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: September 30, 2024

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: 0-11412

AMTECH SYSTEMS, INC.

(Exact name of registrant as specified in its charter)

Arizona	**86-0411215**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**
58 South River Drive Suite 370, Tempe, Arizona	**85288**
(Address of principal executive offices)	(Zip Code)

Registrant's telephone number, including area code: **480-967-5146**

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

Title of each class	**Trading Symbol(s)**	**Name of each exchange on which registered**
Common Stock, par value $0.01 per share	ASYS	NASDAQ Global Select Market

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

Common Stock, $0.01 Par Value

(Title of Class)

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

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

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

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

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

Large accelerated filer	☐	Accelerated filer	☒
Non-accelerated filer	☐	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 check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

As of March 29, 2024, the last business day of the registrant's most recently completed second fiscal quarter, the aggregate market value of the voting and non-voting stock held by non-affiliates of the registrant was approximately $61,578,097, based upon the closing sales price reported by the NASDAQ Global Market on that date.

As of November 29, 2024, the registrant had outstanding 14,277,066 shares of Common Stock, $0.01 par value.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the Definitive Proxy Statement related to the registrant's 2025 Annual Meeting of Shareholders, which Proxy Statement will be filed under the Securities Exchange Act of 1934, as amended, within 120 days of the end of the registrant's fiscal year ended September 30, 2024, are incorporated by reference into Items 10-14 of Part III of this Form 10-K.

AMTECH SYSTEMS, INC. AND SUBSIDIARIES

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DEFINITIONS

Acronyms and defined terms used in the text include the following:

Term	Meaning
2007 Plan	The 2007 Employee Stock Incentive Plan
2022 Plan	Amtech Systems, Inc. 2022 Equity Incentive Plan
3D	Three dimensional
401(k) Plan	The Amtech Systems, Inc. 401(k) Plan
5G	Fifth generation of mobile communications
ACMI	Advanced Compound Materials, Inc.
ADAS	Advanced driver assistance systems
AI	Artificial intelligence
Amtech	Amtech Systems, Inc. and Subsidiaries
ASC	Accounting Standards Codification
Board	The Board of Directors of Amtech Systems, Inc.
Bruce Technologies	Bruce Technologies, Inc.
BTU	BTU International, Inc.
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CM	Contract manufacturer
CMP	Chemical Mechanical Planarization or Chemical Mechanical Polishing
Common Stock	Our common stock, par value $0.01 per share
Company	Amtech Systems, Inc. and Subsidiaries
COSO	Committee of Sponsoring Organizations of the Treadway Commission
COVID-19	A novel coronavirus strain commonly referred to as “coronavirus”
DBC	Direct bond copper
EBIT	Earnings Before Interest and Taxes
EBITDA	Earnings Before Interest, Taxes, Depreciation, and Amortization
EMEA	Europe, Middle East and Asia
Entrepix	Entrepix, Inc.
EPS	Earnings (loss) per share
ERISA	Employee Retirement Income Security Act of 1974
EV	Electric vehicle
Exchange Act	Securities Exchange Act of 1934, as amended
FDIC	Federal Deposit Insurance Corporation
GAAP	Generally Accepted Accounting Principles in the United States
HEV	Hybrid electric vehicles
Intersurface Dynamics	Intersurface Dynamics, Inc.
ISO 9001:2015	International standard that specifies requirements for a quality management system
IoT	Internet of things
LED	Light-emitting diode
Loan Agreement	Loan and Security Agreement
MEMS	Microelectromechanical systems
mm	Millimeter

NIGPP	National Integrated Group Pension Plan and Trust Fund
Note __	Note __ to the consolidated financial statements
O-S-D	Optoelectronic Sensors & Discrete
OEM	original equipment manufacturer
OSATS	Outsourced Semiconductor Assembly and Test Services
our	Amtech Systems, Inc. and Subsidiaries
PCAOB	Public Company Accounting Oversight Board
Power Semiconductor	The fundamental component of modern power electronic circuitry. Power semiconductors perform the same tasks as regular semiconductors — only on a much larger scale. These high-performance components are capable of handling extremely high electrical currents, voltages, and frequencies. They are used in, but not limited to the following applications: electric vehicles, wireless communication, advanced control of electric drives, advanced computer systems, antennas, automobile sensors, broadband wireless, consumer and industrial electronics, and more. They form an indispensable part of electrical appliances, machines, and systems.
PR Hoffman	P.R. Hoffman Machine Products, Inc.
Proxy Statement	Amtech's Proxy Statement to be filed with the SEC in connection with its 2025 Annual Meeting of Shareholders
PVA	Polyvinyl alcohol
R&D	Research and development
RD&E	Research, development and engineering
Registrant	Amtech Systems, Inc.
RF	Radio frequency
ROU	Right-of-use
RSU	Restricted stock unit
SEC	Securities and Exchange Commission
Securities Act	Securities Act of 1933, as amended
Semi	Semiconductor
SEO	Search engine optimization
SG&A	Selling, general and administrative expenses
Si	Silicon
SiC	Silicon carbide
SMT	Surface-mount technology
SSP	Standalone selling price
Subsidiaries	Subsidiaries of Amtech Systems, Inc. listed on Exhibit 21 hereto
TTV	Total thickness variation
UK	United Kingdom
us	Amtech Systems, Inc. and Subsidiaries
U.S.	The United States of America
USA PATRIOT act	The Uniting and Strengthening America by Providing Appropriate Tools to Restrict, Intercept, and Obstruct Terrorism Act of 2001
we	Amtech Systems, Inc. and Subsidiaries
xEV	Hybrid and electric vehicles

Cautionary Note Regarding Forward-Looking Statements

Our discussion and analysis in this Annual Report on Form 10-K ("Annual Report"), our 2024 Annual Report to Shareholders, our other reports that we file with the SEC, our press releases and in public statements of our officers and corporate spokespersons contain "forward-looking" statements within the meaning of Section 27A of the Securities Act, Section 21E of the Exchange Act, and the Private Securities Litigation Reform Act of 1995. Forward-looking statements give our or our officers' current expectations or forecasts of future events. You can identify these statements by the fact that they do not relate strictly to historical or current events. You can also identify forward-looking statements by discussions of strategy, plans or intentions of management. We have tried, wherever possible, to identify such statements by using words such as "may," "plan," "anticipate," "seek," "will," "expect," "intend," "estimate," "believe," "continue," "predict," "potential," "project," "should," "would," "could," "likely," "future," "target," "forecast," "goal," "observe," and "strategy" or the negative thereof or variations thereon or similar terminology relating to the uncertainty of future events or outcomes. Any expectations based on these forward-looking statements are subject to risks and uncertainties and other important factors. Some factors that could cause actual results to differ materially from those anticipated include, among others, future economic conditions, including changes in the markets in which we operate; changes in demand for our services and products; our revenue and operating performance; difficulties in successfully executing our growth or restructuring initiatives; difficulties in executing on our strategic initiatives, the effects of competition in the markets in which we operate, including the adverse impact of competitive product announcements or new entrants into our markets and transfers of resources by competitors into our markets; the cyclical nature of the semiconductor industry; pricing and gross profit pressures; control of costs and expenses; risks associated with new technologies and the impact on our business; legislative, regulatory, and competitive developments in markets in which we operate; possible future claims, litigation or enforcement actions and the results of any such claim, litigation proceeding, or enforcement action; the impact of any future pandemic or other business interruptions on our business operations, financial results and financial position; risks of future cybersecurity incidents; adverse developments affecting financial institutions, including bank failures; and other circumstances and risks identified in this Annual Report or referenced from time to time in our filings with the SEC. The occurrence of the events described, and the achievement of expected results, depend on many events, some or all of which are not predictable or within our control. These and many other factors could affect Amtech's future operating results and financial condition and could cause actual results to differ materially from expectations based on forward-looking statements made in this document or elsewhere by Amtech or on its behalf.

Forward-looking statements are neither historical facts nor assurances of future performance. Instead, they are based on our or our officers' current beliefs, expectations and assumptions regarding the future of our business, future plans and strategies, projections, anticipated events and trends, the economy and other future conditions. Because forward-looking statements relate to the future, they are subject to certain risks and uncertainties. In light of these risks and uncertainties, there can be no assurance that the forward-looking information contained in this Annual Report on Form 10-K will in fact transpire or prove to be accurate. You should not place undue reliance on these forward-looking statements, which speak only as of the date they were made.

The Company undertakes no obligation to update or publicly revise any forward-looking statement whether as a result of new information, future developments or otherwise after the date of this Annual Report. All subsequent written or oral forward-looking statements attributable to the Company or persons acting on its behalf are expressly qualified in their entirety by this cautionary statement. You are advised, however, to consult any further disclosures we make on related subjects in our subsequently filed Form 10-Q and Form 8-K reports and our other filings with the SEC. Also note that we provide a cautionary discussion of risks, uncertainties and possibly inaccurate assumptions relevant to our business under "Item 1A. Risk Factors" of this Annual Report. We note these factors for investors as permitted by the Private Securities Litigation Reform Act of 1995. You should understand it is not possible to predict or identify all such factors.

Unless the context indicates otherwise, the terms "Amtech," the "Company," "we," "us" and "our" refer to Amtech Systems, Inc., an Arizona corporation, together with its subsidiaries.

PART I

ITEM 1. BUSINESS

OUR COMPANY

We provide equipment, consumables and services for semiconductor wafer fabrication and device packaging. Our products are used in fabricating semiconductor devices, such as silicon carbide (SiC) and silicon (Si) power devices, digital and analog devices, power electronic packages, advanced semiconductor packages and electronic assemblies. We sell these products to semiconductor device and module manufacturers worldwide, particularly in Asia, North America and Europe.

Our semiconductor fabrication solutions include consumables, equipment and services for wafer polishing, cleaning, slicing and dicing. Our thermal processing solutions include reflow equipment for chip packaging and electronic assembly, diffusion furnaces and furnaces used to produce ceramic based power semiconductor packages and passive electronic components.

The focus of our strategy is to expand our consumables and service business for semiconductor wafer fabrication and to capitalize on opportunities for thermal processing equipment in advanced packaging and power electronic applications.

