future years.

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.

Results of operations

The following table sets forth our results of operations and certain financial data for the years ended December 31, 2022 and 2021:

(in thousands)	Year ended December 31,	
	2022	2021
Revenue:		
Software	\$ 506,508	\$ 453,746
Software related services	30,661	31,823
Total software and related services	537,169	485,569
Client engineering services	28,883	39,282
Other	6,169	7,328
Total revenue	572,221	532,179
Cost of revenue:		
Software	72,443	67,791
Software related services	21,858	23,205
Total software and related services	94,301	90,996
Client engineering services	23,577	31,710
Other	5,011	6,960
Total cost of revenue	122,889	129,666
Gross profit	449,332	402,513
Operating expenses:		
Research and development	185,863	151,049
Sales and marketing	155,245	132,750
General and administrative	97,606	91,500
Amortization of intangible assets	27,510	18,357
Other operating income, net	(9,955)	(3,482)
Total operating expenses	456,269	390,174
Operating (loss) income	(6,937)	12,339
Interest expense	4,377	12,065
Other expense, net	16,899	562
Loss before income taxes	(28,213)	(288)
Income tax expense	15,216	8,506
Net loss	\$ (43,429)	\$ (8,794)
Other financial information:		
Billings ⁽¹⁾	\$ 607,602	\$ 539,855
Adjusted EBITDA ⁽²⁾	\$ 108,600	\$ 85,253
Net cash provided by operating activities	\$ 39,570	\$ 61,623
Free cash flow ⁽³⁾	\$ 29,922	\$ 53,774

- (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 “Non-GAAP financial measures” contained herein.
- (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 “Non-GAAP financial measures” contained herein.
- (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 “Non-GAAP financial measures” contained herein.

Years ended December 31, 2022 and 2021

Revenue

Software

(dollars in thousands)	Year ended December 31,		Change	
	2022	2021	\$	%
Software revenue	\$ 506,508	\$ 453,746	\$ 52,762	12%
As a percent of software segment revenue	94%	93%		
As a percent of consolidated revenue	89%	85%		

Software revenue increased 12% for the year ended December 31, 2022, as compared to the year ended December 31, 2021, or 18% in constant currency. The increase was the result of growth across all three geographic regions, supported by increases in new and expansion business, as well as retention in our renewal base.

Software related services

(dollars in thousands)	Year ended December 31,		Change	
	2022	2021	\$	%
Software related services revenue	\$ 30,661	\$ 31,823	\$ (1,162)	(4%)
As a percent of software segment revenue	6%	7%		
As a percent of consolidated revenue	5%	6%		

Software related services revenue decreased 4% for the year ended December 31, 2022, as compared to the year ended December 31, 2021. This decrease was the result of lower customer demand in the last half of the current year.

Client engineering services

(dollars in thousands)	Year ended December 31,		Change	
	2022	2021	\$	%
Client engineering services revenue	\$ 28,883	\$ 39,282	\$ (10,399)	(26%)
As a percent of consolidated revenue	5%	7%		

CES revenue decreased 26% for the year ended December 31, 2022, as compared to the year ended December 31, 2021. This decrease was the result of fluctuations in customer demand for these services and reduced CES staff working hours. In addition, we had difficulty filling some CES positions due to a challenging labor market in the U.S.

Other

(dollars in thousands)	Year ended December 31,		Change	
	2022	2021	\$	%
Other revenue	\$ 6,169	\$ 7,328	\$ (1,159)	(16%)
As a percent of consolidated revenue	1%	1%		

Other revenue decreased 16% for the year ended December 31, 2022, as compared to the year ended December 31, 2021, primarily due to reduced unit sales by toggled, our LED lighting business.

Cost of revenue

Software

(dollars in thousands)	Year ended December 31,		Change	
	2022	2021	\$	%
Cost of software revenue	\$ 72,443	\$ 67,791	\$ 4,652	7%
As a percent of software revenue	14%	15%		
As a percent of consolidated revenue	13%	13%		

Cost of software revenue increased \$4.7 million, or 7%, for the year ended December 31, 2022, as compared to the year ended December 31, 2021. Employee compensation and related expense increased \$2.8 million, stock-based compensation expense increased \$2.7 million, third-party sales commissions increased \$0.9 million and travel costs increased \$0.5 million. The increase in employee compensation was primarily due to increased headcount in the current year. These increases were partially offset by decreases in restructuring costs, facilities costs, third-party consulting fees, and technology expenses of \$1.0 million, \$0.5 million, \$0.5 million, and \$0.4 million, respectively.

Software related services

(dollars in thousands)	Year ended December 31,		Change	
	2022	2021	\$	%
Cost of software related services revenue	\$ 21,858	\$ 23,205	\$ (1,347)	(6%)
As a percent of software related services revenue	71%	73%		
As a percent of consolidated revenue	4%	4%		

Cost of software related services revenue decreased 6% for the year ended December 31, 2022, as compared to the year ended December 31, 2021, primarily due to a decrease in employee compensation and related expense of \$2.2 million, partially offset by an increase in facilities costs of \$0.7 million.

Client engineering services

(dollars in thousands)	Year ended December 31,		Change	
	2022	2021	\$	%
Cost of client engineering services revenue	\$ 23,577	\$ 31,710	\$ (8,133)	(26%)
As a percent of client engineering services segment revenue	82%	81%		
As a percent of consolidated revenue	4%	6%		

Cost of CES revenue decreased 26% for the year ended December 31, 2022, as compared to the year ended December 31, 2021, consistent with the change in CES revenue. We have managed CES headcount and compensation to match our customers' demand for our staffing resources, and therefore our costs have moved accordingly.

Other

(dollars in thousands)	Year ended December 31,		Change	
	2022	2021	\$	%
Cost of other revenue	\$ 5,011	\$ 6,960	\$ (1,949)	(28%)
As a percent of other revenue	81%	95%		
As a percent of consolidated revenue	1%	1%		

Cost of other revenue decreased 28% for the year ended December 31, 2022, as compared to the year ended December 31, 2021. This decrease was primarily a result of the decrease in revenue and reduction in inventory obsolescence in the current year.

Gross profit

(dollars in thousands)	Year ended December 31,		Change	
	2022	2021	\$	%
Gross profit	\$ 449,332	\$ 402,513	\$ 46,819	12%
As a percent of consolidated revenue	79%	76%		

Gross profit increased \$46.8 million, or 12%, for the year ended December 31, 2022, as compared to the year ended December 31, 2021. This increase in gross profit was primarily attributable to the increase in software revenue combined with a decrease in cost of revenue.

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 in the aggregate.

Research and development

(dollars in thousands)	Year ended December 31,		Change	
	2022	2021	\$	%
Research and development	\$ 185,863	\$ 151,049	\$ 34,814	23%
As a percent of consolidated revenue	32%	28%		

Research and development expenses increased \$34.8 million, or 23%, for the year ended December 31, 2022, as compared to the year ended December 31, 2021. Stock-based compensation expense increased \$19.8 million and employee compensation and related expense increased \$14.9 million, primarily due to increased headcount and compensation in the current year. The increases in stock-based compensation and headcount were driven by our current year acquisitions and the World Programming acquisition in December 2021.

In addition, cloud hosting and software maintenance expense, facilities costs, and travel costs increased \$1.3 million, \$0.9 million, and \$0.6 million, respectively, in the current year. These increases were partially offset by decreases in consulting fees and restructuring costs of \$1.9 million and \$1.7 million, respectively.

Sales and marketing

(dollars in thousands)	Year ended December 31,		Change	
	2022	2021	\$	%
Sales and marketing	\$ 155,245	\$ 132,750	\$ 22,495	17%
As a percent of consolidated revenue	27%	25%		

Sales and marketing expenses increased \$22.5 million, or 17%, for the year ended December 31, 2022, as compared to the year ended December 31, 2021. Stock-based compensation expense increased \$15.6 million, selling expenses increased \$2.5 million, and employee compensation and related expense increased \$2.2 million for the year ended December 31, 2022. Additionally, cloud hosting and software maintenance expense increased \$1.8 million and travel costs increased \$1.6 million in the current year. These increases were partially offset by a decrease in restructuring costs of \$1.8 million which were non-recurring in 2022.

General and administrative

(dollars in thousands)	Year ended December 31,		Change	
	2022	2021	\$	%
General and administrative	\$ 97,606	\$ 91,500	\$ 6,106	7%
As a percent of consolidated revenue	17%	17%		

General and administrative expenses increased \$6.1 million, or 7%, for the year ended December 31, 2022, as compared to the year ended December 31, 2021. Professional fees increased \$2.8 million, stock-based compensation expense increased \$2.5 million, cloud hosting and software maintenance expense increased \$1.6 million, and travel costs increased \$0.9 million for year ended December 31, 2022. These increases were partially offset by decreases in facilities costs, employee compensation and related expense, and restructuring costs of \$0.8 million, \$0.5 million and \$0.5 million, respectively.

Amortization of intangible assets

(dollars in thousands)	Year ended December 31,		Change	
	2022	2021	\$	%
Amortization of intangible assets	\$ 27,510	\$ 18,357	\$ 9,153	50%
As a percent of consolidated revenue	5%	3%		

Amortization of intangible assets increased \$9.2 million for the year ended December 31, 2022, as compared to the year ended December 31, 2021. Amortization of intangible assets in the current year increased primarily as a result of recent acquisitions, partially offset by a reduction in amortization because of fully amortized intangibles.

Other operating income, net

(dollars in thousands)	Year ended December 31,		Change	
	2022	2021	\$	%
Other operating income, net	\$ (9,955)	\$ (3,482)	\$ 6,473	186%
As a percent of consolidated revenue	(2%)	(1%)		

Other operating income, net increased \$6.5 million for the year ended December 31, 2022, as compared to the year ended December 31, 2021, primarily due to a \$7.2 million gain recognized on the mark-to-market adjustment of contingent consideration associated with the World Programming acquisition. This gain was partially offset by a \$0.7 million decrease in grant income for the year ended December 31, 2022.

Interest expense

(dollars in thousands)	Year ended December 31,		Change	
	2022	2021	\$	%
Interest expense	\$ 4,377	\$ 12,065	\$ (7,688)	(64%)
As a percent of consolidated revenue	1%	2%		

Interest expense decreased \$7.7 million for the year ended December 31, 2022, as compared to the year ended December 31, 2021, primarily due to the adoption of ASU 2020-06 on January 1, 2022. As a result of this adoption, we account for the 2024 Notes as a single liability, which eliminates the amortization of the debt discount. Prior to January 1, 2022, the carrying amount of the equity component was recorded as a debt discount and amortized to interest expense. Interest expense related to the amortization of debt issuance costs was \$1.8 million for the year ended December 31, 2022, while interest expense related to the amortization of debt discount and issuance costs was \$11.4 million for the year ended December 31, 2021. Interest costs on the 2027 Notes were \$2.2 million for the year ended December 31, 2022.

Other expense, net

(dollars in thousands)	Year ended December 31,		Change	
	2022	2021	\$	%
Other expense, net	\$ 16,899	\$ 562	\$ 16,337	NM
As a percent of consolidated revenue	3%	0%		

Other expense, net increased by \$16.3 million for the year ended December 31, 2022, as compared to the year ended December 31, 2021. We recognized expense of \$16.6 million on the repurchase of a portion of our 2024 Notes, and an increase of \$3.3 million in net foreign currency losses during the year ended December 31, 2022, as compared to the year ended December 31, 2021. These losses were partially offset by a \$3.6 million increase in interest income in the current year.

Income tax expense

(dollars in thousands)	Year ended December 31,		Change	
	2022	2021	\$	%
Income tax expense	\$ 15,216	\$ 8,506	\$ 6,710	79%

The effective tax rate was (54%) and (2,953%) for the year ended December 31, 2022 and 2021, 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 due to a valuation allowance. The effective tax rate was impacted by the geographic income mix in 2022 as compared to 2021, primarily related to a United States pre-tax loss of \$62.7 million for the year ended December 31, 2022, for which a tax benefit was not recognized due to the valuation allowance, compared to a United States pre-tax loss of \$27.9 million for the year ended December 31, 2021, for which a tax benefit 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.

Net loss

(dollars in thousands)	Year ended December 31,		Change	
	2022	2021	\$	%
Net loss	\$ (43,429)	\$ (8,794)	\$ (34,635)	(394%)

Net loss increased by \$34.6 million for the year ended December 31, 2022, as compared to the year ended December 31, 2021. The increase in net loss was largely attributable to expense recognized on the repurchase of a portion of our 2024 Notes, increased stock-based compensation expense and increased foreign currency losses in the current year, partially offset by an increase in revenue and a gain on the mark-to-market adjustment of contingent consideration, as described above.

For information regarding the comparison of results of operations for the years ended December 31, 2021 and 2020, please see Item 7 of our Annual Report on Form 10-K for the year ended December 31, 2021.

Non-GAAP financial measures

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 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 as a performance measure and Free Cash Flow as a liquidity measure.

(in thousands)	Year ended December 31,		
	2022	2021	2020
Billings	\$ 607,602	\$ 539,855	\$ 480,447
Adjusted EBITDA	\$ 108,600	\$ 85,253	\$ 57,288
Free Cash Flow	\$ 29,922	\$ 53,774	\$ 26,789

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.