We categorize each of our subsidiaries into one of two reportable segments, based primarily on the industries they serve:

Reportable Segment	% of 2024 Consolidated Net Revenue
Thermal Processing Solutions	68%
Semiconductor Fabrication Solutions	32%

These reportable segments are comprised of the following five wholly-owned subsidiaries:

Thermal Processing Solutions (formerly called Semiconductor):

- BTU, a Delaware corporation based in Westford, Massachusetts, with operations in China, Malaysia and the UK, acquired in January 2015.

Semiconductor Fabrication Solutions (formerly called Material and Substrate):

- PR Hoffman, an Arizona corporation based in Carlisle, Pennsylvania, acquired in July 1997;
- Advanced Compound Materials, Inc., a Delaware corporation based in Spartanburg, South Carolina, founded in 2023;
- Intersurface Dynamics, a Connecticut corporation based in Bethel, Connecticut, acquired in March 2021; and
- Entrepix, an Arizona corporation based in Phoenix, Arizona, acquired in January 2023.

In both of our divisions we are focused on semiconductor and related processes and markets. Amtech is uniquely positioned in that our products are employed throughout the early and late stages of semiconductor and electronics manufacturing. Our products are key to the earliest stages of silicon or silicon carbide wafer manufacturing, then in semiconductor device manufacturing, then advanced semiconductor packaging and then finally in electronics assembly. Our thermal processing solutions business provides high performance equipment used in solder reflow operations for advanced semiconductor packaging and electronic assembly, furnaces used for producing power semiconductor packaging substrates and electronic components, and diffusion furnaces used in wafer processing.

Reflow operations provide a cost effective, high throughput process for electronic packaging and assembly. Our equipment provides the precise temperature, atmospheric control and uniformity required to achieve high yields in mass production reflow operations. Our flux management system scrubs oven gasses to minimize downtime, reduce defects from flux contamination and reduce environmental emissions.

The semiconductor industry is historically cyclical with constantly evolving technical requirements and advancements and can be subject to tariffs and sourcing restrictions driven by geopolitical tensions. Therefore, future growth and profitability will depend on cyclical trends, our ability to produce equipment regionally and meeting performance requirements as technical requirements evolve. We are currently in a longer-than-historical-average contraction cycle, which we believe is due primarily to a prolonged downturn in demand for industrial equipment, computers and smartphones following a spike in demand for these products during the COVID pandemic and a decline in growth expectations for electric vehicles.

Our Semiconductor Fabrication Solutions business provides processing consumables, equipment and services for wafer production. Our PR Hoffman consumables are used for lapping and Chemical Mechanical Planarization (CMP) processes in the manufacturing of SiC and Si power devices, analog devices, optics, ceramics and photonics. Our Entrepix products and services include equipment for SiC and Si wafer cleaning, testing equipment used for optimizing CMP processes, CMP equipment parts and services, and CMP foundry services. Our Intersurface Dynamics products include lubricants, cooling fluids and cleaning chemicals used for semiconductor wafer and optics processing and dispersants for CMP slurries.

CMP processes are used to provide a high degree of flatness, parallelism, and surface finish. Common applications for this technology are silicon wafers used for semiconductor digital and analog devices, SiC wafers for power devices, optics and ceramics. These devices are used in a variety of applications including computers and servers, automotive electronics, industrial electronics, mobile phones, telecommunications equipment and medical devices.

We believe our product portfolio, developed through a track record of technological innovation as well as the integration of key acquisitions, provides exceptional value to semiconductor manufacturing by increasing yields, efficiency and throughput. We have been providing manufacturing solutions to the semiconductor industry for over 30 years and have leveraged our semiconductor technology and industry presence to capitalize on growth opportunities.

For information regarding net revenue, operating income and identifiable assets attributable to each of our two reportable segments, see Note 16 of the Notes to Consolidated Financial Statements included in “Item 8. Financial Statements and Supplementary Data” and “Item 7. Management’s Discussion and Analysis of Financial Condition and Results of Operations” in this Annual Report. For information on the products of each reportable segment, see “Thermal Processing Solutions Products” and “Semiconductor Fabrication Solutions Products” within this “Item 1. Business” section. For information regarding risks to our business, see “Item 1A. Risk Factors.”

Our fiscal year is from October 1 to September 30. Unless otherwise stated, references to the years 2024, 2023 and 2022 relate to the fiscal years ended September 30, 2024, 2023 and 2022, respectively.

ACQUISITION

On January 17, 2023 we acquired 100% of the issued and outstanding capital stock of Entrepix, an Arizona based manufacturer of chemical mechanical polishing (“CMP”) technology for a cash purchase price of $39.2 million. Entrepix’s CMP technology portfolio and water cleaning equipment complements our existing substrate polishing and wet process chemical offerings. Entrepix's results of operations are included in our Semiconductor Fabrication Solutions segment from the date of acquisition.

GROWTH AND INVESTMENT STRATEGY

We believe there are three key secular trends that are key to our future growth:

- ***Advanced Mobility*** - Advanced Mobility encompasses both the development and adoption of electric vehicles and charging infrastructure, including both EV and HEV, as well as advanced automotive electronics including Advanced Driver Assistance Systems ("ADAS"), infotainment and telematics. Our products intersect these markets in multiple ways: CMP consumables and wafer cleaning systems for the SiC substrates used in the EV power invertors; thermal processing systems for producing EV battery cooling systems and ceramic substrates for HEV power semiconductor packaging; and reflow ovens for ADAS, infotainment and telematics component assemblies.

- ***Supply Chain Resiliency*** - There is a global trend of creating supply chain resiliency by expanding and/or relocating operations outside of mainland China. We believe these facilities will create demand for new equipment and services in growing regions like Mexico and Southeast Asia.

- ***Artificial Intelligence*** - With Artificial Intelligence ("AI"), our reflow oven systems are the favored choice for Outsourced Semiconductor Assembly and Test Services ("OSATS") providers who perform advanced packaging of the AI chips.

We continue to invest in research and development, including the introduction of our next-generation reflow platform, Aurora, in 2023. Historically, we have grown our business primarily through acquisitions, including the businesses that currently comprise our two reportable segments in the Thermal Processing Solutions and Semiconductor Fabrication Solutions industries: BTU, PR Hoffman, Intersurface Dynamics and Entrepix. Our 2023 acquisition of Entrepix bolstered our offerings in the CMP technology space and incorporated wafer cleaning into our existing capital equipment product lines. We will continue to pursue acquisitions to supplement organic growth and have added market development resources globally to accelerate organic growth.

Grow consumables revenue to reduce vulnerability to semiconductor business cycles. The semiconductor industry is highly cyclical, and the conditions of this industry remain volatile. We are currently in a longer-than-historical-average contraction cycle, which we believe is due to the capacity that was pulled in during COVID as demand for consumer electronics spiked during the pandemic and reduced expectations for EV growth rates. While all industry participants have been impacted by these fluctuations in demand, they can be particularly problematic for equipment suppliers who rely on capacity expansion to drive orders for their equipment. These sharp business cycles not only impact short-term financial results but can also weaken the strength of suppliers as they right-size their organizations to align with the reduced production demand. Our line of consumables products, including templates, carriers, polishing-related chemicals and spare parts, generates continuous revenue streams regardless of capacity expansions as they are used in equipment already in service. In an effort to minimize both the financial shortfalls and organizational harm of these business cycles, we are seeking to increase the consumables portion of our business. Our initial focus is on aggressively growing the consumable business in our Semiconductor Fabrication Solutions segment, which was approximately 32% of our consolidated revenue in fiscal 2024. In addition, we are working to transform the aftermarket sales business in our Thermal Processing Solutions division, leveraging the strength of our expansive installed base to increase higher-margin sales of replacement parts and services.

Increase the portion of our product line portfolio tied to high-growth, megatrend end markets such as EV and HEV. We believe the opportunity for organic growth through strategic alignment to projects tied to megatrends is an opportunity that exists across all our divisions. In the Semiconductor Fabrication Solutions segment, processing of SiC substrates is directly tied to the production of power modules used in electric vehicles and in other green technology applications such as wind and solar power. Our Thermal Processing Solutions segment has multiple intersections with EV and HEV production, including the use of our diffusion furnaces and surface-mount technology reflow products to manufacture power semiconductors and our high-temp furnaces used in DBC applications used in HEV power modules. In order to increase the portion of our business tied to these high-growth megatrends, we are employing multiple tactics and strategies, including strategic selling and customer-centric product development.

Customer-centric product development in R&D. In order to both increase the output of our development teams and mitigate the risk associated with the introduction of new products, we are emphasizing and prioritizing

customer-centric product development in all of our divisions. For example, the development and roll out of the Aurora reflow system for BTU employed direct customer input in the manufacturing requirements, and the new systems were first deployed as beta units to customers in multiple regions for validation. In addition, development of equipment and aftermarket solutions at Entrepix has focused on eliminating customer pain points, often in areas overlooked by the industry. We have added key customer-facing resources for our Semiconductor Fabrications Solutions segment to enable this type of customer collaboration in all geographic regions. In evaluating potential R&D projects in our portfolio, opportunities where a strong customer partner or partners exist will be given priority over internally-driven programs.

Enhance and invest in legacy business operations. Our legacy business is key to funding both organic and inorganic growth opportunities across our divisions. Throughout 2024, we have been re-enforcing Amtech's core values (Safety, Customer Focus and Continuous Improvement) across all divisions and locations. We have increased cross-divisional sharing of resources and expertise, such as best practices and global sourcing. This strategy has been developed by our CEO, CFO and CHRO, in conjunction with our Vice President of Operations, Vice President of Sales and Customer Service, Segment Managers and Corporate Director of Strategic Marketing, to ensure these advancements are implemented uniformly across all Amtech operations. During 2024, we made investments to strengthen and expand our manufacturing capacity for CMP consumables to meet anticipated growth demands from the SiC industry segment and reduce single-point failure risks to our business. We also relocated our domestic BTU facility to a smaller facility that significantly reduced fixed costs and was better aligned with a fab-lite manufacturing model that was implemented with the support of contract manufacturing partners.

THERMAL PROCESSING AND SEMICONDUCTOR FABRICATION SOLUTIONS OPERATIONS

We provide reflow equipment for chip packaging and electronic assembly, diffusion furnaces for wafer processing and furnaces used to produce ceramic based power semiconductor packages and passive electronic components as well as wafer cleaning equipment, CMP polishing consumables, wafer processing lubricants, coolants and cleaning chemicals and related services to leading semiconductor manufacturers.

As demand for increasingly sophisticated electronic devices continues, new technologies such as Artificial Intelligence (AI), EVs, HEVs, advances in consumer electronics, 5G communications, and IoT will help drive future growth. Electronic equipment continues to become more complex, yet end users demand smaller, lighter and less expensive devices. This trend, in turn, requires increased performance and reduced cost for electronic assemblies, printed circuit boards and semiconductors. In response to these developments, manufacturers are increasingly employing more sophisticated production and assembly techniques requiring more advanced manufacturing equipment and related consumables.

Although the semiconductor market has experienced significant growth over the past fifteen years, it remains cyclical by nature. The market is characterized by short-term periods of under or over utilization of capacity for most semiconductors, including microprocessors, memory, power management chips and other logic devices. When capacity utilization decreases due to the addition of excess capacity, semiconductor manufacturers typically slow their purchasing of capital equipment. Conversely, when capacity utilization increases, so does capital spending. We believe the continued expansion of our consumable and aftermarket product offerings, primarily in our Semiconductor Fabrication Solutions segment, will enable us to partially offset some of these cyclical effects.

THERMAL PROCESSING SOLUTIONS PRODUCTS

Our furnace equipment is manufactured in our facilities in Massachusetts and China and via contract manufacturers in Canada and Mexico. The following paragraphs describe the products that comprise our current product lines in our semiconductor business:

Continuous Thermal Processing Systems. We produce and sell thermal processing systems used in the solder reflow and curing stages of printed circuit board assembly as well as systems for the thermal processes used in advanced semiconductor packaging including 2.5D and flip-chip. In electronics assembly our ovens are used primarily in the advanced, high-density segments of the market that utilize surface mount technology.

Flip-chip reflow provides the physical and electronic bond of the semiconductor device to its package. Our range of convection reflow systems, utilizing closed loop convection technology, are rated at up to 400°C and operate in air or nitrogen atmospheres. These products are manufactured at our ISO 9001:2015 certified facility in Shanghai, China and utilize forced impingement convection technology to transfer heat to the substrate. Using configurable heating elements of up to eight kilowatts, they can process substrates in dual-lane, dual-speed configurations, thereby enabling our customers to double production without increasing the machine's footprint. These products are available in four models based on the heated lengths of thermal processing chambers. Heated length is based on the customer's required production rate and loading requirements.

High-Temperature Belt Furnace. We also produce and sell high-temperature belt furnaces, which have been manufactured in North America for over six decades with ISO 9001:2015 quality certification safe-guarding that each unit is subject to exacting build and test criteria. These furnaces operate at temperatures up to 1180°C and are capable of processing in controlled atmospheres, such as nitrogen, argon, and hydrogen. Applications include DBC, furnace brazing, annealing, glass-to-metal sealing, sintering, and heat-treating for diverse markets including automotive, semiconductors, aerospace and medical.

Horizontal Diffusion Furnaces. We produce and sell 200mm and 300mm horizontal diffusion and deposition furnaces. Our horizontal furnaces currently address several steps in the semiconductor manufacturing process, including diffusion, high temperature oxidation (used in silicon power chips), and annealing.

Our horizontal furnaces generally consist of three large modules: the load station, where the loading of the wafers occurs; the furnace section, which is comprised of one to four thermal reactor chambers; and the gas distribution cabinet, where the flow of gases into the reactor chambers is controlled and is often configured through a range of options to meet the requirements of our customers' particular process needs. The horizontal furnaces utilize a combination of existing industry and proprietary technologies and are sold primarily to semiconductor customers. Our products are capable of processing all currently existing wafer sizes.

SEMICONDUCTOR FABRICATION SOLUTIONS PRODUCTS

Our Semiconductor Fabrication Solutions segment manufactures the products described below in Arizona, Pennsylvania, South Carolina and Connecticut and sells them under our Entrepix, PR Hoffman and Intersurface Dynamics brand names.

Double-Sided Wafer Cleaning System. The Entrepix Double-Sided Wafer Cleaning System (OnTrak) is a single wafer cleaner that uses water or mild chemistries supplied through PVA brushes to clean both sides of a substrate simultaneously. These wafers (substrates) require cleaning following various process steps that leave the substrate contaminated by material particles. The system is designed to accept wet wafers in and send each substrate through two brush cleaning steps followed by a rinse and a spin dry while also providing heat via a high-powered lamp to dry any residual liquid droplets. The Entrepix cleaner is commonly used in post polishing steps, prime silicon/silicon carbide cleaning, epitaxial silicon deposition processes, and general wafer cleaning needs.

Entegrity Head Tester. The Entrepix Entegrity Head Tester is a table-top CMP head testing system that provides our customers with invaluable data regarding their head consumables that make up the polishing heads. The system allows users to customize operation and recipe programming. This allows the user to test individual zones for leaks or cross talk and track each head's performance by generating data that can be used to track issues with head rebuild before it is installed on the polisher. The Entegrity's user friendly touch interface displays data in real time, and also provides a live graph of the individual zone's performance. The ability to scan each head barcode prior to testing allows the user to create a data set for each specific head that can be viewed on the screen or downloaded via network connection.

Substrate Carriers. We manufacture carriers in a variety of sizes and materials. Sizes range from 3 to 38 inches in diameter using a variety of special steels, laminates and extruded polymer raw materials. Silicon wafers, compound semiconductor wafers, and large optics require these special insert carriers. These carriers combine the strength of hardened steel as the processing backbone with a softer plastic material in the work holes known as an insert. Inserts are permanently molded into the work holes via a pressurized process. These inserted work holes provide smoother processing, improved wafer total thickness variation (TTV) and improved wafer edge quality. Insert carriers are available for all wafer sizes from 75mm to 450mm and can be made from hardened and tempered carbon steel or

specialized stainless steel when metal contamination is a processing concern. Insert carriers are widely accepted as the industry solution for both prime wafer and reclaim wafer manufacturers when dual sided lapping or polishing are utilized in the front-end wafer process.

Substrate Polishing Templates. Our polishing templates are used to securely hold SiC, silicon, sapphire or other wafer materials in place during single-sided wax-free CMP polishing processes. Polishing templates are customized for specific applications and are manufactured to extremely tight tolerances. We offer a variety of options to provide the best solution for each specific process. Polishing templates are manufactured for all brands of tools and virtually any wax-free customer process. Critical front-end wafer surface specifications are finalized during the polishing process.

Substrate Process Chemicals. Through Intersurface Dynamics, we produce and sell substrate process chemicals which are used to achieve specific surface morphologies on a variety of materials. Our substrate process chemical customers include some of the world's largest manufacturers of semiconductor devices, silicon wafers, precision optics, ophthalmic lens, advanced displays and flat glass. We offer three different product lines: Tensor Series Products, Vector Series Products, and Challenge Series Products. Tensor Series Products are used by manufacturers of integrated circuits in applications such as cleaning, etching, dicing and CMP. Vector Series Products were designed specifically for grinding, sawing, lapping, cleaning, etching and polishing semiconductor materials such as silicon wafers. Challenge Series Products address similar processes for manufacturers of precision optics, technical ceramics and advanced displays helping to achieve optimum yields.

MANUFACTURING, RAW MATERIALS AND SUPPLY CHAIN

Our Thermal Processing Equipment manufacturing activities consist primarily of engineering design to meet specific and evolving customer needs and procurement and assembly of various commercial and proprietary components into finished thermal processing systems in Massachusetts and China or via our contract manufacturing partners in Canada and Mexico.

Our manufacturing activities in the polishing business include laser-cutting and other fabrication steps in producing lapping and polishing consumables, including carriers, templates, gears, wear items and spare parts in our ISO 9001:2015 certified facility in Pennsylvania, as well as our facility in South Carolina, from raw materials manufactured to our specifications by our suppliers. These products are engineered and designed for specific applications and to meet the increasingly tight tolerances required by our customers. Many items, such as proprietary components for our semiconductor equipment, are purchased from suppliers who manufacture these items to our specifications.

Our cleaner manufacturing activities include electrical and mechanical assembly of components and assemblies for the construction of two versions of our double-side scrubbers/cleaners at our Phoenix facility. These components and assemblies are engineered and designed for specific applications and to meet the increasingly tight tolerances required by our customers. Many items are purchased from suppliers who manufacture these items to our specifications. We also utilize our second manufacturing center in north Phoenix to manufacture and machine parts from raw materials, for our own use in construction of the cleaners as well as for customers.

Final assembly and tests of our machines are performed within our manufacturing facilities. Quality control is maintained through inspection of incoming materials and components, in-process inspection during equipment assembly, testing of assemblies and final inspection and, when practical, operation of manufactured equipment prior to shipment.

Our polishing supplies business relies on key suppliers for certain materials, including specialized steel mills in Germany and Japan, an injection molding machine, a single-sourced pad supplier from Japan and an adhesive manufacturer. Injection molding for our insert carriers is subcontracted out to a third party. To minimize the risk of production and service interruptions and/or shortages of key parts, we seek to maintain appropriate inventory levels of key raw materials and parts. In addition, in order to respond to the anticipated growth rates for SiC substrate manufacturing and to provide our customers with assurance for business continuity and risk mitigation, we have opened a new manufacturing facility for SiC related polishing consumables in Spartanburg, South Carolina. This facility, run by our ACMI subsidiary, not only provides additional manufacturing capacity, but it also brings us geographically closer to key customers in the region allowing for even faster response times.

During 2023, we partnered with contract manufacturers ("CM") to improve our lead times and diversify our manufacturing operations. One CM is located in Canada and is building our high temperature belt furnaces. By partnering with this CM, we achieved record shipments of our high temperature belt furnaces. We also have partnered with a CM in Mexico, who will build our Pyramax furnaces and ship to our North American and European customers. In addition, we are using a CM partner as well as our Shanghai factory as backup sources to manufacture key components for certain high temperature belt furnaces. This CM strategy is key to ensuring we are not concentrated in one geographic location and to give us additional capacity during peak semiconductor cycles.