Billings increased by \$67.7 million, or 13%, for the year ended December 31, 2022, as compared to the year ended December 31, 2021. This increase in Billings was attributable to an increase in Software segment billings.

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.

Adjusted EBITDA increased by \$23.3 million, or 27%, for the year ended December 31, 2022, as compared to the year ended December 31, 2021. This increase in Adjusted EBITDA was primarily attributable to the increase in gross profit, partially offset by an increase in operating expenses.

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.

Net cash provided by operating activities for the year ended December 31, 2022, was \$39.6 million, which reflects a decrease of \$22.1 million compared to the year ended December 31, 2021. Free Cash Flow decreased by \$23.9 million, or 44%, for the year ended December 31, 2022, as compared to year ended December 31, 2021. This decrease in Free Cash Flow was primarily attributable to a \$65.9 million payment in January 2022, for a damages judgement assumed in an acquisition in December 2021, partially offset by an increase in our cash-related profitability and changes to our working capital position for the year ended December 31, 2022.

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 loss to Adjusted EBITDA, and net cash provided by operating activities to Free Cash Flow:

Billings

(in thousands)	Year ended December 31,		
	2022	2021	2020
Revenue	\$ 572,221	\$ 532,179	\$ 469,921
Ending deferred revenue	144,460	106,032	95,079
Beginning deferred revenue	(106,032)	(95,079)	(83,567)
Deferred revenue acquired	(3,047)	(3,277)	(986)
Billings	<u>\$ 607,602</u>	<u>\$ 539,855</u>	<u>\$ 480,447</u>

Adjusted EBITDA

(in thousands)	Year Ended December 31,		
	2022	2021	2020
Net loss	\$ (43,429)	\$ (8,794)	\$ (10,500)
Income tax expense	15,216	8,506	12,532
Stock-based compensation	84,787	44,549	21,355
Interest expense	4,377	12,065	11,598
Depreciation and amortization	35,504	25,644	23,806
Restructuring expense	—	5,053	—
Special adjustments, interest income and other ⁽¹⁾	12,145	(1,770)	(1,503)
Adjusted EBITDA	<u>\$ 108,600</u>	<u>\$ 85,253</u>	<u>\$ 57,288</u>

- (1) The year ended December 31, 2022, includes \$16.6 million expense on repurchase of convertible senior notes, \$6.8 million currency losses on acquisition-related intercompany loans, \$7.2 million gains from the mark-to-market adjustment of contingent consideration associated with the World Programming acquisition, and \$4.1 million of interest income. The year ended December 31, 2021, includes \$1.2 million currency gains on acquisition-related intercompany loans and the year ended December 31, 2020, includes \$1.0 million of proceeds from settlements related to an historical acquisition and \$0.6 million of severance expense.

Free Cash Flow

(in thousands)	Year ended December 31,		
	2022	2021	2020
Net cash provided by operating activities	\$ 39,570	\$ 61,623	\$ 32,882
Capital expenditures	(9,648)	(7,849)	(6,093)
Free Cash Flow	<u>\$ 29,922</u>	<u>\$ 53,774</u>	<u>\$ 26,789</u>

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 92% for each of the years ended December 31, 2022, 2021 and 2020.

Liquidity and capital resources

As of December 31, 2022, our principal sources of liquidity were \$316.1 million in cash and cash equivalents and \$200.0 million availability on our credit facility. As of December 31, 2022, our outstanding debt consists of \$81.8 million and \$230.0 million convertible notes due in 2024 and 2027, respectively.

During the period ended December 31, 2022, 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, 2022. We have the ability to settle the Convertible Notes in cash, shares of our common stock, or a combination of cash and shares of our common stock at our own election.

During the year ended December 31, 2022, under our stock repurchase program, we repurchased 460,950 shares of our Class A Common Stock at an average price of \$46.99 per share for a total cost of approximately \$21.7 million. As of December 31, 2022, approximately \$28.3 million of shares remained available for repurchase under the program.

We continue to evaluate possible acquisitions and other strategic transactions designed to expand our business. As a result, our expected uses of cash could change, our cash position could be reduced, or we may incur additional debt obligations to the extent we complete additional acquisitions.

Our existing cash and cash equivalents may fluctuate during fiscal 2023, due to changes in our planned cash expenditures, including changes in incremental costs such as direct costs and integration costs related to acquisitions. Cash from operations could also be affected by various risks and uncertainties, including, but not limited to, the effects of COVID-19 and global unrest. It is possible that certain customers may unilaterally decide to extend payments on accounts receivable, however our customer base is comprised primarily of larger organizations with typically strong liquidity and capital resources.

We believe that our existing cash balances, together with funds generated from operations and amounts available under our credit facility, will be sufficient to finance our operations and meet our foreseeable cash requirements for the next twelve months. We also believe that our financial resources, along with managing discretionary expenses, will allow us to manage the impact of COVID-19 on our business operations for the foreseeable future and withstand global unrest, which could include reductions in revenue and delays in payments from customers and partners. We will continue to evaluate our financial position as developments evolve relating to COVID-19 and global unrest.

Revolving credit facility

On November 7, 2022, we exercised the \$50.0 million accordion feature of our credit facility in accordance with the terms and conditions set forth in our credit agreement. In June 2022, we amended our credit agreement to, among other things, permit the issuance of the 2027 Notes and extend the maturity date of the credit facility to December 31, 2025.

As of December 31, 2022, there were no outstanding borrowings under the 2019 Amended Credit Agreement and there was \$200.0 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, a Senior Secured Leverage Ratio not greater than 3.0 to 1.0, as such terms are defined in the 2019 Amended Credit Agreement. As of December 31, 2022, 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, 2022 and 2021, respectively, we had an aggregate of cash and cash equivalents of \$316.1 million and \$413.7 million, which we held for working capital purposes, acquisitions, and capital expenditures. As of December 31, 2022 and 2021, respectively, \$222.0 million and \$348.0 million of this aggregate amount was held in the United States, and \$88.3 million and \$60.2 million was held in the APAC and EMEA regions combined, 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 following table summarizes our cash flows for the periods indicated:

(in thousands)	Year ended December 31,		
	2022	2021	2020 ⁽¹⁾
Net cash provided by operating activities	\$ 39,570	\$ 61,623	\$ 32,882
Net cash used in investing activities	(154,511)	(62,482)	(49,092)
Net cash provided by financing activities	22,981	175,947	31,250
Effect of exchange rate changes on cash, cash equivalents and restricted cash	(5,094)	(2,623)	3,010
Net (decrease) increase in cash, cash equivalents and restricted cash	<u>\$ (97,054)</u>	<u>\$ 172,465</u>	<u>\$ 18,050</u>

- (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, 2021 and 2020, please see Item 7 of our Annual Report on Form 10-K for the year ended December 31, 2021.

Net cash provided by operating activities

Net cash provided by operating activities for the year ended December 31, 2022, was \$39.6 million, which reflects a decrease of \$22.1 million compared to the year ended December 31, 2021. This decrease was the result of a \$65.9 million payment in January on an existing damages judgment against World Programming, and changes to our working capital position for the year ended December 31, 2022.

Net cash used in investing activities

Net cash used in investing activities for the year ended December 31, 2022, was \$154.5 million, which reflects an increase of \$92.0 million compared to the year ended December 31, 2021. For the year ended December 31, 2022, we paid \$96.7 million for the acquisition of RapidMiner, and an additional \$47.8 million related to other business acquisitions and investments.

Net cash provided by financing activities

Net cash provided by financing activities for the year ended December 31, 2022, was \$23.0 million, which reflects a decrease in cash provided of \$153.0 million compared with the year ended December 31, 2021. For the year ended December 31, 2022, we received aggregate proceeds of \$224.3 million from the issuance of our 2027 Notes, net of certain discounts and commissions, partially offset by \$192.4 million proceeds used for the repurchase of a portion of our 2024 Notes. In addition, we used \$19.7 million to repurchase shares of our Class A Common Stock under our stock repurchase program in the current year.

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

There were adverse effects of exchange rate changes on cash, cash equivalents and restricted cash of \$5.1 million and \$2.6 million for the years ended December 31, 2022 and 2021, respectively.

Commitments

As of December 31, 2022, our principal commitments consist of our \$81.8 million and \$230.0 million convertible notes due in 2024 and 2027, respectively.

As of December 31, 2022, we have recorded a \$12.0 million liability as part of the acquisition consideration of World Programming that is contingent upon the results of certain legal matters and will be settled in the Company's Class A common stock.

As of December 31, 2022, we had a net benefit liability of \$13.1 million associated with our pension and post-retirement benefit plans. For additional information on pension and other post-retirement benefits, including expected benefit payments for the next 10 years, see Note 14 in the Notes to consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

We have non-cancelable contractual agreements primarily related to the hosting of our data storage processing, storage, and other computing services, as well as other commitments. We had \$26.3 million in non-cancelable contractual agreements as of December 31, 2022, primarily due within three years.

We also have approximately \$30.0 million of tax liabilities associated with uncertain tax positions. There is a high degree of uncertainty regarding the future cash outflows associated with these amounts. For additional discussion of uncertain tax positions, see Note 12 in the Notes to consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

Critical accounting 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 estimates discussed below are critical to understanding our historical and future performance, as these estimates relate to the more significant areas involving management's judgments and assumptions. Refer to Note 2 to our consolidated financial statements for our significant accounting policies related to our critical accounting estimates.

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 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 recognize 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 in a manner consistent with the direct sales described above for both perpetual and term-based licenses. 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.

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.

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.

As of December 31, 2022, we do not have any foreign currency hedging contracts. 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 2022, we issued \$230.0 million aggregate principal amount of 1.750% convertible senior notes due in 2027 (the "2027 Notes"). In June 2019, we issued \$230.0 million aggregate principal amount of 0.250% convertible senior notes due 2024 (the "2024 Notes" together with the 2027 Notes "Convertible Notes"), of which approximately \$148.2 million aggregate principal amount had been repurchased as of December 31, 2022. The 2027 Notes and 2024 Notes have fixed annual interest rates at 1.750% and 0.250%, respectively, and, therefore, we do not have 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 issuance costs on our balance sheet, and we present the fair value for required disclosure purposes only.

As of December 31, 2022, we had cash, cash equivalents and restricted cash of \$317.0 million, consisting primarily of bank deposits and money market funds. As of December 31, 2022, we had no borrowings outstanding under our 2019 Amended 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. Changes in interest rates would impact the amount of interest income we realize on our invested cash balances. 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.

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, 2022. 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, 2022.

(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, 2022 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 RapidMiner, Inc., Concept Engineering GmbH ASIC, Gen3D Limited, and Powersim Inc., which are included in our December 31, 2022 consolidated financial statements and constituted 2% and 2% of total and net assets (excluding acquired goodwill and intangible assets), respectively, as of December 31, 2022, and 2% 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, 2022. The results of management's assessment have been reviewed with the Audit Committee.

The effectiveness of our internal control over financial reporting as of December 31, 2022, has been audited by Ernst & Young LLP, an independent registered public accounting firm, as stated in their report which is included elsewhere herein.

(c) Changes in Internal Control Over Financial Reporting

In July 2022, we implemented a new enterprise resource planning (“ERP”) system. This implementation resulted in changes to our reporting processes and our internal control over financial reporting, by automating certain manual procedures and standardizing business processes and reporting across the organization. We have evaluated the design and operating effectiveness of our internal control over financial reporting under the new system.

There were no additional changes 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, 2022, that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information.

None.

Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections.

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 2023 Annual Meeting of Stockholders, or Proxy Statement, to be filed with the SEC within 120 days of the fiscal year ended December 31, 2022, 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:

	Page
Reports of Independent Registered Public Accounting Firm (Ernst & Young LLP, Detroit, Michigan, Auditor Firm ID: 42)	66
<u>Consolidated financial statements</u>	
Consolidated balance sheets	70
Consolidated statements of operations	71
Consolidated statements of comprehensive loss	72
Consolidated statement of changes in stockholders' equity (deficit)	73
Consolidated statements of cash flows	74
Notes to consolidated financial statements	75

(2) *Financial Statement Schedule:* The schedules have been omitted because they are not applicable, are not required, or the information required to be set forth therein is 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.

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

(b) *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, 2022 and 2021, the related consolidated statements of operations, comprehensive loss, changes in stockholders' equity (deficit) and cash flows for each of the three years in the period ended December 31, 2022, and the related notes (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, 2022 and 2021, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2022, 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, 2022, 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 February 24, 2023 expressed an unqualified opinion thereon.

Adoption of ASU No. 2020-06

As discussed in Note 2 to the consolidated financial statements, the Company changed its method of accounting for convertible debt instruments in 2022 due to the adoption of ASU 2020-06, *Debt—Debt with Conversion and Other Options (Subtopic 470-20) and Derivatives and Hedging—Contracts in Entity's Own Equity (Subtopic 815-40): Accounting for Convertible Instruments and Contracts in an Entity's Own Equity*.

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 promises to transfer licenses and services to a customer. Judgement 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 the standalone selling price at contract inception considering all information that is reasonably available and 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 its 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 completeness and accuracy of the data used in the analysis and recalculated the standalone selling prices.

*Description of the
Matter*

Business Combination

As described in Note 4, the Company completed the acquisition of RapidMiner, Inc. for consideration of \$98.6 million. This transaction was accounted for as a business combination.

Auditing the Company's acquisition of RapidMiner, Inc. was challenging and complex due to significant estimation uncertainty in certain assumptions used to determine the fair value of intangible assets acquired. The intangible assets acquired primarily consisted of developed technology of \$8.9 million and customer relationships of \$5.7 million. The significant assumptions used to estimate the fair value of the identified intangible assets included future expected cash flows from product sales, customer contracts and acquired technologies, expenses to operate the acquired business, and discount rates.

*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 the significant assumptions. In addition, we tested controls over management's review of the valuation calculations performed by its specialist, including management's procedures to validate 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 selected 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 significant assumptions used to determine the fair value estimates, including discount rates used by the Company. We also performed procedures to test the assumptions used to develop the forecasted data 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 within the same industry, and to other acquisitions completed by the Company in the past. We also compared expenses required to operate the acquired business as a percentage of revenue to historical results of the acquired company, and to other acquisitions completed by the Company in the past.

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

/s/ Ernst & Young LLP

Detroit, Michigan
February 24, 2023

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, 2022, 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, 2022, 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 RapidMiner, Inc., Concept Engineering GmbH, Gen3D Limited, and Powersim Inc., which are included in the December 31, 2022 consolidated financial statements of the Company and constituted 2% and 2% of total and net assets (excluding acquired goodwill and intangible assets), respectively, as of December 31, 2022 and 2% 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 2022 consolidated financial statements of the Company and our report dated February 24, 2023 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

February 24, 2023

ALTAIR ENGINEERING INC. AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS

(in thousands)	December 31,	
	2022	2021
ASSETS		
CURRENT ASSETS		
Cash and cash equivalents	\$ 316,146	\$ 413,743
Accounts receivable, net	170,279	137,561
Income tax receivable	11,259	9,388
Prepaid expenses and other current assets	29,142	27,529
Total current assets	526,826	588,221
Property and equipment, net	37,517	40,478
Operating lease right of use assets	33,601	28,494
Goodwill	449,048	370,178
Other intangible assets, net	107,609	99,057
Deferred tax assets	9,727	8,495
Other long-term assets	40,410	28,352
TOTAL ASSETS	\$ 1,204,738	\$ 1,163,275
LIABILITIES, MEZZANINE EQUITY AND STOCKHOLDERS' EQUITY		
CURRENT LIABILITIES		
Accounts payable	\$ 10,434	\$ 6,647
Accrued compensation and benefits	42,456	42,307
Current portion of operating lease liabilities	10,396	9,933
Other accrued expenses and current liabilities	56,371	122,226
Deferred revenue	113,081	93,160
Convertible senior notes, net	—	199,705
Total current liabilities	232,738	473,978
Convertible senior notes, net	305,604	—
Operating lease liabilities, net of current portion	24,065	19,550
Deferred revenue, non-current	31,379	12,872
Other long-term liabilities	41,216	42,894
TOTAL LIABILITIES	635,002	549,294
Commitments and contingencies		
MEZZANINE EQUITY	—	784
STOCKHOLDERS' EQUITY		
Preferred stock (\$0.0001 par value), authorized 45,000 shares, none issued or outstanding	—	—
Common stock (\$0.0001 par value)		
Class A common stock, authorized 513,797 shares, issued and outstanding 52,277 and 51,524 shares as of December 31, 2022 and 2021, respectively	5	5
Class B common stock, authorized 41,203 shares, issued and outstanding 27,745 shares as of December 31, 2022 and 2021	3	3
Additional paid-in capital	721,307	724,226
Accumulated deficit	(121,577)	(102,087)
Accumulated other comprehensive loss	(30,002)	(8,950)
TOTAL STOCKHOLDERS' EQUITY	569,736	613,197
TOTAL LIABILITIES, MEZZANINE EQUITY AND STOCKHOLDERS' EQUITY	\$ 1,204,738	\$ 1,163,275

See accompanying notes to consolidated financial statements.

ALTAIR ENGINEERING INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF OPERATIONS

(in thousands, except per share data)	Year ended December 31,		
	2022	2021	2020
Revenue			
License	\$ 363,520	\$ 324,808	\$ 259,965
Maintenance and other services	142,988	128,938	131,746
Total software	506,508	453,746	391,711
Software related services	30,661	31,823	26,454
Total software and related services	537,169	485,569	418,165
Client engineering services	28,883	39,282	44,320
Other	6,169	7,328	7,436
Total revenue	572,221	532,179	469,921
Cost of revenue			
License	20,497	19,929	19,637
Maintenance and other services	51,946	47,862	38,688
Total software	72,443	67,791	58,325
Software related services	21,858	23,205	21,243
Total software and related services	94,301	90,996	79,568
Client engineering services	23,577	31,710	35,684
Other	5,011	6,960	6,053
Total cost of revenue	122,889	129,666	121,305
Gross profit	449,332	402,513	348,616
Operating expenses			
Research and development	185,863	151,049	126,081
Sales and marketing	155,245	132,750	111,440
General and administrative	97,606	91,500	86,432
Amortization of intangible assets	27,510	18,357	16,376
Other operating income, net	(9,955)	(3,482)	(3,426)
Total operating expenses	456,269	390,174	336,903
Operating (loss) income	(6,937)	12,339	11,713
Interest expense	4,377	12,065	11,598
Other expense (income), net	16,899	562	(1,917)
(Loss) income before income taxes	(28,213)	(288)	2,032
Income tax expense	15,216	8,506	12,532
Net loss	\$ (43,429)	\$ (8,794)	\$ (10,500)
Loss per share:			
Net loss per share attributable to common stockholders, basic and diluted	\$ (0.55)	\$ (0.12)	\$ (0.14)
Weighted average shares outstanding:			
Weighted average number of shares used in computing net loss per share, basic and diluted	79,472	76,179	73,241

See accompanying notes to consolidated financial statements.

ALTAIR ENGINEERING INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF COMPREHENSIVE LOSS

(in thousands)	Year ended December 31,		
	2022	2021	2020
Net loss	\$ (43,429)	\$ (8,794)	\$ (10,500)
Other comprehensive (loss) income, net of tax:			
Foreign currency translation (net of tax effect of \$0 for all periods)	(24,084)	(7,254)	7,782
Retirement related benefit plans (net of tax effect of \$(308), \$(296) and \$308, respectively)	3,032	1,101	(1,051)
Total other comprehensive (loss) income	(21,052)	(6,153)	6,731
Comprehensive loss	\$ (64,481)	\$ (14,947)	\$ (3,769)

See accompanying notes to consolidated financial statements.

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

(in thousands)	Common stock				Additional paid-in capital	Accumulated deficit	Accumulated other comprehensive loss	Total stockholders' equity (deficit)
	Class A		Class B					
	Shares	Amount	Shares	Amount				
Balance at December 31, 2019	41,271	\$ 4	31,131	\$ 3	\$ 446,633	\$ (82,405)	\$ (9,528)	\$ 354,707
Cumulative effect of an accounting change	—	—	—	—	—	(388)	—	(388)
Net loss	—	—	—	—	—	(10,500)	—	(10,500)
Issuance of common stock for acquisitions	230	—	—	—	3,504	—	—	3,504
Exercise of stock options and other	1,472	—	—	—	1,710	—	—	1,710
Vesting of restricted stock	223	—	—	—	—	—	—	—
Conversion from Class B to Class A common stock	1,020	—	(1,020)	—	—	—	—	—
Stock-based compensation	—	—	—	—	21,254	—	—	21,254
Reclassification of mezzanine equity to permanent equity	—	—	—	—	1,568	—	—	1,568
Foreign currency translation, net of tax	—	—	—	—	—	—	7,782	7,782
Retirement related benefit plans, net of tax	—	—	—	—	—	—	(1,051)	(1,051)
Balance at December 31, 2020	44,216	4	30,111	3	474,669	(93,293)	(2,797)	378,586
Net loss	—	—	—	—	—	(8,794)	—	(8,794)
Issuance of common stock in private placement, net of issuance costs	2,936	1	—	—	199,871	—	—	199,872
Issuance of common stock for acquisitions	155	—	—	—	3,690	—	—	3,690
Exercise of stock options	1,478	—	—	—	2,262	—	—	2,262
Vesting of restricted stock	373	—	—	—	—	—	—	—
Conversion from Class B to Class A common stock	2,366	—	(2,366)	—	—	—	—	—
Stock-based compensation	—	—	—	—	43,734	—	—	43,734
Foreign currency translation, net of tax	—	—	—	—	—	—	(7,254)	(7,254)
Retirement related benefit plans, net of tax	—	—	—	—	—	—	1,101	1,101
Balance at December 31, 2021	51,524	5	27,745	3	724,226	(102,087)	(8,950)	613,197
Cumulative effect of an accounting change	—	—	—	—	(50,009)	23,939	—	(26,070)
Net loss	—	—	—	—	—	(43,429)	—	(43,429)
Settlement of convertible senior notes	—	—	—	—	(29,756)	—	—	(29,756)
Repurchase and retirement of common stock	(461)	—	—	—	(21,658)	—	—	(21,658)
Reclassification of mezzanine equity to permanent equity	—	—	—	—	784	—	—	784
Issuance of common stock for acquisitions	111	—	—	—	224	—	—	224
Issuance of common stock for employee stock purchase program	185	—	—	—	8,723	—	—	8,723
Exercise of stock options	440	—	—	—	3,577	—	—	3,577
Vesting of restricted stock	478	—	—	—	—	—	—	—
Stock-based compensation	—	—	—	—	85,196	—	—	85,196
Foreign currency translation, net of tax	—	—	—	—	—	—	(24,084)	(24,084)
Retirement related benefit plans, net of tax	—	—	—	—	—	—	3,032	3,032
Balance at December 31, 2022	52,277	5	27,745	3	721,307	(121,577)	(30,002)	569,736

See accompanying notes to consolidated financial statements.

ALTAIR ENGINEERING INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOWS

(in thousands)	Year Ended December 31,		
	2022	2021	2020
OPERATING ACTIVITIES:			
Net loss	\$ (43,429)	\$ (8,794)	\$ (10,500)
Adjustments to reconcile net loss to net cash provided by operating activities:			
Depreciation and amortization	35,504	25,644	23,806
Amortization of debt discount and issuance costs	1,792	11,428	10,829
Stock-based compensation expense	84,787	44,549	21,355
Deferred income taxes	(4,164)	(1,502)	(10,350)
Gain on mark-to-market adjustment of contingent consideration	(7,153)	—	—
Expense on repurchase of convertible senior notes	16,621	—	—
Other, net	387	1,271	1,377
Changes in assets and liabilities:			
Accounts receivable	(34,175)	(15,645)	(11,032)
Prepaid expenses and other current assets	1,014	(9,026)	(2,131)
Other long-term assets	2,852	(6,682)	(4,527)
Accounts payable	3,771	(3,857)	(1,839)
Accrued compensation and benefits	280	7,761	1,985
Other accrued expenses and current liabilities	(59,463)	6,365	5,629
Deferred revenue	40,946	10,111	8,280
Net cash provided by operating activities	39,570	61,623	32,882
INVESTING ACTIVITIES:			
Payments for acquisition of businesses, net of cash acquired	(134,541)	(53,983)	(41,028)
Capital expenditures	(9,648)	(7,849)	(6,093)
Other investing activities, net	(10,322)	(650)	(1,971)
Net cash used in investing activities	(154,511)	(62,482)	(49,092)
FINANCING ACTIVITIES:			
Proceeds from issuance of convertible senior notes, net of underwriters' discounts and commissions	224,265	—	—
Repurchase of convertible senior notes	(192,422)	—	—
Repurchase and retirement of common stock	(19,659)	—	—
Proceeds from employee stock purchase plan contributions	8,976	4,222	—
Proceeds from the exercise of common stock options	3,577	2,262	1,710
Payments for issuance costs of convertible senior notes	(1,523)	—	—
Proceeds from private placement of common stock	—	200,000	—
Payments on revolving commitment	—	(30,000)	—
Borrowings under revolving commitment	—	—	30,000
Other financing activities	(233)	(537)	(460)
Net cash provided by financing activities	22,981	175,947	31,250
Effect of exchange rate changes on cash, cash equivalents and restricted cash	(5,094)	(2,623)	3,010
Net (decrease) increase in cash, cash equivalents and restricted cash	(97,054)	172,465	18,050
Cash, cash equivalents and restricted cash at beginning of year	414,012	241,547	223,497
Cash, cash equivalents and restricted cash at end of period	\$ 316,958	\$ 414,012	\$ 241,547
Supplemental disclosures of cash flow:			
Interest paid	\$ 2,425	\$ 633	\$ 731
Income taxes paid	\$ 8,941	\$ 9,168	\$ 12,666
Supplemental disclosure of non-cash investing and financing activities:			
Promissory notes issued and deferred payment obligations for acquisitions	\$ 1,350	\$ 86,936	\$ 1,266
Property and equipment in accounts payable and other current liabilities	\$ 659	\$ 1,056	\$ 1,671
Issuance of common stock in connection with acquisitions	\$ 224	\$ 3,690	\$ 3,504
Finance leases	\$ —	\$ 9	\$ 118

See accompanying notes to consolidated financial statements.