CUSTOMERS AND SEASONALITY

Our customers are primarily manufacturers of semiconductor substrates, devices and electronic assemblies. Additionally, our Semiconductor Fabrication Solutions segment also serves customers in the ceramics and optics industries. During 2024, 59% of our net revenue came from customers outside of North America. This group represented 52% of revenues in 2023. In 2024, net revenue was distributed among customers in the following geographic regions:

- North/South America 41% (39% of which is in the United States)
- Asia 43% (including 20% in China, 12% in Malaysia and 8% in Taiwan)
- Europe 16% (including 6% in Germany and 3% in Czech Republic)

No customer accounted for 10% of our net revenues in 2024. In 2023, one Thermal Processing Solutions customer accounted for 11% of our net revenues.

Our business is not seasonal in nature, but is cyclical based on the capital equipment investment patterns of semiconductor manufacturers. These expenditure patterns are based on many factors, including capacity utilization, anticipated demand, the development of new technologies and global and regional economic conditions. Historically, these cycles typically last between 10-17 quarters, with each complete cycle made up of a contraction phase of about 4-6 quarters, followed by an expansion phase of approximately 6-11 quarters. We are currently in a longer-than-historical-average contraction cycle, which we believe is due primarily to a prolonged downturn in demand for personal computers and smartphones following a spike in demand for these products during the COVID pandemic and a reduction in anticipated growth rates for EVs.

SALES AND MARKETING

Due to the highly technical nature of our products, we market our products primarily by direct customer contact through our sales personnel and through a network of domestic and international independent sales representatives and distributors that specialize in semiconductor equipment and supplies. Our promotional activities include direct sales contacts, participation in trade shows, advertising and press releases in trade magazines and digital marketing including website SEO and pay-per-click advertising.

We use a mix of direct sales, representatives and distributors globally. Manufacturer representatives provide sales coverage in specific geographic regions and are paid a commission when products are sold. Sales to distributors are generally on terms comparable to sales to end-user customers, as our distributors generally quote their customers after first obtaining a quote from us and have an order from the end-user before placing an order with us. Our sales to distributors are not contingent on their future sales and do not include a general right of return. Historically, returns have been rare. Distributors of our semiconductor equipment do not stock a significant amount of our products, as the inventory they hold is generally limited to parts needed to provide timely repairs to customers. Our manufacturer representatives and distributors are closely managed by our global sales team.

Historically, each of our segments have been responsible for their own sales and marketing activities, including managing sales personnel and representative and distributor relationships, however, as we continue to refocus and grow our organization, we are developing opportunities for increased collaboration and teamwork across our divisions. These cross-segment collaboration opportunities will continue to be a focus at all levels and departments of our organization, as we believe they can lead to greater efficiencies while reducing operating costs. These efforts are further coordinated by our Vice President of Sales, who oversees all sales and marketing activities at each division.

RESEARCH, DEVELOPMENT AND ENGINEERING

The markets we serve are characterized by rapidly-evolving industry standards and technological change. To compete effectively, we must continually maintain or exceed the pace of such change by improving our products and our process technologies and by developing new technologies and products that are competitive based on price and performance. To assure that these technologies and products address current and future customer requirements, we obtain as much customer cooperation and input as possible, thus increasing the efficiency and effectiveness of our research and development efforts. In addition, we look for strategic acquisitions that will provide us with new technologies to compete effectively in the markets in which we operate.

RD&E expenses may vary from period to period depending on the engineering projects in process. Expenses related to engineers working on strategic projects or sustaining engineering projects are recorded in RD&E. However, from time to time we add functionality to our products or develop new products during engineering and manufacturing to fulfill specifications in a customer's order, in which case the cost of development, along with other costs of the order, are charged to cost of goods sold.

In 2024, 2023 and 2022, we recorded RD&E expense of $4.2 million, $7.3 million and $6.4 million, respectively. We plan to continue to develop new products and invest in upgrades to existing products to stay competitive in the markets we serve.

COMPETITION

We compete in several distinct equipment markets for semiconductor devices, semiconductor substrates, MEMS, semiconductor packaging, and electronics assembly, as well as the markets for supplies used in power semiconductor applications. Each of these markets is highly competitive. Our ability to compete depends on our ability to continually improve our products, processes and services, as well as our ability to develop new products that meet constantly evolving customer technical and other requirements. Significant competitive factors for succeeding in these markets include the product's technical capability, productivity, cost-effectiveness, overall reliability, ease of use and maintenance, contamination and defect control and the level of technical service and support.

The Thermal Processing Solutions Market. Our thermal processing equipment primarily competes with equipment produced by other OEMs. Some of these manufacturers are well-established firms that are much larger and have substantially greater financial and other resources than we have with which to pursue development, engineering, manufacturing, marketing and distribution of products. Additionally, these manufacturers may generally be better situated to withstand adverse economic or market conditions.

Competitors of our horizontal diffusion furnaces include Centrotherm GmbH and CVD Equipment, Inc. Our principal competitors for printed circuit board assembly equipment and advanced semiconductor packaging vary by product application. The principal competitors for solder reflow systems are ITW/EAE Vitronics-Soltec, Heller, Folungwin, ERSA, Shenzhen JT Automation Equipment Co., Ltd. and Rehm. The principal competitors for advanced semiconductor packaging are ITW/EAE Vitronics-Soltec and Heller. Our in-line, controlled atmosphere furnaces compete primarily against products offered by Centrotherm and SierraTherm/Schmid Thermal Systems. We also face competition from emerging low-cost Asian manufacturers and other established European manufacturers.

Although price is a factor in buying decisions, we believe that technological leadership, process capability, throughput, safer designs, uptime, mean time-to-repair, cost of ownership and after-sale support have become increasingly important factors to purchasers of our products. As such, we believe we compete primarily on the basis of these criteria, rather than on the basis of price alone.

Semiconductor Fabrication Solutions Markets. Our CMP wafer carriers experience price competition from foreign manufacturers for which there is very little publicly available information. To maintain our competitive position, we work closely with customers to update our product line to keep pace with their requirements and provide a high level of quality and customer service. We also produce steel carriers, including insert carriers, on advanced laser-cutting tools, which reduces our costs and lead times and increases our control over quality.

Entrepix competes with other cleaning equipment providers including Screen and TEL with the OnTrak double sided scrubber. The OnTrak is normally paired with a stand-alone CMP tool to match the throughput. The OnTrak competes with other cleaning technologies in several other applications like SiC substrate manufacturing and others that require particle removal from the surface of a device wafer.

Entrepix also competes with other companies specializing in refurbishment of older legacy CMP equipment. Competitors include Axus Technology and many other companies located in geographical regions such as China, South Korea and Taiwan. Entrepix's strategy consists of providing solutions for obsolete equipment for legacy 200mm, 300mm and smaller wafer processing equipment where support has been discontinued by the OEM. In addition, Entrepix provides support for their customers various wafer production and R&D requirements in their class 1000 clean room foundry.

The competitive landscape in the substrate process chemical industry is varied, ranging from large multinational companies to small regional or regionally-focused companies. Intersurface Dynamics competes with much larger companies, such as Entegris, Inc. and Cabot.

HUMAN CAPITAL

The Amtech Values

Amtech is focused on growth: profitable company growth and employee growth. To encourage achieving these objectives, Amtech's leadership team developed Amtech's core values, which are communicated to employees on a regular basis. These core values include the following:

- Safety – Employees should never be injured at work. Adherence to safety protocols underscores our commitment to disciplined operation.
- Customer Focus – We know our success depends on the success of our customers. We aim to exceed customer expectations at every interaction.
- Continuous Improvement – Our company's dedication to continuous improvement is what enables us to adapt, evolve, and excel in our ever-changing industry.

Amtech's Employees

Our employees are critical to our success as a leading, global manufacturer of capital equipment and related consumables used in fabricating and packaging semiconductor devices. To continue producing and delivering high-quality products and services to our customers, and to compete and succeed in the highly competitive and continually evolving markets in which we operate, it is critical that we continue to attract, retain and develop a diverse group of talented individuals at all levels of our organization.

Our management seeks to align employment levels with the needs of our business. As of September 30, 2024, we employed 328 people. We also employ individuals on a temporary full-time basis and use the services of contractors as necessary. Of our 328 total employees, 38% were engaged in manufacturing, 21% were engaged in sales and service, 9% were engaged in research, development and engineering, and 32% were engaged in other roles. Our employees were based out of the following locations:

- Tempe, Arizona corporate offices — 21
- Phoenix, Arizona manufacturing plants — 42
- Bethel, Connecticut manufacturing plant — 4
- Westford, Massachusetts manufacturing plant — 65
- Carlisle, Pennsylvania manufacturing plant — 31
- Spartanburg, South Carolina manufacturing plant — 3
- Shanghai, China manufacturing plant — 140

- Other Asia-Pacific sales and services offices — 13
- UK sales and services office — 9

Of the 31 people employed at our Carlisle, Pennsylvania facility, 18 were represented by the United Auto Workers Union - Local 1443. We have a three-year agreement with this union, which expires on September 30, 2025. We expect this agreement to be renewed prior to expiration. We have never experienced a work stoppage or strike, and other than employees at the Carlisle facility, no other employees are represented by a union. At select business units, we have hired certain highly specialized employees under employment contracts that specify a term of employment, pay and other benefits. We consider our employee relations to be good.

Talent Acquisition and Retention

The future growth and success of our company largely depends on our ability to attract, train and retain qualified professionals. As part of our effort to do so, we offer competitive rewards, compensation and benefits, including an employee equity award program, performance-based bonuses, health and wellness benefits, retirement benefits, flexible schedules and holiday and paid time off. We understand that competitive compensation and benefits programs are important in retaining high-performing and qualified individuals.

We know that retention of high-performing employees benefits us and our customers. We are committed to helping our employees develop in their careers and thrive within the Company. Management provides regular performance reviews to ensure our employees are receiving timely and constructive feedback, as well as rewards based on their performance. These performance reviews also assess each employee's performance as it relates to Amtech's core values. We believe these programs and efforts contribute to attracting and retaining a talented and driven workforce.

Turnover

In 2024, our total employee turnover was 26.2%, of which approximately 36.5% was voluntary. Approximately 7.3% of voluntary turnover were employees that retired from the workforce. The average tenure of our employees is approximately 11 years and approximately 47.3% of our employees have been employed with us for more than 10 years. In 2023, our total employee turnover was 5.4%, of which approximately 70.8% was voluntary. Approximately 4.6% of voluntary turnover were employees that retired from the workforce.