ALTAIR ENGINEERING INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. Description of business

Altair Engineering Inc. (“Altair” or the “Company”) is incorporated in the state of Delaware. The Company is a global leader in computational science and artificial intelligence enabling organizations across broad industry segments to drive smarter decisions in an increasingly connected world. Altair delivers software and cloud solutions in the areas of simulation, high-performance computing (“HPC”), data analytics, and artificial intelligence (“AI”). Altair’s products and services leverage computational science to drive innovation and intelligent decisions for a more connected, safe, and sustainable future. The Company is based in Troy, Michigan.

The Company’s simulation and AI-driven approach to innovation is powered by the Company’s broad portfolio of high-fidelity and high-performance physics solvers, our market leading technology for optimization and HPC, and our end-to-end platform for developing AI and Internet of Things (“IoT”) solutions. 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 AI solutions and true-to-life visualization and rendering. The Company’s HPC solutions maximize the efficient utilization of complex compute resources and streamline the workflow management of compute-intensive tasks for applications including AI, modeling and simulation, and visualization. Altair’s data analytics, AI, and IoT products include data preparation, data science, MLOps, orchestration, and visualization solutions that fuel engineering, scientific, and business decisions.

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 quickly perceive trends in the overall market, helping the Company to better tailor its software products’ research and development and sales initiatives. The Company hires engineers and data scientists for placement at a customer site for specific customer-directed assignments.

2. Summary of significant accounting policies

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. Intercompany accounts and transactions have been eliminated in the consolidated financial statements.

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 expected credit losses, 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, and stock-based compensation. Actual results could differ from those estimates.

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 as of 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

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-based 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-based license and a minority is attributable to the PCS. The license component is classified as license 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 maintenance and other services 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 maintenance and other services 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 and is classified as maintenance and other services in the consolidated statement of operations. 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 in a manner consistent with the direct sales described above for both perpetual and term-based licenses. 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 sheets 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 ("T&M") or fixed-price basis. The Company 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 total estimated project costs.

Client engineering services

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.

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 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.

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.

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.

Building and improvements is depreciated over an estimated useful life of five to thirty-nine years. Computer equipment and software is depreciated over an estimated useful life of three to five years. Office furniture and equipment is depreciated over an estimated useful life of five to fifteen years. 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.

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 2022, 2021, or 2020.

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 intangible assets acquired. As described in Note 4 – Acquisitions, 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 2022, 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 2022, 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 2022.

Government assistance

The Company receives incentives from federal, state and local governments in different regions of the world to primarily encourage the Company to establish, maintain, or increase investment or employment in the region. Government incentives are recorded in the consolidated financial statements in accordance with their purpose as a reduction of expense or other income based on the substance of the incentive received. Benefits are generally recorded when the conditions of the grant are met, there is reasonable assurance of receipt and amounts are recorded in earnings as the expenses in which the incentive is meant to offset are incurred. For the year ended December 31, 2022, Other operating income includes \$3.0 million of government related funding.

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, 2022, the Company had approximately \$10.0 million receivables from the French government related to CIR, of which \$3.1 million is recorded in income tax receivable and the remaining \$6.9 million is recorded in other long-term assets. As of December 31, 2021, the Company had approximately \$12.0 million receivables from the French government related to CIR, of which \$3.5 million was recorded in income tax receivable and the remaining \$8.5 million was recorded in other long-term assets. CIR is subject to customary audit by the French tax authorities.

Other Investments

Other investments include non-marketable equity investments in privately held companies, which do not have readily determinable fair values, and in which the Company does not have a controlling interest or significant influence. The Company applies the measurement alternative for non-marketable equity securities, measuring them at cost, less any impairment. These investments are presented within other long-term assets on our consolidated balance sheets and are periodically analyzed to determine whether there are indicators of impairment.

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.

Advertising costs

Advertising costs are expensed as incurred. Advertising expenses were \$5.0 million, \$4.3 million and \$4.0 million for the years ended December 31, 2022, 2021 and 2020, respectively.

Assets held for sale

Assets held for sale are reported at the lower of the carrying amount or fair value less costs to sell. Depreciation expense is not recognized on assets held for sale. On December 19, 2022, the Company signed a letter of intent to sell an office building in Korea. As of December 31, 2022, the building and related assets of \$2.7 million were classified as held for sale and presented in Prepaid expenses and other current assets. The sale of the building was finalized in February 2023.

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 had a put right that could be exercised by the holder five years from date of purchase at \$12.50 per share that required the shares to be recorded at fair value and classified as mezzanine equity in the consolidated balance sheet.

During the year ended December 31, 2020, the third-party holder sold 133,336 shares on the open market and as a result, the issuance value of those shares was reclassified into permanent equity from mezzanine equity. As of December 31, 2022, the put right had lapsed and the issuance date fair value of the remaining 66,664 shares were reclassified into permanent equity from 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, other accrued expenses and current liabilities, and other long-term liabilities on the consolidated balance sheets. The Company did not receive any lease concessions related to COVID-19 that had a material effect on the Company’s consolidated financial statements.

Stock-based compensation

Employee stock-based awards, consisting of stock options, restricted stock units (RSUs) and employee stock purchase plan (ESPP) shares expected to be settled by issuing shares of Class A common stock, are recorded as equity awards. The fair value of stock options and ESPP shares 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 Company expenses the fair value of ESPP shares over the offering 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.

Business combinations

The Company accounts for business acquisitions using the acquisition method of accounting. The fair value of purchase consideration of the acquired businesses is allocated 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, the Company 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.

Recent accounting guidance

Accounting standards adopted

Debt – In August 2020, the Financial Accounting Standards Board (“FASB”) issued Accounting Standards Update (“ASU”) No. 2020-06, *Debt – Debt with Conversion and Other Options (Subtopic 470-20) and Derivatives and Hedging – Contracts in Entity’s Own Equity (Subtopic 815-40)*. This ASU simplifies the accounting for convertible instruments by eliminating certain separation models. Under ASU 2020-06, a convertible debt instrument will generally be reported as a single liability at its amortized cost with no separate accounting for embedded conversion features. The update also requires the if-converted method to be used for convertible instruments and the effect of potential share settlement be included in the diluted earnings per share calculation when an instrument may be settled in cash or shares. The Company adopted ASU 2020-06 effective as of January 1, 2022, using the modified retrospective approach. Adoption of the new standard resulted in a decrease to accumulated deficit of \$23.9 million, a decrease to additional paid-in capital of \$50.0 million, and an increase to convertible senior notes, net of \$26.1 million. Interest expense recognized in the current and future periods will be reduced as a result of accounting for the convertible debt instrument as a single liability measured at its amortized cost.

Government Assistance – In November 2021, the FASB issued ASU 2021-10, *Government Assistance (Topic 832): Disclosures by Business Entities about Government Assistance*. This ASU requires certain disclosures about transactions with a government that are accounted for by applying a grant or contribution accounting model by analogy. The amendment requires disclosure of information about the nature of the transactions and the related accounting policy used to account for the transactions, information regarding the line items within the consolidated financial statements that are affected by the transactions, and significant terms and conditions of the transactions. The Company adopted ASU 2021-10 on a prospective basis effective January 1, 2022. The adoption of this guidance did not have a material effect on the Company's consolidated financial statements.

Accounting standards not yet adopted

Reference Rate Reform – In March 2020, the FASB issued ASU 2020-04, *Reference Rate Reform (Topic 848) - Facilitation of the Effects of Reference Rate Reform on Financial Reporting*. This ASU provides optional expedients and exceptions for applying U.S. GAAP to contract modifications and hedging relationships, subject to meeting certain criteria, that reference LIBOR or another rate that is expected to be discontinued. The amendments in the guidance are optional and effective for all entities as of March 12, 2020 through December 31, 2022. In October 2022, the FASB Board voted to amend the sunset date of ASU 2020-04 to December 31, 2024. 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.

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-based 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-based license and a minority is attributable to the PCS. The license component is classified as license 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 maintenance and other services 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 maintenance and other services 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 and is classified as maintenance and other services in the consolidated statement of operations. 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 in a manner consistent with the direct sales described above for both perpetual and term-based licenses. 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 sheets 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 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. The Company 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 within Other revenue.

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. In instances where standalone selling price was not determined based on the range of historical observable prices for goods and services sold separately, the Company used an adjusted market assessment approach to estimate the standalone selling price. In such cases the Company has considered market conditions and other observable inputs, such as internal price lists, peer data, and industry data for a similar or identical product. 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 assesses 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.

Disaggregation of revenue

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

	Year Ended December 31,		
	2022	2021	2020
Term licenses and other ⁽¹⁾	\$ 320,181	\$ 283,226	\$ 224,472
Perpetual licenses	43,339	41,582	35,493
Maintenance	135,752	122,733	117,159
Professional software services ⁽¹⁾	7,236	6,205	14,587
Software related services	30,661	31,823	26,454
Client engineering services	28,883	39,282	44,320
Other	6,169	7,328	7,436
Total revenue	<u>\$ 572,221</u>	<u>\$ 532,179</u>	<u>\$ 469,921</u>

- (1) Term licenses and other includes hardware revenue of \$7 million and \$9 million for the years ended December 31, 2022 and 2021, respectively, and was reported in License revenue. Professional software services includes hardware revenue of \$10 million for the year ended December 31 2020, and was reported in Maintenance and other services revenue.

The Company derived approximately 13.9%, 12.0% and 11.2% of its total revenue through indirect sales channels for the years ended December 31, 2022, 2021 and 2020, respectively.

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 the 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, 2022 and 2021, respectively, capitalized costs to obtain a contract were \$3.9 million and \$4.5 million recorded in Prepaid and other current assets and \$0.4 million and \$0.4 million recorded in Other long-term assets. Sales commissions were \$8.3 million and \$7.3 million for the years ended December 31, 2022 and 2021, respectively, and were included in sales and marketing expense in the Company's consolidated statements of operations.

Contract assets

As of December 31, 2022 and 2021, respectively, contract assets were \$6.3 million and \$3.8 million included in Accounts receivable and \$2.3 million and \$2.3 million included in Prepaid expenses and other current assets in the Company's consolidated balance sheets.

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.

Approximately \$89.4 million of revenue recognized during 2022 was included in the deferred revenue balances at the beginning of the year.

Revenue allocated to remaining performance obligations represents contracted revenue that has not yet been recognized, which includes deferred revenue and amounts that will be invoiced and recognized as revenue in future periods. Contracted revenue not yet recognized was \$171.1 million and \$146.4 million as of December 31, 2022 and 2021, respectively. Of the amount recorded as of December 31, 2022, the Company expects to recognize approximately 73% over the next 12 months and the remainder thereafter.

4. Acquisitions

2022 Acquisitions

RapidMiner

In September 2022, the Company entered into an Agreement and Plan of Merger (the "Merger Agreement") with RapidMiner, Inc., a Delaware corporation ("RapidMiner"), and a wholly-owned subsidiary of the Company ("Merger Sub"). RapidMiner's low-code platform is used to develop production-scale data pipelines and ML model. It provides drag-and-drop building blocks to transform and augment data. The acquisition of RapidMiner adds to the Company's end-to-end data analytics portfolio.

Pursuant to the Merger Agreement, the Company acquired 100% of the outstanding capital stock of RapidMiner and completed the acquisition of RapidMiner through the merger of the Merger Sub with and into RapidMiner, with RapidMiner surviving as a wholly-owned subsidiary of the Company.

The preliminary aggregate merger consideration was \$98.6 million in cash, subject to customary working capital arrangements. The Company financed the acquisition with cash on hand.

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

Fair value of consideration transferred	\$ 98,594
Recognized amounts of identifiable assets acquired and liabilities assumed:	
Cash	3,530
Accounts receivable	3,548
Other assets	3,088
Deferred tax assets	782
Trade names (7-year life)	802
Developed technology (5-year life)	8,884
Customer relationships (7-year life)	5,711
Accounts payable and other liabilities	(2,844)
Deferred revenue	(1,584)
Total net identifiable assets acquired and liabilities assumed	21,917
Goodwill ⁽¹⁾	\$ 76,677

(1) Goodwill is primarily attributable to market synergies expected to arise after the acquisition and is not deductible for tax purposes. All goodwill is recorded in the Software segment.

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. The Company expects to finalize the valuation as soon as practicable, but not later than one year from the acquisition date.

Concept Engineering

In June 2022, the Company entered into a stock purchase agreement and simultaneously acquired 100% of the outstanding capital stock of Concept Engineering, a leading provider of electronic system visualization software that accelerates the development, manufacture, and service of complex electrical and electronic systems, for preliminary aggregate consideration of \$25.3 million. The Company financed the acquisition with cash on hand. See Note 11 for further information on post-combination stock-based compensation expense related to this acquisition. Concept Engineering's software will be integrated into Altair's Electronic System Design suite and will be available via Altair Units.

The acquisition of Concept Engineering 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 value as of the acquisition date. The following table summarizes the preliminary purchase consideration transferred to acquire Concept Engineering and the amounts of identified assets acquired and liabilities assumed at the acquisition date (in thousands):

Fair value of consideration transferred	\$ 25,325
Recognized amounts of identifiable assets acquired and liabilities assumed:	
Cash	\$ 2,468
Accounts receivable	1,552
Other assets	418
Developed technology (4-year life)	7,620
Customer relationships (7-year life)	3,315
Accounts payable and other liabilities	(393)
Deferred revenue	(624)
Deferred tax liabilities and other tax reserves	(3,919)
Total net identifiable assets acquired and liabilities assumed	10,437
Goodwill ⁽¹⁾	\$ 14,888

(1) Goodwill is primarily attributable to market synergies expected to arise after the acquisition and is not deductible for tax purposes. All goodwill is recorded in the Software segment.

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. The Company expects to finalize the valuation as soon as practicable, but not later than one year from the acquisition date.

Other business acquisitions

During the year ended December 31, 2022, the Company completed three other business acquisitions that were accounted for as business combinations under the acquisition method. The preliminary transaction consideration of \$18.0 million was allocated to assets acquired and liabilities assumed at their estimated fair values. The allocation included \$11.6 million to developed technology, \$2.7 million to customer relationships, \$(0.9) million to net liabilities acquired and \$4.6 million to goodwill, of which approximately \$3.2 million is deductible for tax purposes. All goodwill is recorded in the Software segment. The Company expects to finalize the valuations as soon as practicable, but not later than one year from the acquisition dates. These acquisitions were financed with cash on hand. The operating results of each acquisition have been included in the consolidated financial statements since the respective dates of acquisition. The Company's transaction costs related to its 2022 acquisitions were not material.

2021 Acquisitions

World Programming

In December 2021, the Company acquired all of the outstanding capital stock of two related privately held companies, World Programming Limited and December 2015 Software Limited (together "World Programming"), from the stockholders named therein, for aggregate consideration of \$73.2 million. The consideration consisted of cash in the amount of \$50.0 million, subject to a customary working capital adjustment, and contingent consideration of \$23.2 million, including \$19.7 million of the Company's Class A Common Stock (the "Contingent Stock Consideration") and a measurement period adjustment of \$3.5 million recognized in 2022. The dates on which the Contingent Stock Consideration is issuable and the number of shares issuable on such dates depend primarily on certain aspects of legal proceedings in which World Programming and SAS Institute, Inc. are engaged. For further information on the legal proceedings see Note 16.

The Company is required to mark-to-market the Contingent Stock Consideration liability based on the trading price of the Company's Class A Common Stock. For the year ended December 31, 2022, the Company recognized a gain of \$7.2 million on the mark-to-market adjustment of contingent consideration, which is included in Other operating income, net in the consolidated statement of operations.

In addition, per the stock purchase agreement, \$29.5 million 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 service period of three years.

The acquisition 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 value as of the acquisition date, which was finalized in 2022. The following table summarizes the purchase consideration transferred to acquire World Programming and the amounts of identified assets acquired and liabilities assumed at the acquisition date (in thousands):

Fair value of consideration transferred	\$	73,243
Recognized amounts of identifiable assets acquired and liabilities assumed:		
Cash	\$	1,895
Accounts receivable		5,656
Other assets		5,756
Property and equipment		2,209
Trade names (4-year life)		300
Developed technology (5-year life)		33,000
Customer relationships (7-year life)		7,000
SAS legal liability		(66,596)
Accounts payable and other liabilities		(3,401)
Deferred revenue		(2,737)
Deferred tax liabilities and other tax reserves		(11,406)
Total net identifiable assets acquired and liabilities assumed		(28,324)
Goodwill ⁽¹⁾	\$	101,567

(1) Goodwill is primarily attributable to market synergies expected to arise after the acquisition and is not deductible for tax purposes. All goodwill is recorded in the Software segment.

Other

The allocation of fair value of purchase consideration for the Company's other 2021 acquisition was finalized during 2022. There were no changes to the preliminary fair value of assets acquired and liabilities assumed, as previously reported.

5. Supplementary Information

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,	
	2022	2021
Cash and cash equivalents	\$ 316,146	\$ 413,743
Restricted cash included in other long-term assets	812	269
Total cash, cash equivalents, and restricted cash	<u>\$ 316,958</u>	<u>\$ 414,012</u>

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,	
	2022	2021
Accounts receivable, trade	\$ 163,989	\$ 133,717
Contract assets	6,290	3,844
Accounts receivable, net	<u>\$ 170,279</u>	<u>\$ 137,561</u>

A provision for expected credit losses for groups of billed and unbilled receivables and contract assets that share similar risk characteristics is recorded based on an evaluation of historical loss experience, current conditions, and reasonable and supportable forecasts. Accounts are written off when it becomes apparent that such amounts will not be collected, generally when amounts are past due by greater than one year. Generally, the Company does not require collateral or charge interest on accounts receivable. Accounts receivable were reported net of a provision for credit loss of \$2.6 million and \$2.5 million at December 31, 2022 and 2021, respectively. Activity in the provision for credit loss was as follows (in thousands):

	For the Year Ended December 31,		
	2022	2021	2020
Balance, beginning of year	\$ (2,539)	\$ (2,559)	\$ (1,415)
Adoption of ASC 326 on beginning allowance	—	—	(388)
Provision charged to expense	(203)	(514)	(1,259)
Write-off, net of recoveries	498	500	563
Effects of foreign currency translation	(346)	34	(60)
Balance, end of year	<u>\$ (2,590)</u>	<u>\$ (2,539)</u>	<u>\$ (2,559)</u>

Property and equipment, net

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

	Estimated useful lives	December 31,	
		2022	2021
Land	Indefinite	\$ 7,994	\$ 9,888
Building and improvements	5-39 years	16,995	18,358
Computer equipment and software	3-5 years	45,340	45,027
Office furniture and equipment	5-15 years	13,335	12,947
Leasehold improvements	(1)	8,766	9,829
Right of use assets under finance leases	(1)	2,122	2,532
Total property and equipment		94,552	98,581
Less: accumulated depreciation and amortization		57,035	58,103
Property and equipment, net		\$ 37,517	\$ 40,478

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

Depreciation expense, including amortization of right of use assets under finance leases, was \$8.0 million, \$7.3 million and \$7.4 million for the years ended December 31, 2022, 2021 and 2020, respectively.

Other liabilities

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

	December 31,	
	2022	2021
Obligations related to acquisition of businesses	\$ 13,136	\$ 87,636
Income taxes payable	11,524	5,887
Accrued VAT	8,402	6,047
Employee stock purchase plan obligations	3,969	4,222
Accrued professional fees	3,637	3,516
Accrued royalties	2,593	2,537
Non-income tax liabilities	2,465	1,653
Billings in excess of cost	1,874	1,459
Defined contribution plan liabilities	1,393	1,513
Other current liabilities	7,378	7,756
Total	\$ 56,371	\$ 122,226

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

	December 31,	
	2022	2021
Deferred tax liabilities	\$ 16,775	\$ 15,389
Pension and other post retirement liabilities	12,273	15,086
Other liabilities	12,168	12,419
Total	\$ 41,216	\$ 42,894

Private placement financing

In September 2021, the Company issued 2,935,564 shares of its Class A common stock in a private placement to Matrix Capital Management Company LP, for aggregate proceeds of \$200.0 million. The Company filed a registration statement with the U.S. Securities and Exchange Commission (the “SEC”) registering the resale of the shares of common stock issued in the private placement declared or deemed effective by the SEC in August 2022.

Restructuring expense

In 2021, the Company initiated a restructuring plan to realign resources with the Company’s current business outlook and cost structure. The restructuring plan resulted in charges for employee termination benefits of \$5.1 million for the year ended December

31, 2021. There were no restructuring costs for the year ended December 31, 2022. The restructuring costs were attributable primarily to the Software reportable segment. The restructuring plan was completed, and all amounts were paid in 2021.

Other expense (income), net

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

	Year ended December 31,		
	2022	2021	2020
Expense on repurchase of convertible senior notes	\$ 16,621	\$ —	\$ —
Foreign exchange loss (gain)	4,405	1,103	(787)
Other income, net	(4,127)	(541)	(1,130)
Other expense (income), net	<u>\$ 16,899</u>	<u>\$ 562</u>	<u>\$ (1,917)</u>

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 as of December 31, 2020	\$ 264,481
Acquisitions	108,772
Effects of foreign currency translation and other	(3,075)
Balance as of December 31, 2021	370,178
Acquisitions	96,092
Effects of foreign currency translation and other	(17,222)
Balance as of December 31, 2022	<u>\$ 449,048</u>

Other intangible assets

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

	December 31, 2022			
	Weighted average amortization period	Gross carrying amount	Accumulated amortization	Net carrying amount
<i>Definite-lived intangible assets:</i>				
Developed technology	4-6 years	\$ 135,703	\$ 67,665	\$ 68,038
Customer relationships	7-10 years	57,143	29,148	27,995
Other intangibles	4-10 years	1,448	298	1,150
Total definite-lived intangible assets		<u>194,294</u>	<u>97,111</u>	<u>97,183</u>
<i>Indefinite-lived intangible assets:</i>				
Trade names		10,426		10,426
Total other intangible assets		<u>\$ 204,720</u>	<u>\$ 97,111</u>	<u>\$ 107,609</u>

	December 31, 2021			
	Weighted average amortization period	Gross carrying amount	Accumulated amortization	Net carrying amount
<i>Definite-lived intangible assets:</i>				
Developed technology	4-6 years	\$ 110,891	\$ 49,672	\$ 61,219
Customer relationships	7-10 years	48,277	21,859	26,418
Other intangibles	4-10 years	647	127	520
Total definite-lived intangible assets		159,815	71,658	88,157
<i>Indefinite-lived intangible assets:</i>				
Trade names		10,900		10,900
Total other intangible assets		\$ 170,715	\$ 71,658	\$ 99,057

Amortization expense related to amortizing intangible assets was \$27.5 million, \$18.4 million and \$16.4 million for the years ended December 31, 2022, 2021 and 2020, respectively.

Estimated amortization expense for the next five years as of December 31, 2022, is as follows (in thousands):

Year ending	
December 31, 2023	\$ 30,099
December 31, 2024	27,244
December 31, 2025	20,627
December 31, 2026	14,574
December 31, 2027	3,565
Thereafter	1,074
Total	\$ 97,183

7. Debt

Convertible senior notes

2027 Notes

In June 2022, the Company issued \$230.0 million aggregate principal amount of 1.750% convertible senior notes due in 2027 (the "2027 Notes"), which includes the initial purchaser's exercise in full of its option to purchase an additional \$30.0 million principal amount of the 2027 Notes, in a private offering. The net proceeds from the issuance of the 2027 Notes was \$224.3 million after deducting discounts, commissions and estimated issuance costs.

The Company entered into an Indenture relating to the issuance of the 2027 Notes dated June 14, 2022 (the "Indenture"), by and between the Company and U.S. Bank Trust Company, National Association, as trustee. The Indenture includes customary covenants and sets forth certain events of default after which the 2027 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 2027 Notes become automatically due and payable. The 2027 Notes are senior unsecured obligations of the Company.

The 2027 Notes mature on June 15, 2027, unless earlier repurchased, redeemed or converted. The Company may redeem for cash all or, subject to certain limitations, any portion of the 2027 Notes, at its option, on or after June 20, 2025 if the last reported sale price of Altair's Class A Common Stock has been at least 130% of the conversion price then in effect for at least 20 trading days (whether or not consecutive) during any 30 consecutive trading day period, at a redemption price equal to 100% of the principal amount of the notes to be redeemed, plus accrued and unpaid interest to, but excluding, the redemption date. The 2027 Notes bear interest at a rate of 1.750% per year, payable semiannually in arrears on June 15 and December 15 of each year, which commenced on December 15, 2022.

The 2027 Notes have an initial conversion rate of 13.9505 shares of the Company's Class A common stock per \$1,000 principal amount of 2027 Notes, which is equivalent to an initial conversion price of approximately \$71.68 per share of 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 2027 Notes in connection with such make whole fundamental change or during the relevant redemption period.

Holders of the 2027 Notes may convert all or any portion of their 2027 Notes at any time prior to the close of business on the business day immediately preceding December 15, 2026, in integral multiples of \$1,000 principal amount, only under the following circumstances:

- during any 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 the 2027 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 the 2027 Notes for redemption (which the Company may not do prior to June 20, 2025), at any time prior to the close of business on the scheduled trading day immediately preceding the redemption date but only with respect to the 2027 Notes called (or deemed called) for redemption; or
- upon the occurrence of specified corporate events.

On or after December 15, 2026 until the close of business on the business day immediately preceding the maturity date, holders may convert their 2027 Notes at any time, regardless of the foregoing circumstances. Upon conversion, the Company will pay or deliver, 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 period ended December 31 2022, the conditions allowing holders of the 2027 Notes to convert were not met. Therefore, the 2027 Notes were classified as long-term debt on the consolidated balance sheet as of December 31, 2022.

As of December 31, 2022, the “if converted value” did not exceed the principal amount of the 2027 Notes since the closing sales price of the Company’s common stock was less than the conversion price of the 2027 Notes.

2024 Notes

In June 2019, the Company issued \$230.0 million aggregate principal amount of 0.25% convertible senior notes due in 2024 (the “2024 Notes” together with the 2027 Notes “Convertible Notes”), which includes the underwriters’ exercise in full of their option to purchase an additional \$30.0 million principal amount of the 2024 Notes, in a public offering. The net proceeds from the issuance of the 2024 Notes were \$221.9 million after deducting the underwriting discounts and commissions and issuance costs. The 2024 Notes have an initial conversion rate of 21.5049 shares of the Company’s Class A common stock per \$1,000 principal amount of 2024 Notes, which is equivalent to an initial conversion price of approximately \$46.50 per share of its Class A common stock. The interest rate is fixed at 0.25% per year, payable semi-annually in arrears on June 1 and December 1 of each year, which commenced on December 1, 2019. The 2024 Notes mature on June 1, 2024, unless, earlier repurchased or redeemed by the Company or converted pursuant to their terms.