Throughout 2024, we made targeted labor reductions as a result of our shift to contract manufacturing and the longer than expected slowdown in the broader semiconductor industry.

Diversity, Equity, and Inclusion

Amtech is dedicated to building a diverse workforce, fostering a culture built on the principle of inclusion, and maintaining a workplace free from discrimination. We strongly believe that a diversity of experience, perspectives and backgrounds will lead to a better environment for our employees and better products and service for our customers. Amtech's commitment to diversity covers our Board of Directors, our leadership team and all teams and functions across our global locations.

Health and Safety

It is our highest priority to keep our employees, customers and suppliers safe. We provide our employees with ongoing safety training to ensure safety policies and procedures are communicated and implemented in an effective and timely manner. As noted above, safety is one of our core values.

PATENTS

The following table shows our material patents and the expiration date of each patent:

Product	Countries	Expiration Date or Pending Approval
Ultrafast gas bearing-based reactive ion etching	Europe	2030
Lapping machine adjustable mechanism	Various	2027
RFID-containing carriers used for silicon wafer quality	United States	2030
Polishing machine wafer holder	Various	2037
Devices, Systems and Methods for Flux Removal from Furnace Process Gas	Various	2038

To our knowledge, there are currently no pending lawsuits against us regarding infringement of any existing patents or other intellectual property rights or any material unresolved claims made by third parties that allege we are infringing the intellectual property rights of such third parties.

AVAILABLE INFORMATION

We file our annual report on Form 10-K, quarterly reports on Form 10-Q, Current Reports on Form 8-K, proxy statements, and other documents (including registration statements) with the SEC under the Securities Exchange Act of 1934 or the Securities Act of 1933, as applicable. Our SEC filings are available to the public on the SEC's website at *www.sec.gov* and through The Nasdaq Global Select Market, 165 Broadway, New York, New York 10006, on which our common stock is listed.

AMTECH WEBSITE

In addition to the information contained in this Report, extensive information about Amtech can be found at *www.amtechsystems.com*, including information about our management team, products and services, and corporate governance practices. The corporate governance information on our website includes our Code of Conduct, Corporate Governance guidelines and the charters for each of the committees of the Board. In addition, amendments to these documents and waivers granted to directors and executive officers under the Code of Conduct, if any, will be posted in this area of the website. In addition, our filings with the SEC, as well as Section 16 filings made by any of our executive officers or directors with respect to Amtech's common stock, are available free of charge on our website as soon as reasonably practicable after the filing is electronically filed with, or furnished to, the SEC.

These details about our website and its content are only for information. The contents of our website are not, nor shall they be deemed to be, incorporated by reference in this Report. Further, our references to website URLs are intended to be inactive textual references only.

ITEM 1A. RISK FACTORS

There are many factors that affect our business, financial condition, operating results and cash flows, as well as the market price for our securities. The following is a description of important factors that may cause our actual results of operations in future periods to differ materially from those currently expected or discussed in forward-looking statements set forth in this Annual Report. The risks and uncertainties described below are not the only risks we face. We operate in a continually changing business environment. Additional risks and uncertainties not presently known to us or that we may currently deem immaterial also may impair our business operations. Forward-looking statements and such risks, uncertainties and other factors speak only as of the date of this Report, and we expressly disclaim any obligation or undertaking to update or revise any forward-looking statement contained herein, to reflect any change in our expectations with regard thereto, or any other change in events, conditions or circumstances on which any such statement is based, except to the extent otherwise required by law. The following risk factors should be read in conjunction with all the other information in this Annual Report, including "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our consolidated financial statements and related notes.

Risks Related to the Semiconductor Industry

There is ongoing volatility in the semiconductor equipment industry.

The semiconductor equipment industry is highly cyclical and volatile. As such, demand for, and the profitability of, our products can change significantly from period to period as a result of numerous factors, including the following: (a) changes in global and regional economic conditions; (b) the shift of semiconductor production to Asia, where there often is increased price competition; (c) tariffs, quotas and international trade barriers; (d) changes in capacity utilization and production volume of manufacturers of semiconductors, silicon wafers and MEMS; (e) the profitability and capital resources of those manufacturers; and (f) challenges associated with marketing and selling manufacturing equipment and services to a diverse and diffuse customer base.

The purchasing decisions of our customers are highly dependent on their capacity utilization, which changes when new facilities are put into production and with the level of demand for our products, as well as our customers' capital expenditure budgets. Purchasing decisions are also impacted by changes in the economies of the countries served by our customers, as well as the state of the worldwide industries in which we operate or expect to operate in the future. The timing, length, and severity of the up-and-down cycles in the semiconductor equipment industry are difficult to predict. Additionally, we generally experience a one-to-two quarter lag between upturns/downturns experienced by larger equipment manufacturers.

When cyclical fluctuations result in lower than expected revenue levels, our operating results are adversely affected. Cost reduction measures may be necessary for us to remain competitive and financially sound. During a down cycle, our operating results may be adversely affected if we are unable to make timely adjustments to our cost and expense structure to correspond to the prevailing market conditions, effectively manage our supply chain, and motivate and retain key employees. In addition, during periods of rapid growth, our operating results may be adversely affected if we are unable to increase manufacturing capacity and personnel and effectively manage our supply chain to meet customer demand, which may require additional liquidity. We can provide no assurance that we can timely and effectively respond to the industry cycles, and our failure to do so could have a material adverse effect on our business, financial position and results of operations.

The semiconductor equipment industry is highly competitive and, because we are relatively small and have fewer financial and other resources compared to our competitors, we may not be able to compete successfully with them.

Our industry includes large manufacturers with substantial resources to support customers worldwide. Our future performance depends, in part, upon our ability to continue to compete successfully in these markets. Some of our competitors are diversified companies with extensive financial resources and research, engineering, manufacturing, marketing and customer service and support capabilities that are greater than ours. We face competition from companies whose strategy is to provide a broad array of products, some of which compete with the products and services we offer. These competitors may bundle their products in a manner that discourages customers from purchasing our products. In addition, we face competition from emerging semiconductor equipment companies whose strategy is to provide a portion of the products and services that we offer often at a lower price than ours and use innovative technology to sell products into specialized markets. We also face competition from Chinese equipment manufacturers that may receive greater support than we do from Chinese customers and governmental agencies because they are locally based. In addition, our local Chinese competitors may offer lower prices and more liberal payment terms than ours. Loss of our competitive position due to any of these factors could impair our prices, customer orders, revenue, gross margin, and market share, any of which would negatively affect our business, financial position and results of operations.

Risks Related to Our Business

We may not be able to generate sufficient cash flows or obtain access to external financing necessary to fund existing operations and our growth plan.

Our cash flows may be insufficient to provide adequate working capital in the future and we may require additional financing to fund existing operations as well as our growth plan. We paid off and terminated our existing credit facility with UMB Bank in September 2024. There is no assurance that we will be able to replace such facility or that any additional financing will be available if required, or, even if available, that it would not materially dilute the ownership

percentage of our then existing shareholders, result in increased expenses or result in covenants or special rights that would restrict our operations.

We may not be able to manage our business successfully through severe business cycles.

We may be unable to successfully expand or contract our business to meet fluctuating demands. Market fluctuations place significant strain on our management, personnel, systems, and resources. To successfully manage our growth through such market fluctuations, we believe we must effectively: (a) maintain the appropriate number and mix of permanent, part-time, temporary and contract employees to meet the fluctuating demand for our products; (b) train, integrate and manage personnel, particularly process engineers, field service engineers, sales and marketing personnel, and financial and information technology personnel to maintain and improve skills and morale; (c) retain key management and augment our management team, particularly if we lose key members; (d) continue to enhance our customer resource and manufacturing management systems to maintain high levels of customer satisfaction and efficiencies, including inventory control; (e) manage our existing contract manufacturers and those we engage in the future, (f) implement and improve existing and new administrative, financial and operations systems, procedures and controls; (g) expand and upgrade our technological capabilities; and (h) manage multiple relationships with our customers, suppliers and other third parties.

We may encounter difficulties in effectively managing the budgeting, forecasting and other process control issues presented by rapidly changing business cycles. If we are unable to effectively manage our business through these cycles, we may not be able to take advantage of market opportunities, develop new technologies and other products, satisfy customer requirements, execute our business plan or respond to competitive pressures.

Our inability to attract, train and retain effective employees and management could harm our business.

Our success depends upon the continued contributions of our executive officers and certain other employees, many of whom have many years of experience with us and would be extremely difficult to replace. We must also attract and retain experienced and highly skilled engineering, sales and marketing and managerial personnel. Competition for qualified personnel is intense in our industry, and we may not be successful in hiring and retaining these people. If we lost the services of our executive officers or our other highly qualified and experienced employees or cannot attract and retain other qualified personnel, our business could suffer as a result of less effective management due to loss of accumulated knowledge of our business or through less successful products due to a reduced ability to design, manufacture and market our products.

We may be unable to implement certain business strategies and any issue with the pursuit of such business strategies could materially adversely affect our business and results of operations.

We may from time to time determine to implement business strategies and restructuring initiatives in order to remain competitive. Because our strategies and restructuring activities may involve changes to many aspects of our business, including the location of our production facilities, the use of contract manufactures, and the potential exit of certain product lines and businesses, our ability to successfully do so depends on a number of factors, many of which are outside of our control. If we are not able to effectively manage or efficiently implement these strategies and/or restructuring initiatives for reasons within or outside of our control, then our business operations could be materially adversely affected.

In addition, implementation of a business strategy may lead to the disruption of our existing business operations. For example, the contingent risks associated with outsourcing certain of our existing manufacturing operations to third parties, as is the case with our use of third party manufacturers, primarily in Canada and Mexico, could materially impact our financial condition or results of operations and/or could disrupt our existing operations, especially if a contract manufacturer is unable to meet its commitments under any agreements or encounters financial difficulty. Furthermore, our efforts to outsource certain of our manufacturing operations may require additional management time and effort to implement successfully, and lead to higher than anticipated capital expenditures.

The failure to successfully and timely realize the anticipated benefits of these transactions or strategies could have a material adverse effect on our profitability, financial condition or results of operations. In addition, even if we fully execute and implement these activities, there may be other unforeseeable and unintended consequences that could

materially adversely impact our profitability and business, including unintended employee attrition or harm to our competitive position. To the extent that we do not achieve the profitability enhancement or other anticipated benefits of strategy or restructuring initiatives, our results of operations may be materially adversely affected.