Holders of the 2024 Notes may convert all or any portion of their 2024 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, 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 the 2024 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 the 2024 Notes for redemption, 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 2024 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.

Prior to January 1, 2022, the Company separated the 2024 Notes into liability and equity components. On issuance, the carrying amount of the equity component was recorded as a debt discount and subsequently amortized to interest expense. Effective January 1, 2022, the Company adopted ASU 2020-06 using the modified retrospective approach. As a result, the 2024 Notes are accounted for as a single liability measured at amortized cost, as no other embedded features require bifurcation and recognition as derivatives. Adoption of the new standard resulted in a decrease to Accumulated deficit of \$23.9 million, a decrease to Additional paid-in capital of \$50.0 million, and an increase to Convertible senior notes, net of \$26.1 million.

During the year ended December 31, 2022, using proceeds from the issuance of the 2027 Notes, the Company entered into separate privately negotiated transactions with certain holders of the 2024 Notes to repurchase and retire \$148.2 million aggregate principal amount of the 2024 Notes for an aggregate amount of \$192.4 million of cash including accrued and unpaid interest. The Company recognized expense of \$16.6 million, representing the fair value of the consideration paid to certain holders of the 2024 Notes in excess of the value to which they were entitled to receive on the respective settlement dates. The amount is included in Other expense, net in the Company's consolidated statement of operations.

As of December 31, 2022, \$81.8 million principal amount of the 2024 Notes remained outstanding. The Company may settle the 2024 Notes in 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.

During the period ended December 31, 2022, the conditions allowing holders of the 2024 Notes to convert were not met. Therefore, the 2024 Notes were classified as long-term debt on the consolidated balance sheet as of December 31, 2022. During the period ended December 31, 2021, the conditions allowing the holders of the 2024 Notes to convert were met. Therefore, the 2024 Notes were classified as current on the consolidated balance sheet as of December 31, 2021.

As of December 31, 2022, the "if converted value" did not exceed the principal amount of the 2024 Notes since the closing sales price of the Company's common stock was less than the conversion price of the 2024 Notes.

The net carrying value of the liability component of the 2027 and 2024 Notes was as follows (in thousands):

	December 31, 2022		December 31, 2021	
	2027 Notes	2024 Notes	2027 Notes	2024 Notes
Principal	\$ 230,000	\$ 81,754	—	\$ 230,000
Less: unamortized debt discount	—	—	—	27,022
Less: unamortized debt issuance costs	5,247	903	—	3,273
Net carrying amount	<u>\$ 224,753</u>	<u>\$ 80,851</u>	<u>\$ —</u>	<u>\$ 199,705</u>

The interest expense related to the 2027 and 2024 Notes was as follows (in thousands):

	Year Ended December 31,		
	2022	2021	2020
Contractual interest expense	\$ 2,452	\$ 575	\$ 575
Amortization of debt issuance cost and discount	1,745	11,405	10,806
Total	<u>\$ 4,197</u>	<u>\$ 11,980</u>	<u>\$ 11,381</u>

Credit agreement

Revolving credit facility

On November 7, 2022, the Company exercised the \$50.0 million accordion feature of its credit facility in accordance with the terms and conditions set forth in its credit agreement. In June 2022, the Company amended its credit agreement to, among other things, permit the issuance of the 2027 Notes and extend the maturity date of the credit facility to December 31, 2025.

As of December 31, 2022, the Company has a \$200.0 million credit agreement with a maturity date of December 31, 2025 (“2019 Amended Credit Agreement”) and there were no outstanding borrowings. 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% and (3) the Adjusted Term SOFR Rate (as defined in the 2019 Amended Credit Agreement) for one-month interest period as published two U.S. Government Securities Business Days prior to such day (or if such day is not a business day, the immediately preceding business day) plus 1.00%) or the Adjusted Term SOFR Rate. The applicable margin for borrowings under the 2019 Amended Credit Agreement is based on the Company’s most recently tested senior secured leverage ratio and will vary from (a) in the case of Term Benchmark 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.

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 a Senior Secured Leverage Ratio not greater than 3.00 to 1.00 as of the last day of each fiscal quarter. The Senior Secured Leverage Ratio is defined as 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. As of December 31, 2022, the Company was in compliance with its 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. As of December 31, 2022 and 2021, the Company had \$3.1 million and \$3.3 million, respectively, 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, other accrued expenses and current liabilities, and other long-term liabilities on the consolidated balance sheets.

Right of use (“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 does not 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 does not allocate the contract consideration, and accounts 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 15 years, some of which include one or more options to renew and some of which include options to terminate the leases within the next three years.

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

	Year Ended December 31,		
	2022	2021	2020
Operating lease cost	\$ 13,403	\$ 13,754	\$ 13,412
Finance lease cost:			
Amortization of ROU assets	\$ 266	\$ 440	\$ 634
Interest on lease liabilities	6	18	32
Total finance lease cost	\$ 272	\$ 458	\$ 666

Operating lease cost includes short-term leases and variable lease costs, which are immaterial. Rent cost related to operating leases for office facilities was \$11.7 million, \$12.2 million and \$12.1 million for the years ended December 31, 2022, 2021 and 2020, respectively.

Supplemental balance sheet information related to lease liabilities was as follows:

(in thousands, except lease term and discount rate)	December 31,	
	2022	2021
Operating leases:		
Operating lease ROU assets	\$ 33,601	\$ 28,494
Current portion of operating lease liabilities	\$ 10,396	\$ 9,933
Operating lease liabilities, net of current portion	24,065	19,550
Total operating lease liabilities	<u>\$ 34,461</u>	<u>\$ 29,483</u>
Weighted average remaining lease term	3.4	3.8
Weighted average discount rate	3.8%	4.3%
Finance leases:		
Property and equipment	\$ 2,122	\$ 2,532
Accumulated depreciation	(2,054)	(2,151)
Property and equipment, net	<u>\$ 68</u>	<u>\$ 381</u>
Other accrued expenses and current liabilities	\$ 77	\$ 195
Other long-term liabilities	15	146
Total finance lease liabilities	<u>\$ 92</u>	<u>\$ 341</u>
Weighted average remaining lease term	1.0	1.5
Weighted average discount rate	2.7%	2.9%

Supplemental cash flow information related to leases was as follows (in thousands):

	Year Ended December 31,		
	2022	2021	2020
Cash paid for amounts included in the measurement of lease liabilities:			
Operating cash flows from operating leases	\$ (12,949)	\$ (12,058)	\$ (11,875)
Operating cash flows from finance leases	\$ (6)	\$ (18)	\$ (32)
Financing cash flows from finance leases	\$ (242)	\$ (407)	\$ (456)
ROU assets obtained in exchange for lease obligations:			
Operating leases	\$ 12,455	\$ 6,577	\$ 11,713
Finance leases	—	\$ 9	\$ 118

Maturities of operating lease liabilities as of December 31, 2022, were as follows (in thousands):

Year ending December 31,	
2023	\$ 12,177
2024	8,832
2025	5,996
2026	4,696
2027	2,739
Thereafter	6,617
Total lease payments	41,057
Less: imputed interest	6,596
Total operating lease liabilities	<u>\$ 34,461</u>

9. 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 line of credit is at a variable rate, and as such the debt obligation outstanding approximates fair value.

The carrying value of the Company's Convertible Notes are at face value less unamortized debt 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. As of December 31, 2022, the estimated fair value of the 2027 Notes and 2024 Notes was \$210.4 million and \$91.2 million, respectively, and is presented for required disclosure purposes only. For further information on the Convertible Notes see Note 7.

10. Stockholders' equity

Preferred stock

As of December 31, 2022, 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, 2022, 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 2022, 2021, or 2020.

Stock repurchase program

In February 2022, the Company's Board of Directors approved a stock repurchase program. Under the program, the Company is authorized to repurchase up to \$50.0 million of the Company's outstanding Class A Common Stock. As permitted by securities laws and other legal requirements and subject to market conditions and other factors, purchases under the program may be made from time to time in the open market at prevailing prices, or through privately negotiated transactions. The Company is not obligated to repurchase any dollar amount or number of shares, and the stock repurchase program may be suspended or terminated at any time. All shares repurchased under the stock repurchase program are retired. The Company intends to use the share repurchase plan to opportunistically return capital to shareholders while still focusing on its primary goal of investing in the business to drive growth.

During the year ended December 31, 2022, under the Company's stock repurchase program, the Company repurchased 460,950 shares at an average price of \$46.99 per share for a total cost of \$21.7 million. As of December 31, 2022, \$28.3 million of shares of Class A Common Stock remained available for repurchase under the program.

11. 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 1,158,260 stock options with an exercise price of \$.000025 remain outstanding as of December 31, 2022. 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 as of January 1, 2022	1,356,475	\$ 0.000025	15.0	
Exercised	(198,215)	\$ 0.000025		
Forfeited	—	\$ —		
Outstanding and exercisable as of December 31, 2022	<u>1,158,260</u>	\$ 0.000025	14.0	\$ 52.7

The total intrinsic value of the NSO Plan stock options exercised during the years ended December 31, 2022, 2021 and 2020, was \$11.0 million, \$78.7 million and \$43.1 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 authorized to issue nonqualified stock options and incentive stock options totaling 11,153,872 shares of Class A common stock. This plan was completed in 2020 and no options remained outstanding. The total intrinsic value of the ISO Plan stock options exercised during the year ended December 31, 2020 was \$3.8 million.

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.

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 as of January 1, 2022	543,889	\$ 4.15	4.0	
Granted	—	\$ —		
Exercised	(168,515)	\$ 3.74		
Forfeited	(800)	\$ 2.48		
Outstanding and exercisable as of December 31, 2022	<u>374,574</u>	\$ 4.34	3.4	\$ 15.4

The total intrinsic value of the 2012 Plan stock options exercised during the years ended December 31, 2022, 2021 and 2020, was \$8.5 million, \$17.5 million and \$13.9 million, respectively.

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 and 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 16,999,318 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 as of January 1, 2022	1,281,411
Granted	476,476
Vested	(477,604)
Forfeited	(49,509)
Outstanding as of December 31, 2022	<u>1,230,774</u>

The weighted average grant date fair value of the RSUs was \$56.65 and the RSUs generally vest in four equal annual installments. The fair value of RSUs that vested during the year ended December 31, 2022, was \$27.2 million. Total compensation cost related to nonvested awards not yet recognized as of December 31, 2022, was \$56.0 million and is expected to be recognized over a weighted average period of 2.2 years.

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 as of January 1, 2022	4,875,562	\$ 51.02	8.8	
Granted	2,855,812	\$ 49.12		
Exercised	(73,128)	\$ 40.03		
Forfeited	(166,755)	\$ 54.69		
Outstanding as of December 31, 2022	<u>7,491,491</u>	\$ 50.39	8.5	\$ 11.5
Exercisable as of December 31, 2022	<u>2,162,645</u>	\$ 48.88	7.5	\$ 5.8

The total intrinsic value of the 2017 Plan stock options exercised during the years ended December 31, 2022, 2021 and 2020, was \$1.1 million, \$0.7 million and \$0.0 million, respectively.

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, 2022, 2021 and 2020, were estimated using the following assumptions:

	2022 grants	2021 grants	2020 grants
Weighted average grant date fair value per share	\$44.63 - 64.79	\$61.93 - 80.06	\$29.22 - 57.72
Expected volatility	35%	35%	34 - 35%
Expected term (in years)	6.25	6.25	6.25
Risk-free interest rate	1.7% - 4.2%	1.1% - 1.2%	0.46 - 0.6%
Expected dividend yield	0%	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.

2021 Employee Stock Purchase Plan

The Company has an Employee Stock Purchase Plan ("ESPP") which allows eligible employees to purchase shares of common stock through payroll deductions. As of December 31, 2022, the Company had 3,014,960 shares of its common stock available for future issuances under the ESPP.

The purchase price for each share of common stock purchased under the ESPP will be 85% of the lower of (a) the fair market value per share on the first day of the applicable offering period or (b) the fair market value per share on the applicable purchase date.

Each offering period will last a number of months determined by the plan administrator, up to a maximum of 27 months. The initial offering period began on July 15, 2021, and ended on January 14, 2022, and new offering periods are expected to begin on each January 15 and July 15 thereafter, unless modified by the plan administrator. The ESPP allows participants to purchase the Company's common stock through payroll deductions, up to a maximum of 15% of their eligible compensation or \$25,000, whichever is lower, and subject to limitations under Section 423 of the Internal Revenue Code. The plan administrator has limited participant contributions to \$1,000 per month to prevent prejudicial advantages to higher compensated employees. Participants may withdraw from the ESPP and receive a refund of their accumulated payroll contributions at any time prior to a purchase date.

The Company issued 185,040 shares of common stock under the ESPP during the year ended December 31, 2022. As of December 31, 2022 and 2021, \$4.0 million and \$4.2 million, respectively, has been withheld on behalf of employees for future purchases under the ESPP due to the timing of payroll deductions and was reported in current liabilities. There were no issuances of common stock under the ESPP for the year ended December 31, 2021. The Company recognized \$2.6 million and \$1.2 million of stock-based compensation expense related to the ESPP for the years ended December 31, 2022 and 2021, respectively.

Other

In connection with the acquisition of Polliwog in October 2019, per the Polliwog stock purchase agreement, 256,594 shares of the Company's Class A Common Stock were issued to existing employees, subject to continuing employment. The shares were issued on the one-, two- and three-year anniversaries of the closing. The accounting treatment for these shares in the context of the business combination was to recognize the expense as a post-combination expense, not as transaction consideration.

The post combination expense to the Company as a result of the Polliwog business combination was approximately \$8.7 million which was recognized on a straight-line basis over the employment period that was stipulated in the Polliwog stock purchase agreement. As of December 31, 2022, the service period was met, and all shares have been issued. Stock-based compensation expense includes \$2.2 million, \$2.9 million and \$2.9 million expense related to these shares for the years ended December 31, 2022, 2021 and 2020, respectively.

In connection with the acquisition of World Programming in December 2021, per the World Programming stock purchase agreement, \$29.5 million of the Company's Class A Common Stock will be issued to existing employees, subject to continuing employment and certain other contingencies. The dates on which the shares will be issuable and the number of shares issuable depend on continuing employment and certain aspects of legal proceedings in which World Programming and SAS Institute, Inc. are engaged. 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 World Programming business combination was approximately \$29.5 million which is recognized on an accelerated method over the employment period. As of December 31, 2022, the weighted average remaining service period is 2.0 years. Once the vesting conditions of the service period are met, the Company will issue shares for each award. Stock-based compensation expense includes \$17.6 million and \$0.7 million for the years ended December 31, 2022 and 2021.

In connection with the acquisition of Powersim Inc. in March 2022, per the Powersim stock purchase agreement, 68,792 shares of the Company's Class A Common Stock will be issued to existing employees, subject to continuing employment and certain other contingencies. The shares will be issued in installments of 34,396 shares on the one- and two-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 post combination expense was approximately \$4.3 million is recognized on an accelerated method over the employment period. As of December 31, 2022, the weighted average remaining service period is 1.2 years. Stock-based compensation expense includes \$2.7 million for the year ended December 31, 2022.

In connection with the acquisition of Concept Engineering in June 2022, per the Concept Engineering stock purchase agreement, 105,082 shares of the Company's Class A Common Stock will be issued to existing employees, subject to continuing employment and certain other contingencies. The shares will be issued in installments of 52,541 shares on the one- and two-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 post combination expense was approximately \$6.0 million and is recognized on an accelerated method over the employment period. As of December 31, 2022, the weighted average remaining service period is 1.4 years. Stock-based compensation expense includes \$2.7 million for the year ended December 31, 2022.

Stock-based compensation expense

The stock-based compensation expense was recorded as follows (in thousands):

	Year ended December 31,		
	2022	2021	2020
Cost of revenue-software	\$ 8,351	\$ 5,619	\$ 2,473
Research and development	36,250	16,561	8,372
Sales and marketing	30,370	15,044	6,423
General and administrative	9,816	7,325	4,087
Total stock-based compensation expense	<u>\$ 84,787</u>	<u>\$ 44,549</u>	<u>\$ 21,355</u>

12. Income taxes

The components of income (loss) before income taxes are as follows (in thousands):

	Year ended December 31,		
	2022	2021	2020
U.S.	\$ (62,702)	\$ (27,850)	\$ (22,127)
Non-U.S.	34,489	27,562	24,159
	<u>\$ (28,213)</u>	<u>\$ (288)</u>	<u>\$ 2,032</u>

The significant components of the income tax expense are as follows (in thousands):

	Year ended December 31,		
	2022	2021	2020
Current			
U.S. Federal	\$ —	\$ —	\$ —
Non-U.S.	18,759	9,781	23,197
U.S. State and Local	621	227	(315)
Total current	<u>19,380</u>	<u>10,008</u>	<u>22,882</u>
Deferred			
U.S. Federal	23	26	(881)
Non-U.S.	(4,206)	(1,550)	(9,849)
U.S. State and Local	19	22	380
Total deferred	<u>(4,164)</u>	<u>(1,502)</u>	<u>(10,350)</u>
Income tax expense	<u>\$ 15,216</u>	<u>\$ 8,506</u>	<u>\$ 12,532</u>

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,		
	2022	2021	2020
U.S. federal statutory rate	21%	21%	21%
Income taxes at U.S. federal statutory rate	\$ (5,925)	\$ (60)	\$ 427
Foreign income taxes at rates other than the federal statutory rate	2,249	2,950	1,161
U.S. state and local income taxes, net of U.S. federal tax benefit	(5,976)	(4,826)	(4,892)
U.S. effect of changes in tax laws	—	—	4,946
U.S. effect of foreign operations	15,827	1,827	1,205
Change in valuation allowance	7,830	20,212	5,215
Foreign withholding taxes	6,738	(4,545)	5,236
U.S. foreign tax credit and deduction	(12,315)	(288)	(1,308)
Research and development tax credit	(326)	(784)	2,576
Stock-based compensation	8,649	(12,791)	(5,034)
Other	1,250	753	825
Uncertain tax positions	472	6,058	2,175
FDII deduction	(5,245)	—	—
Mark-to-market adjustment of contingent consideration	(1,502)	—	—
Repurchase of convertible senior notes	3,490	—	—
Income tax expense	<u>\$ 15,216</u>	<u>\$ 8,506</u>	<u>\$ 12,532</u>

The Tax Cuts and Jobs Act, or 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 years ended December 31, 2022 and 2021 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. On July 23, 2020, the Department of Treasury published final regulations under the GILTI and Subpart F provisions of the Code regarding the treatment of income that is subject to a high rate of foreign tax (“high-tax exclusion”). These regulations, among other things, permit U.S. shareholders of foreign corporations to make an annual election for a controlled foreign corporation to exclude from subpart F income any item of income received by the controlled foreign corporation if that income is subject to an effective tax rate greater than 90% of the maximum U.S. corporate income tax rate of 21%. The Company has evaluated the impact of these regulations and made an election to avail the high-tax exclusion for tax years 2020 and 2021. For the 2022 tax year, the Company does not intend to make a high-tax exclusion election and has recorded the impact in its 2022 year-end tax provision.

For tax years beginning on or after January 1, 2022, the Tax Act eliminates the option to currently deduct research and development expenses and requires taxpayers to capitalize and amortize them over five years for research activities performed in the United States and 15 years for research activities performed outside the United States pursuant to Section 174 of the Code. For the 2022 tax year, the Company has capitalized \$178.7 million of research and development expenses. This has resulted in an increase in the DTA associated with capitalized research and development by \$39.5 million.

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,	
	2022	2021
Deferred tax assets:		
Deferred revenue	\$ 18,571	\$ 12,217
Net operating loss carryforwards	64,091	87,144
Tax credit carryforwards	24,319	26,035
Stock-based compensation	8,312	5,011
Capitalized research and development	43,860	4,408
Lease obligation	8,810	8,518
Employee benefits	5,941	6,460
Other	5,931	3,866
Total gross deferred tax assets	179,835	153,659
Less: valuation allowances	(149,441)	(119,981)
Net deferred tax assets ⁽¹⁾	30,394	33,678
Deferred tax liabilities:		
Property and equipment and intangibles	24,155	21,834
Deferred tax on investment in subsidiary	1,500	1,500
Lease right of use asset	8,578	8,283
Convertible debt, net of issuance costs	-	6,331
Other	3,209	2,624
Total deferred tax liabilities	37,442	40,572
Total net deferred tax (liabilities) assets	\$ (7,048)	\$ (6,894)

(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.

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 (in thousands):

	Year ended December 31,		
	2022	2021	2020
Beginning balance	\$ 119,981	\$ 96,831	\$ 84,356
Additions charged to expense	7,830	20,212	5,215
Other	21,630	2,938	7,260
Ending balance	<u>\$ 149,441</u>	<u>\$ 119,981</u>	<u>\$ 96,831</u>

The change in valuation allowance in Other for 2022 of \$21.6 million is primarily related to a \$6.8 million increase from the adoption of ASU 2020-06 for convertible debt instruments, and a \$13.1 million valuation allowance recorded on deferred tax assets established during purchase accounting from the RapidMiner acquisition. The change in valuation allowance in Other for 2021 of \$2.9 million is primarily related to a valuation allowance recorded on deferred tax assets established during purchase accounting from the World Programming acquisition. The change in valuation allowance in Other for 2020 of \$7.3 million is related to a valuation allowance recorded on deferred tax assets established during purchase accounting from the Univa acquisition.

The following table summarizes the amount and expiration dates of operating loss and tax credit carryforwards as of December 31, 2022 (in thousands):

	Expiration dates	Amounts
U.S. general business credits and loss carryforwards	2023-Indefinite	\$ 65,755
Foreign general business credits and loss carryforwards	2023-Indefinite	19,428
U.S. foreign tax credits	2027	3,227
Total operating loss and tax credit carryforwards		<u>\$ 88,410</u>

A reconciliation of the beginning and ending amounts of unrecognized tax benefits is as follows (in thousands):

	Year ended December 31,		
	2022	2021	2020
Unrecognized tax benefits—January 1	\$ 16,376	\$ 8,310	\$ 12,114
Additions for tax positions of current period	50	1,042	209
Additions for tax positions of prior periods	13,910	8,983	1,849
Reductions for tax positions of prior periods	(1,334)	(1,934)	(5,862)
Reductions due to statute of limitations	(25)	(25)	—
Unrecognized tax benefits—December 31	<u>\$ 28,977</u>	<u>\$ 16,376</u>	<u>\$ 8,310</u>

As of December 31, 2022, the Company had \$10.3 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 \$0.2 million which if recognized would not impact the effective tax rate during 2023.

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 2010 through 2022. All other significant jurisdictions have open tax years from 2016 through 2022.

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, 2022, 2021, and 2020, accrued interest and penalties related to unrecognized tax benefits were approximately \$1.0 million, \$1.0 million, and \$0.5 million, respectively.

13. Net loss per share

The Company adopted ASU 2020-06 on January 1, 2022, using the modified retrospective method, applicable to its convertible senior notes outstanding as of adoption. The Company has not changed any previously disclosed amounts or provided additional disclosures for comparative periods. ASU 2020-06 requires the if-converted method to be applied for all convertible instruments when calculating diluted earnings per share. Under the if-converted method, shares related to convertible senior notes, to the extent dilutive, are assumed to be converted into common stock at the beginning of the period.

Basic net (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 dilutive securities, stock options, RSUs and ESPP shares. Diluted net (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. The treasury stock method is used to calculate the effect of dilutive securities, stock options, RSUs and ESPP shares and the if-converted method is used to calculate the effect of convertible instruments. The following table sets forth the computation of the numerators and denominators used in the basic and diluted net loss per share amounts (in thousands, except per share data):

	Year ended December 31,		
	2022	2021	2020
Numerator:			
Net loss	\$ (43,429)	\$ (8,794)	\$ (10,500)
Denominator:			
Denominator for basic and diluted loss per share — weighted average shares	79,472	76,179	73,241
Net loss per share attributable to common stockholders, basic and diluted	<u>\$ (0.55)</u>	<u>\$ (0.12)</u>	<u>\$ (0.14)</u>

Anti-dilutive shares excluded from the computation of diluted net loss per share were as follows (in thousands):

	Year ended December 31,		
	2022	2021	2020
Stock options and ESPP	961	3,425	3,123
Convertible shares	4,958	1,555	—
Total shares excluded from calculation	<u>5,919</u>	<u>4,980</u>	<u>3,123</u>

Since the Company was in a net loss position for the years ended December 31, 2022, 2021 and 2020, basic net loss per share attributable to common stockholders is the same as diluted net loss per share for those periods as the inclusion of all potential common shares outstanding would have been anti-dilutive.

14. 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 for each of the years ended December 31, 2022, 2021 and 2020.

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 \$2.5 million, \$3.0 million and \$2.7 million in 2022, 2021 and 2020, respectively. The amount of benefits paid under these plans was \$0.7 million, \$0.4 million and \$0.5 million in 2022, 2021 and 2020, respectively. The accumulated benefit obligation, unlike the projected benefit obligation, does not reflect expected benefit increases from future salary levels, and was \$10.1 million and \$10.0 million as of December 31, 2022 and 2021, respectively, under these plans. The projected benefit obligation, net of plan assets, was \$13.1 million and \$15.7 million as of December 31, 2022 and 2021, respectively.