We may be unable to successfully acquire and integrate new operations, which could cause our business to suffer.

We continually evaluate potential acquisitions and consider acquisitions an important part of our future growth strategy. In the past, we have made acquisitions of, or significant investments in, other businesses with synergistic products, services and technologies and plan to continue to do so in the future. There can be no assurance that we will be able to identify suitable acquisition opportunities in the future or that we will be able to consummate any such transactions on terms and conditions acceptable to us.

Additionally, we cannot predict if or when acquisitions will be completed, and we may face significant competition for acquisition targets. Acquisitions involve numerous risks, including: (a) difficulties in integrating the operations, technologies, management information systems, products and personnel of the acquired companies; (b) diversion of management's attention from normal daily operations of the business; (c) loss of key employees; (d) difficulties in entering markets in which we have no or limited prior experience and where our competitors in such markets have stronger market positions; (e) difficulties in complying with regulations, such as antitrust and environmental regulations, and managing risks related to an acquired business; (f) an inability to timely obtain financing, including any amendments required to our existing financing agreement; (g) an inability to implement uniform standards, controls, procedures and policies; (h) undiscovered and unknown problems, defects, liabilities or other issues related to any acquisition that become known to us only after the acquisition; and (i) loss of key customers or suppliers. Any of these risks could have a material adverse effect on our business, results of operations, financial condition, or cash flows, particularly in the case of a large acquisition.

Our reliance on sales to a few major customers, often on credit terms, places us at financial risk.

We currently sell to a relatively small number of customers and expect to do so for the foreseeable future. Therefore, our operating results depend on the ability of these customers to sell products that require our equipment in their manufacturing operations. Many of our customer relationships have developed over a short period of time and certain ones are in the early stages of development. The loss of sales to any of these customers would have a significant negative impact on our business. Additionally, our customers may cancel their agreements or orders with us if we fail to meet certain product specifications, materially breach agreements or encounter insolvency or bankruptcy. Any such cancellations may result in inventory that we may not be able to quickly resell. They also may seek to renegotiate the terms of current agreements or renewals. We cannot be certain our existing customers will generate significant revenue for us in the future or that these new customer relationships will be maintained or continue to develop. If we are unable to maintain or expand our customer base, we may not be able to maintain or increase our revenue.

In addition to having a relatively limited number of customers, we manufacture a limited number of products for each of our customers. If we lose any of our largest customers (as we have in the past from time to time), experience a significant reduction in sales to any such customers or no longer manufacture a particular product line for one of our largest customers, we will experience a significant reduction in our revenue.

As of September 30, 2024, one Thermal Processing Solutions customer represented 12% of our accounts receivable. A concentration of our receivables from one or a small number of customers places us at risk. A significant change in the liquidity or financial position of any of our customers that purchase large systems could have a material impact on the collectability of our accounts receivable and our future operating results. We attempt to manage this credit risk by requiring significant partial payments prior to shipment, where appropriate, and by actively monitoring collections. We also require letters of credit from certain customers depending on the size of the order, type of customer or its creditworthiness and its country of domicile. Our major customers may seek and, on occasion, may receive pricing, payment or other commercial terms that are less favorable to us than the current terms we customarily obtain. If any one or more of our major customers were to seek to re-negotiate their agreements on more favorable terms, or not pay us or continue business with us, it could adversely affect our business, financial position and results of operations.

Manufacturing interruptions or delays could affect our ability to meet customer demand and lead to higher costs.

Our business depends on timely supply of parts, services and related products that meet the rapidly changing technical and volume requirements of our customers. Some key parts to our products are subject to long lead times and/or are obtainable only from a single supplier or limited group of suppliers. Cyclical industry conditions and the volatility of demand for manufacturing equipment increase capital, technical, operational and other risks for us and for companies throughout our supply chain. Further, these conditions may cause some suppliers to scale back operations, exit businesses, merge with other companies, file for bankruptcy protection or possibly cease operations. We also may experience significant interruptions of our manufacturing operations, delays in our ability to deliver products or services or increased costs as a result of any of the following: (a) the failure or inability of suppliers to deliver sufficient quantities of quality parts on a cost-effective and timely basis; (b) volatility in the availability and cost of materials, including rare earth elements; (c) difficulties or delays in obtaining required import or export approvals; (d) information technology or infrastructure failures; and (e) natural disasters or other events beyond our control (such as earthquakes, floods or storms, regional economic downturns, pandemics, social unrest, political instability, terrorism, or acts of war), particularly where we conduct manufacturing operations.

We use third parties for certain of our manufacturing activities. If our contract manufacturers do not perform effectively, we may not be able to achieve the expected cost savings and may incur additional costs to correct errors or fulfill customer demand. Depending on the function involved, such errors may also lead to business disruption, processing inefficiencies, the loss of or damage to intellectual property through security breach, or an impact on employee morale. Our operations may also be negatively impacted if any of these contract manufacturers do not have the financial capability to meet our growing needs.

There are also inherent execution risks in starting up a new factory or expanding production capacity, whether one of our own factories or that of our contract manufacturers, as well as risks to moving production to different contract manufacturers, which could increase costs and reduce our operating results. In the fourth quarter of fiscal 2023, we opened a new SiC consumables facility in Spartanburg, South Carolina to complement our manufacturing facility in Carlisle, Pennsylvania. We are also working with contract manufacturing facilities in Canada and Mexico. The establishment and operation of new manufacturing facilities or contract manufacturing involves significant risks and challenges, some of which we have experienced and may experience in the future, including, but not limited to, the following: (a) design and construction delays and cost overruns; (b) issues in installing and qualifying new equipment and ramping production; (c) poor production process yields and reduced quality control; and (d) insufficient personnel with requisite expertise and experience to operate a manufacturing facility for the products we manufacture.

Because we depend on revenue from international customers, our business may be adversely affected by changes in the economies and policies of the countries or regions in which we do business.

In 2024, 59% of our net revenue came from customers outside of North America as follows: Asia - 43% (including China - 20%, Malaysia - 12% and Taiwan - 8%); and Europe - 16% (including Germany - 6% and Czech Republic - 3%).

Each geographic region in which we, our customers, and our suppliers operate exhibits unique characteristics that can cause capital equipment investment patterns to vary significantly from period to period. Our business and results of operations could be negatively affected by periodic local or international economic downturns, trade balance issues and political, social and military instability in countries such as China, Russia, India, South Korea, Taiwan, Ukraine and possibly elsewhere. In addition, we face competition from a number of suppliers based in Asia that have certain advantages over suppliers from outside of Asia. These advantages include lower operating, shipping and regulatory costs, proximity to customers, favorable tariffs and other government policies that favor local suppliers. Additionally, the marketing and sale of our products to international markets expose us to a number of risks, including the following: (a) increased costs associated with maintaining the ability to understand the local markets and follow their trends and customs, as well as developing and maintaining an effective marketing and distributing presence; (b) limitations on our ability to require advance payments from our customers; (c) difficulty in providing customer service and support in local markets; (d) difficulty in staffing and managing overseas operations; (e) longer sales cycles and collection periods; (f) fewer or weaker legal protections for our intellectual property rights; (g) failure to develop appropriate risk management and internal control structures tailored to overseas operations; (h) difficulty and costs relating to compliance with the different or changing commercial and legal requirements of our overseas markets; (i) fluctuations

in foreign currency exchange and interest rates; (j) failure to obtain or maintain certifications for our products or services in these markets; and (k) international trade barriers such as export requirements, tariffs, taxes and other restrictions and expenses.

Our business may be adversely affected by significant exchange rate fluctuations.

Though our business has not been materially affected in the past by currency fluctuations, there is a risk that it may be materially adversely affected in the future. Such risk includes possible losses due to currency exchange rate fluctuations, future prohibitions against repatriation of earnings, or proceeds from disposition of investments.

We are exposed to risks associated with an uncertain global economy.

Uncertain global economic conditions and slowing growth in China, Europe and the United States, along with difficulties in the financial markets, national debt concerns and government austerity measures in certain regions, pose challenges to the industries in which we operate. Related factors, including unemployment, inflation and fuel prices, exacerbate negative trends in business and consumer spending and may cause our customers to delay, cancel, or refrain from placing orders for equipment or services. These actions may, in turn, reduce our net sales, reduce backlog, and negatively affect our ability to convert backlog to sales. Uncertain market conditions, difficulties in obtaining capital, or reduced profitability also may cause some customers to scale back operations, exit businesses, merge with other manufacturers, or file for bankruptcy protection and potentially cease operations, which can result in lower sales and/or additional inventory or bad debt expense for us. These conditions may similarly affect key suppliers, impairing their ability to deliver parts and potentially causing delays or added costs for delivery of our products. In addition, these conditions may lead to strategic alliances by, or consolidation of, other equipment manufacturers, which could adversely affect our ability to compete effectively. Uncertainty about future economic and industry conditions also makes it more challenging for us to forecast our operating results, make business decisions, and identify and prioritize the risks that may affect our businesses, sources and uses of cash, financial condition and results of operations. We may be required to implement additional cost reduction efforts, including restructuring activities, and/or modify our business model, which may adversely affect our ability to capitalize on opportunities in a market recovery. If we do not timely and appropriately adapt to changes resulting from these uncertain macroeconomic and industry conditions, or to difficulties in the financial markets, our business, financial condition and results of operations may be materially and adversely affected.

If we fail to maintain optimal inventory levels, our inventory obsolescence costs could increase, our liquidity could be significantly reduced, or our revenue could decrease.

While we must maintain sufficient inventory levels to operate our business successfully, meet our customers' demands, and mitigate the possible impact of supply chain issues, accumulating excess inventory may have a significant unfavorable impact on our operating results and financial condition. Changing customer demands, supplier lead times and uncertainty surrounding new product launches expose us to risks associated with excess inventory or shortages. Our products are manufactured using a wide variety of purchased parts and raw materials and we must maintain sufficient inventory levels to meet the demand for the products we sell, which can change rapidly and unexpectedly. During peak years of our business, increases in demand for capital equipment result in longer lead times for many important system components. Future increases in demand could cause delays in meeting the shipment requirements or expectations of our customers. Because of the variability and uniqueness of customer orders, we seek to avoid maintaining an extensive inventory of materials for manufacturing. However, long lead times for important system components during industry upturns sometimes require us to carry higher levels of inventory and make larger purchase commitments than we otherwise would make. We may be unable to sell sufficient quantities of products if market demand changes, resulting in increased risk of excess inventory that could lead to obsolescence or reduced liquidity as we fulfill our purchase commitments. Conversely, if we do not have a sufficient inventory of a product to fulfill customer orders, we may lose orders or customers, which may adversely affect our business, financial condition and results of operations. We may not be able to accurately predict market demand to avoid inventory shortages or build inventories and issue purchase commitments in excess of our current requirements.