A summary of the components of the pension benefits obligation recorded in the consolidated balance sheets are as follows (in thousands):

	December 31,	
	2022	2021
Other long-term assets	\$ 127	\$ —
Accrued compensation and benefits	957	650
Other long-term liabilities	12,273	15,086
	<u>\$ 13,103</u>	<u>\$ 15,736</u>

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, 2023	\$ 1,018
December 31, 2024	\$ 731
December 31, 2025	\$ 792
December 31, 2026	\$ 1,274
December 31, 2027	\$ 1,219
Next five years	\$ 5,627

15. 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 as of December 31, 2019	\$ (6,928)	\$ (2,600)	\$ (9,528)
Other comprehensive income (loss) before reclassification	7,782	(501)	7,281
Amounts reclassified from accumulated other comprehensive loss	—	(858)	(858)
Tax effects	—	308	308
Other comprehensive income (loss)	7,782	(1,051)	6,731
Balance as of December 31, 2020	854	(3,651)	(2,797)
Other comprehensive income (loss) before reclassification	(7,254)	198	(7,056)
Amounts reclassified from accumulated other comprehensive loss	—	1,199	1,199
Tax effects	—	(296)	(296)
Other comprehensive income (loss)	(7,254)	1,101	(6,153)
Balance as of December 31, 2021	(6,400)	(2,550)	(8,950)
Other comprehensive income (loss) before reclassification	(24,084)	87	(23,997)
Amounts reclassified from accumulated other comprehensive loss	—	3,253	3,253
Tax effects	—	(308)	(308)
Other comprehensive income (loss)	(24,084)	3,032	(21,052)
Balance as of December 31, 2022	\$ (30,484)	\$ 482	\$ (30,002)

16. Commitments and contingencies

World Programming

The Company acquired World Programming Limited and a related company (collectively, “World Programming”) in December 2021. In 2010, SAS Institute, Inc. (“SAS”) filed an action against World Programming in the United States District Court for the Eastern District of North Carolina (the “NC Court”) alleging copyright infringement, breach of contract, fraudulent inducement to contract, and violations of the North Carolina Unfair and Deceptive Trade Practices Act (UDTPA). SAS was unsuccessful on its copyright claims but prevailed on its breach of contract, fraudulent inducement, and UDTPA claims and was awarded damages of \$79.1 million in 2016 (the “NC Judgment”). The NC Court subsequently enjoined World Programming from licensing its WPS Analytics software to new customers for use in the United States until the NC Judgment was satisfied. At the time that the Company acquired World Programming, World Programming had partially paid the NC Judgment.

In relation to the NC Court order that enjoined World Programming from licensing its WPS Analytics Software to new customers for use in the United States, SAS filed a related matter in California, which resulted in the California court issuing an order that required certain then existing customers of World Programming to direct payment (of their licensing fees for WPS Analytics software) to SAS until the NC Judgment was satisfied.

On January 3, 2022, the Company paid the outstanding balance of \$65.9 million on the NC Judgment. Despite payment in full, SAS asserted that the Company had not satisfied the NC Judgment. The NC Court held a hearing to address this issue on March 3, 2022 (the “March Hearing”). At the March Hearing, the NC Court confirmed that the Company’s January 3, 2022 payment fully satisfied the NC Judgment, and lifted the injunction that had enjoined World Programming from licensing its WPS Analytics software to new customers for use in the United States. On March 7, 2022, SAS agreed that the California court order was no longer necessary and together with World Programming, filed a joint notice of satisfaction of the NC Judgment with the California court, thereby allowing customers of World Programming to resume payment of their licensing fees to World Programming directly.

In 2018, SAS filed litigation in the United States District Court for the Eastern District of Texas asserting that World Programming infringed SAS copyrights and patents. SAS voluntarily dismissed with prejudice its patent claims, and the Texas court entered judgment in favor of World Programming on the copyright claims. SAS appealed this judgment to the United States Court of Appeals for the Federal Circuit (the “Court of Appeals”). Oral arguments were held before the Court of Appeals on January 13, 2022. A decision from the Court of Appeals is pending.

Other legal proceedings

From time to time, the Company may be subject to other 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.

Effects of proceedings

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.

Commitments

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 \$11.7 million, \$10.9 million, and \$10.4 million for the years ended December 31, 2022, 2021 and 2020, respectively, and are reported in Cost of revenue—software.

Additionally, the Company has current contractual purchase obligations for services supporting business operations, including non-cancelable agreements. The future purchase obligations for these agreements are as follows (in thousands):

Year ending December 31,	
2023	\$ 23,570
2024	7,370
2025	5,152
2026	1,929
2027	300
Thereafter	—
Total	<u>\$ 38,321</u>

17. 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 software licenses and cloud solutions in the areas of simulation, high-performance computing, and artificial intelligence to design and optimize high-performance, efficient, innovative and sustainable products and processes for improved business performance. The software services and software-related services component of this segment includes consulting, implementation services, training, and software-related services focused on product design and development expertise and analysis from the component level up to complete product engineering at any stage of the lifecycle. To a much lesser extent, the Software segment includes revenue from the sale of hardware products.

The Client Engineering Services reportable segment provides support to the Company's customers with long-term ongoing expertise. The Company hires simulation specialists, industrial designers, design engineers, materials experts, development engineers, manufacturing engineers, data scientists, 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, in part, on intellectual property for the direct replacement of fluorescent tubes with LED lighting. Other businesses combined within Other include potential services and product concepts that are still in their development stages.

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, 2022	Software	CES	All other	Total
Revenue	\$ 537,169	\$ 28,883	\$ 6,169	\$ 572,221
Adjusted EBITDA	\$ 107,638	\$ 2,576	\$ (1,614)	\$ 108,600
Year ended December 31, 2021	Software	CES	All other	Total
Revenue	\$ 485,569	\$ 39,282	\$ 7,328	\$ 532,179
Adjusted EBITDA	\$ 82,845	\$ 4,723	\$ (2,315)	\$ 85,253
Year ended December 31, 2020	Software	CES	All other	Total
Revenue	\$ 418,165	\$ 44,320	\$ 7,436	\$ 469,921
Adjusted EBITDA	\$ 53,820	\$ 5,129	\$ (1,661)	\$ 57,288

	Year ended December 31,		
	2022	2021	2020
Reconciliation of Adjusted EBITDA to GAAP (loss) income before income taxes:			
Adjusted EBITDA	\$ 108,600	\$ 85,253	\$ 57,288
Stock-based compensation expense	(84,787)	(44,549)	(21,355)
Interest expense	(4,377)	(12,065)	(11,598)
Depreciation and amortization	(35,504)	(25,644)	(23,806)
Restructuring expense	—	(5,053)	—
Special adjustments, interest income and other ⁽¹⁾	(12,145)	1,770	1,503
(Loss) income before income taxes	<u>\$ (28,213)</u>	<u>\$ (288)</u>	<u>\$ 2,032</u>

⁽¹⁾ The year ended December 31, 2022, includes \$16.6 million expense on repurchase of convertible senior notes, \$6.8 million currency losses on acquisition-related intercompany loans, \$7.2 million gains from the mark-to-market adjustment of contingent consideration associated with the World Programming acquisition and \$4.1 million of interest income. The year ended December 31, 2021, includes \$1.2 million currency gains on acquisition-related intercompany loans and the year ended December 31, 2020, includes \$1.0 million of proceeds from settlements related to an historical acquisition and \$0.6 million of severance expense.

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,	
	2022	2021	2020	2022	2021
United States	\$ 274,635	\$ 259,344	\$ 233,611	\$ 56,853	\$ 54,559
Other countries	13,425	12,249	12,127	5,841	8,777
Total Americas	<u>288,060</u>	<u>271,593</u>	<u>245,738</u>	<u>62,694</u>	<u>63,336</u>
Germany	51,495	52,227	48,559	25,332	7,212
France	19,442	19,694	15,287	740	1,155
Other countries	69,769	52,264	49,403	39,405	48,474
Total Europe, Middle East and Africa	<u>140,706</u>	<u>124,185</u>	<u>113,249</u>	<u>65,477</u>	<u>56,841</u>
Japan	40,335	42,322	41,109	944	1,346
Other countries	103,120	94,079	69,825	5,585	7,112
Total Asia Pacific	<u>143,455</u>	<u>136,401</u>	<u>110,934</u>	<u>6,529</u>	<u>8,458</u>
Total	<u>\$ 572,221</u>	<u>\$ 532,179</u>	<u>\$ 469,921</u>	<u>\$ 134,700</u>	<u>\$ 128,635</u>

(1) Includes property and equipment, net and definite-lived intangible assets, net.

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 29%, 33%, and 36% of the Company's 2022, 2021 and 2020 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, 2022, 2021 or 2020.

Exhibit No.	Description	Incorporated by Reference				
		Form	File No.	Exhibit	Filing Date	Filed Herewith
2.1	Agreement and Plan of Merger, dated as of September 13, 2022, by and among the Company, RapidMiner, Inc., Rambler Merger Sub Inc., and the Shareholder Representative Services LLC	8-K	001-38263	2.1	9/13/2022	
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, by and between Altair Engineering Inc. and U.S. Bank National Association	8-K	001-38263	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	001-38263	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).	8-K	001-38263	4.3	6/10/2019	
4.5	Indenture, dated as of June 14, 2022, by and between Altair Engineering Inc. and U.S. Bank Trust Company, National Association as trustee	8-K	001-38263	4-1	6/15/2022	
4.6	Form of 1.750% Convertible Senior Notes due 2027 (included in Exhibit 4.1 to the Indenture, dated as of June 14, 2022, by and between Altair Engineering Inc., and U.S. Bank Trust Company National Association as trustee)	8-K	001-38263	4.2	6/15/2022	
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	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
10.14	First Amendment to the Registrant's 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	001-38263	10.1	11/5/2018
10.15	Second Amendment to the Registrant's Third Amended and Restated Credit Agreement, dated as of June 5, 2019, by and among the Company, as borrower, the lenders party thereto, and JPMorgan Chase Bank, N.A., as Administrative Agent.	8-K	001-38263	10.1	6/6/2019
10.16+	Form of 2020 Stock Option Award Agreement	8-K	001-38263	10.1	6/8/2020
10.17+	Altair Engineering Inc. 2021 Employee Stock Purchase Plan	DEF 14A	001-38263	Appendix B	4/9/2021
10.18+	Employment Letter dated December 6, 2020, by and between Altair Engineering Inc. and Matthew Brown	10-Q	001-38263	10.2	5/6/2021
10.19+	Executive Severance Agreement dated January 26, 2021, by and between Altair Engineering Inc. and Matthew Brown	10-Q	001-38263	10.3	5/6/2021
10.20+	Employment Transition and Separation Agreement dated January 15, 2021, by and between Altair Engineering Inc. and Howard Morof	10-Q	001-38263	10.4	5/6/2021

10.21+	Amended and Restated Executive Severance Agreement dated March 8, 2021, by and between Altair Engineering Inc. and James Scapa	10-Q	001-38263	10.5	5/6/2021	
10.22+	Amended and Restated Executive Severance Agreement dated February 3, 2021, by and between Altair Engineering Inc. and Gilma Saravia	10-Q	001-38263	10.6	5/6/2021	
10.23+	Amended and Restated Executive Severance Agreement dated February 22, 2021, by and between Altair Engineering Inc. and Amy Messano	10-Q	001-38263	10.7	5/6/2021	
10.24+	Amended and Restated Executive Severance Agreement dated February 15, 2021, by and between Altair Engineering Inc. and Uwe Schramm	10-Q	001-38263	10.8	5/6/2021	
10.25+	Amended and Restated Executive Severance Agreement dated January 31, 2021, by and between Altair Engineering Inc. and Brett Chouinard	10-Q	001-38263	10.9	5/6/2021	
10.26+	Executive Severance Agreement, dated March 5, 2021, by and between Altair Engineering Inc., and Mahalingam Srikanth					X
10.27	Securities Purchase Agreement, dated September 27, 2021, by and between the Company and Matrix Capital Management Company, LP	8-K	001-38263	10.1	9/27/2021	
10.28	Registration Rights Agreement dated September 27, 2021, by and between the Company and Matrix Capital Management Company, LP	8-K	001-38263	10.2	9/27/2021	
10.29	Stock Purchase Agreement, dated December 15, 2021, by and among the Company, its UK-based subsidiary Altair Engineering Ltd., the stockholders of World Programming Limited named therein and a sellers' representative named therein	8-K	001-38263	10.1	12/15/2021	
10.30	Stock Purchase Agreement, dated December 15, 2021, by and among the Company, its UK-based subsidiary Altair Engineering Ltd., the stockholders of December 2015 Software Limited named therein and a sellers' representative named therein	8-K	001-38263	10.2	12/15/2021	
10.31+	Employment Separation and General Release Agreement, dated as of September 30, 2022, by and between Brett Chouinard and the Company	8-K	001-38263	10.1	10/3/2022	
10.32+	Employment Separation and General Release Agreement, dated as of December 30, 2022, by and between Dr. Uwe Schramm and the Company	8-K	001-38263	10.1	1/4/2023	

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, 2022, 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: February 24, 2023

By: /s/ James R. Scapa
James R. Scapa
Chief Executive Officer (Principal Executive Officer)

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints James R. Scapa and Matthew Brown, 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
<u>/s/ James R. Scapa</u> James R. Scapa	Chief Executive Officer and Director (Principal Executive Officer)	February 24, 2023
<u>/s/ Matthew Brown</u> Matthew Brown	Chief Financial Officer (Principal Financial Officer)	February 24, 2023
<u>/s/ Brian Gayle</u> Brian Gayle	Senior Vice President, Chief Accounting Officer (Principal Accounting Officer)	February 24, 2023
<u>/s/ Jim F. Anderson</u> Jim F. Anderson	Director	February 24, 2023
<u>/s/ Shekar Ayyar</u> Shekar Ayyar	Director	February 24, 2023
<u>/s/ Mary C. Boyce</u> Mary C. Boyce	Director	February 24, 2023
<u>/s/ Sandy Carter</u> Sandy Carter	Director	February 24, 2023
<u>/s/ Stephen Earhart</u> Stephen Earhart	Director	February 24, 2023
<u>/s/ Trace Harris</u> Trace Harris	Director	February 24, 2023



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