Supplier capacity constraints, supplier production disruptions, supplier quality issues or price increases could increase our operating costs and adversely impact the competitive positions of our products.

We use numerous suppliers covering a wide range of materials and services in the production of our products including custom electronic and mechanical components. Key vendors include suppliers of controllers, quartz and silicon carbide for our diffusion systems, steel mills capable of producing the types of steel to the tolerances needed for our wafer carriers, an injection molding machine that molds plastic inserts into our steel carriers, an adhesive manufacturer that supplies the critical glue and a pad supplier that produces a unique material used in the manufacture of our polishing templates. We also rely on third parties for certain machined parts, steel frames and metal panels and other components used particularly in the assembly of our production equipment. Although we strive to ensure that parts are available from multiple suppliers, we procure some key parts from a single supplier or a limited number of suppliers. Thus, at times, certain parts may not be available in sufficient quantities, or on a timely and cost-efficient basis, to adequately meet our needs and the needs of our customers.

In the event of supplier capacity constraints, production disruptions, or failure to meet our requirements concerning quality, cost or performance factors, we may seek to transfer our business to alternative sourcing which could lead to further delays, additional costs or other difficulties. If, in the future, we do not receive, in a timely and cost-effective manner, a sufficient quantity and quality of parts to meet our production requirements, our business, financial position and results of operations may be materially and adversely affected.

Our income taxes are subject to variables beyond our control.

Our net income and cash flow may be adversely affected by conditions affecting income taxes which are outside our control. Examples of the potential uncontrollable circumstances that could affect our tax rate are as follows:

- We sell and operate globally in the United States, Europe and Asia. Disagreement could occur on the jurisdiction of income and taxation among different governmental tax authorities. Potential areas of dispute may include transfer pricing, intercompany charges and intercompany balances.
- We are subject to a Chinese withholding tax on certain non-tangible charges made under our transfer pricing agreements. The interpretation of what charges are subject to the tax and when the liability for the tax occurs has varied and could change in the future.
- Tax rates may increase, or new tax rates may be implemented (i.e., a global minimum rate), and, therefore, have a material adverse effect on our earnings and cash flows.

Natural disasters, outbreaks of infectious diseases, terrorist attacks, wars and threats of war may negatively impact our operations, revenue, costs, and stock price.

Natural disasters such as earthquakes, floods, severe weather conditions, outbreaks of infectious diseases in addition to COVID-19 or other catastrophic events may severely affect our operations or those of our suppliers and customers. Acts of terrorism, as well as events occurring in response or connection to them, including potential future terrorist attacks, rumors or threats of war, actual military conflicts or trade disruptions impacting our domestic or foreign customers or suppliers, may negatively impact our operations by causing, among other things, delays, or losses in the delivery of supplies or finished goods and decreased sales of our products. More generally, any of these events could cause consumer confidence and spending to decrease and/or result in increased volatility in the worldwide financial markets and economy. They also could result in economic recession either globally or in the markets in which we operate. Any of these occurrences could have a significant adverse impact on our business, financial position and results of operations.

We maintain cash deposits in excess of federally insured limits. Adverse developments affecting financial institutions, including bank failures, could adversely affect our liquidity and financial performance.

We maintain domestic cash deposits in Federal Deposit Insurance Corporation ("FDIC") insured banks that exceed the FDIC insurance limits. We also maintain cash deposits in foreign banks where we operate, some of which are not insured or are only partially insured by the FDIC or similar agencies. Bank failures, events involving limited liquidity, defaults, non-performance, or other adverse developments that affect financial institutions, or concerns or rumors about such events, may lead to liquidity constraints. The failure of a bank, or other adverse conditions in the financial

or credit markets impacting financial institutions at which we maintain balances, could adversely impact our liquidity and financial performance. There can be no assurance that our deposits in excess of the FDIC or other comparable insurance limits will be backstopped by the U.S. or applicable foreign government, or that any bank or financial institution with which we do business will be able to obtain needed liquidity from other banks, government institutions, or by acquisition in the event of a failure or liquidity crisis.

We have identified material weaknesses in our internal control over financial reporting which, if not remediated, could result in material misstatements in our financial statements.

During the fourth quarter ended September 30, 2023, we identified a material weakness in internal control related to ineffective information technology general controls in the areas of user access, segregation of duties, and program change-management over information technology systems that support substantially all of the Company's financial reporting processes. This resulted in our inability to segregate user duties within the Company's business processes. A substantial portion of the Company's controls are dependent upon the information derived from the information technology systems and therefore the dependent controls were concluded to be ineffective. A material weakness is a deficiency, or combination of deficiencies, in internal control over financial reporting such that there is a reasonable possibility that a material misstatement of our annual consolidated financial statements will not be prevented or detected on a timely basis.

Additionally, in the fourth quarter ended September 30, 2023, we identified a material weakness because we did not design and maintain adequate internal controls over non-routine and complex transactions, including the preparation and review of the third-party service provider valuation reports in the areas of goodwill and intangible assets.

In fiscal 2024, our management, under the oversight of our Audit Committee, began designing and implementing measures designed to remediate the control deficiencies contributing to these material weaknesses. The material weaknesses are considered remediated once all necessary internal controls have been implemented, tested and determined to be operating effectively for a sufficient period of time, which we concluded occurred as of September 30, 2024. Notwithstanding the remediation of the control deficiencies, we cannot assure you that we will not identify additional material weaknesses in our internal control over financial reporting in the future. If we are unable to remediate the material weaknesses, our ability to record, process and report financial information accurately, and to prepare financial statements with the time periods specified by the rules and forms of the Securities and Exchange Commission, could be adversely affected. This failure could negatively affect the market price and trading liquidity of our common stock, cause investors to lose confidence in our reported financial information, subject us to civil and criminal investigations and penalties and generally materially and adversely impact our business and financial condition.

Continued changes in corporate governance requirements, policies and practices may impact our business.

Corporate governance, public disclosure and compliance practices continue to evolve based upon continuing legislative action, SEC rulemaking and policy positions taken by large institutional stockholders and proxy advisors. As a result, the number of rules, regulations and standards applicable to us may become more burdensome to comply with, could increase scrutiny of our practices and policies by these or other groups and increase our legal and financial compliance costs and the amount of time management must devote to governance and compliance activities. For example, the SEC has recently adopted rules requiring that issuers provide significantly increased disclosures concerning cybersecurity risk management, strategy, governance and incident reporting and adopt more stringent executive compensation clawback policies. Increasing regulatory burdens and corporate governance requirements could make it more difficult for us to attract and retain qualified members of our Board and qualified executive officers.

Risks Related to Regulations and Litigation

We are subject to various laws and regulations, including recent pronouncements related to laws and regulations governing climate related disclosures, cybersecurity, privacy, anti-corruption and the environment. Obligations and liabilities under these laws and regulations may materially harm our business.

Our operations are subject to an array of governmental regulations in each of the jurisdictions in which we operate, including taxation policies, governance and audit requirements, employment and labor laws, environmental regulations, transportation regulations, import and export regulations and tariffs, possible foreign exchange restrictions and international monetary fluctuations. Noncompliance with applicable regulations, implementation of new regulations or modifications to existing regulations may increase costs of compliance, require a termination of certain activities or otherwise materially adversely affect our business, results of operations and financial condition.

Climate Disclosure, Cybersecurity and Other Pronouncements - Pronouncements by the SEC, Federal Trade Commission, Department of Justice, and from the state of California, among others, related to antitrust, climate related disclosures, cybersecurity and privacy could have the impact of increasing Company compliance costs, increasing potential liability to the Company as a result of frivolous lawsuits, or place the Company in a position of not knowing when or if the laws are settled in a particular area in order for the Company to effectively comply.

Anti-Corruption Laws and Regulations - We are a U.S.-based multinational company with extensive operations in Asia and elsewhere. We operate in several high-risk jurisdictions, including, but not limited to China. Various U.S. and certain non-U.S. anti-corruption/anti-bribery and other international trade laws and regulations apply to us and our businesses. These laws and regulations may include, among others, the Foreign Corrupt Practices Act of 1977, as amended, the U.S. Travel Act, domestic anti-corruption laws such as 18 U.S.C. §201, the Money Laundering Control Act of 1986, the USA PATRIOT Act, the U.S. Export Control Reform Act of 2018, the U.S. Export Administration Regulations (15 C.F.R. §§730 et seq.), U.S. sanctions contained in 31 C.F.R. Parts 500-599, the U.S. International Emergency Economic Powers Act, the U.S. Trading with the Enemy Act, the International Boycott Provisions (Section 999) of the U.S. Internal Revenue Code, the UK Bribery Act 2010, the UK Proceeds of Crime Act 2002, and certain other anti-corruption, anti-bribery, anti-kickback, anti-fraud, anti-money laundering, anti-terrorist financing, anti-narcotics, anti-boycott, export control, sanctions, embargo, import control, customs, tax, insider trading, insurance, banking, false claims, anti-racketeering, and other laws, regulations, decrees, government or executive orders, or judicial or administrative decisions or determinations to the extent applicable.

These laws and regulations are interpreted very broadly and will impact and raise legal compliance risks for our business in the various jurisdictions where we operate. Violations of any of these laws and regulations may result in substantial civil and/or criminal fines and penalties, imprisonment, the loss of export or import privileges, debarment, tax reassessments, breach of contract and fraud litigation, reputational harm, and other consequences.

Anti-corruption/anti-bribery and the other laws and regulations referenced above are actively enforced by U.S. and other government agencies. Among various matters, anti-corruption/anti-bribery laws prohibit our companies, subsidiaries, directors, officers, employees, and business partners, as well as third parties acting for or on our behalf, from authorizing, promising, offering, providing, soliciting, or accepting, whether directly or indirectly, improper payments or anything else of value to or from recipients in the public or private sector. We may engage vendors and third-party business partners to sell our products or services and/or to obtain necessary permits, licenses, patent registrations, and other regulatory approvals. We have direct or indirect interactions with officials and employees of government agencies or government-affiliated organizations. These activities raise our anti-corruption/anti-bribery risk exposure. We can be held liable for the corrupt or other illegal activities of our officers, directors, employees, and business partners, as well as the conduct of third parties acting for or on our behalf, even if we do not explicitly authorize or have actual knowledge of their misconduct. The application of these laws to us also may place us at a competitive disadvantage to foreign companies that are not subject to similar laws/regulations.

Environmental Laws and Regulations - We are subject to a variety of national, state, regional and local environmental laws and regulations. Among other things, these laws and regulations impose limitations and prohibitions on the discharge and emission of, and establish standards for the use, disposal and management of, regulated materials and waste and impose liabilities for the costs of investigating and cleaning up, and damages resulting from, present and past spills, disposals or other releases of hazardous substances or materials. In the ordinary

course of business, we use and generate substances that are regulated or may be hazardous under environmental laws. We have an inherent risk of liability under environmental laws and regulations, both with respect to ongoing operations and with respect to contamination that may have occurred in the past on our properties or as a result of our operations. While we endeavor to comply with all regulatory requirements, from time to time, our operations or conditions on properties that we have acquired have resulted in liabilities under these environmental laws. We may in the future incur material costs to comply with environmental laws or sustain material liabilities from claims concerning noncompliance or contamination. Under certain environmental laws, we could be held responsible for all the costs relating to any contamination at, or migration to or from, our or our predecessors' past or present facilities. These laws often impose liability even if the owner, operator or lessor did not know of, or was not responsible for, the release of such hazardous substances. While we maintain certain related insurance coverages, we have no reserves for any such liabilities.

We are also required to obtain environmental permits from governmental authorities for certain of our operations. If we violate or fail to obtain or comply with these laws, regulations, or permits, we could be fined or otherwise sanctioned by regulators. We could also become liable if employees or other parties are improperly exposed to hazardous materials.

We cannot predict what environmental legislation or regulations will be enacted in the future, how existing or future laws or regulations will be administered or interpreted, or what environmental conditions may be found to exist at our facilities or at third party sites for which we may be liable. Enactment of stricter laws or regulations, stricter interpretations of existing laws and regulations or the requirement to undertake the investigation or remediation of currently unknown environmental contamination at sites we own or third-party sites may require us to make additional expenditures, some of which could be material. Responding to governmental investigations or other actions may be both time-consuming and disruptive to our operations and could divert the attention of our management and key personnel from our business operations. The impact of these and other investigations and lawsuits could have a material adverse effect on our financial statements.

The United States could withdraw from or materially modify certain international trade agreements, or change tariff, trade, or tax provisions related to the global manufacturing and sales of our products in ways that we currently cannot predict.

A portion of our business activities are conducted in foreign countries, including China, Malaysia and Taiwan. Our business benefits from free trade agreements, and we also rely on various U.S. corporate tax provisions related to international commerce as we build, market and sell our products globally. Changes in U.S. or international social, political, regulatory and economic conditions could impact our business, reputation, financial condition and results of operations. Political and economic instability, geopolitical conflicts, political unrest, civil strife, terrorist activity, acts of war, public corruption, expropriation, nationalism and other economic or political uncertainties in the United States or internationally could interrupt and negatively affect the sale of our products or other business operations. Any negative sentiment toward the United States as a result of any such changes could also adversely affect our business. In addition, changes in laws and policies governing foreign trade, manufacturing, development and investment in the territories or countries where we currently sell our products or conduct our business could adversely affect our business. U.S. presidential administrations have instituted or proposed changes in trade policies that include the negotiation or termination of trade agreements, the imposition of higher tariffs on imports into the U.S., economic sanctions on individuals, corporations or countries, and other government regulations affecting trade between the U.S. and other countries where we conduct our business. It may be time-consuming and expensive for us to alter our business operations to adapt to or comply with any such changes. Changes or proposed changes in U.S. or other countries' trade policies may result in restrictions and economic disincentives on international trade. Tariffs and other changes in U.S. trade policy have in the past and could in the future trigger retaliatory actions by affected countries, and certain foreign governments have instituted or are considering imposing retaliatory measures on certain U.S. goods. Further, any emerging protectionist or nationalist trends either in the United States or in other countries could affect the trade environment. Amtech, like many other multinational corporations, does a significant amount of business that would be impacted by changes to the trade policies of the United States and foreign countries (including governmental action related to tariffs, international trade agreements, or economic sanctions). Such changes have the potential to adversely impact the U.S. economy or certain sectors thereof or the economy of another country in which we conduct operations, our industry and the global demand for our products, and as a result, could have a material adverse effect on our business, financial condition and results of operations. We are continuing to evaluate the impact of the announced and other proposed tariffs on products that we import from China, and we may experience a material

increase in the cost of our products, which may result in our products becoming less attractive relative to products offered by our competitors.

These developments, or the perception that any of them could occur, may have a material adverse effect on global economic conditions and the stability of global financial markets, and may significantly reduce global trade and, in particular, trade between the impacted nations and the United States. Any of these factors, or any changes to U.S. corporate tax policies related to international commerce, could depress economic activity and have a material adverse effect on our business, financial condition and results of operations.

We are subject to expanded export control restrictions adopted by the U.S. Department of Commerce's Bureau of Industry and Security that could negatively impact our business in China.

The United States and certain other countries in which we do business maintain government controls that may restrict our ability to import or export our products and services or increase the cost of our operations through the imposition of tariffs, new controls, outright bans, or otherwise, that could harm our business and negatively impact our financial position and results of operations. For example, the U.S. Department of Commerce has added and continues to add numerous China-based entities to the U.S. Entity List, including many entities active in the semiconductor industry in China, restricting our ability to provide products and services to such entities without an export license. Even if we apply for licenses to sell our products or provide services to companies on the U.S. Entity List, there can be no assurance that licenses will be granted. In addition, the U.S. Department of Commerce has imposed new export licensing requirements on exports to China-based customers engaged in development or production in China of advanced semiconductors and supercomputers, military end uses, support for military end users, or where Commerce has determined there is a risk of diversion to a military end use, as well as requiring our customers to obtain export licenses when they use certain semiconductor capital equipment based on U.S. technology to manufacture products connected to certain entities on the U.S. Entity List. The U.S. Department of Commerce has also imposed restrictions on the activities of U.S. persons supporting or facilitating transactions with projects in China for the development or production of advanced semiconductors and supercomputers. To date, these new rules have not significantly impacted our operations, but we are continually monitoring their impact. If additional companies are added to the U.S. Entity List, or other licensing requirements or restrictions are imposed, thereby limiting our ability to sell our products or services to other customers in China, our business could be significantly harmed. Similar actions by the U.S. government or another country could impact our ability to provide our products and services to existing and potential customers.

We face a risk of product liability claims or other litigation, which could be expensive and may divert management's attention from running our business.

Amtech and our subsidiaries are defendants from time to time in actions for matters arising out of our business operations. The manufacture and sale of our products, which, in our customers' operations, involve toxic materials and robotic machinery, involve the risk of product liability claims. In addition, a failure of one of our products at a customer site could interrupt the business operations of our customer. Our existing insurance coverage limits may not be adequate to protect us from all liabilities that we might incur in connection with the manufacture and sale of our products if a successful product liability claim or series of product liability claims were brought against us. As of September 30, 2024 and 2023, our accrued warranty costs amounted to $0.6 million and $1.0 million, respectively. Our assumptions regarding the durability and reliability of our products may not be accurate, and because our products have relatively long warranty periods, we cannot assure you that the amount of accrued warranty by us for our products will be adequate considering the actual performance of our products or that we won't experience higher than expected warranty claims. If we experience a significant increase in warranty claims, we may incur significant repair and replacement costs associated with such claims. Furthermore, widespread product underperformances or failures will damage our reputation and customer relationships and may cause our sales to decline, which in turn could have a material adverse effect on our business, financial condition and results of operations.

We also may be involved in other legal proceedings or claims and experience threats of legal action from time to time in the ordinary course of our business. For example, securities class action litigation is often brought against companies following periods of volatility in the market price of its securities or in connection with strategic transactions. We may in the future be the target of securities litigation due to volatility in the market price of our common stock or for other reasons. Any securities litigation could result in substantial costs and could divert the attention and resources of our management.

Where appropriate, we intend to vigorously defend all claims. However, any actual or threatened claims, even if not meritorious or material, could result in the expenditure of significant financial and managerial resources. The continued defense of these claims and other types of lawsuits could divert management's attention away from running our business. In addition, amounts required to be paid in settlement of any claims, and the legal fees and other costs associated with their defense or settlement, cannot be estimated and could, individually or in the aggregate, materially harm our financial condition.

Social and environmental responsibility regulations, policies and provisions, as well as customer and investor demands, may make our supply chain more complex and may adversely affect our relationships with customers and investors.

With the increasing focus on corporate social and environmental responsibility in the semiconductor industry, a number of our customers have adopted, or may adopt, procurement policies that include social and environmental responsibility provisions or requirements that their suppliers should comply with, or they may seek to include such provisions or requirements in their procurement terms and conditions. We may face difficulties in satisfying these customers' demands, which may harm our sales and operating results.

Many investors also expect companies to disclose corporate social and environmental policies, practices and metrics under voluntary disclosure standards and frameworks. We periodically communicate our strategies, goals and targets related to our corporate social and environmental policies and programs. These strategies, goals and targets, and their underlying assumptions and projections, reflect our current plans and aspirations, but we may be unable to achieve them. It is also possible that our investors might not be satisfied with our policies, programs, goals, performance and related disclosures, or the speed of their adoption, implementation and measurable success, or that we have adopted such policies, programs and commitments at all.

In addition, unfavorable ratings or assessment of our corporate social and environmental policies and programs, including our compliance with certain voluntary disclosure standards and frameworks, may lead to negative investor sentiment toward us, which could have a negative impact on our stock price and our access to and cost of capital.

Risks Related to Our Research and Development and Intellectual Property Activities

We may not be able to keep pace with the rapid change in the technology needed to meet customer requirements.

Success in the semiconductor equipment industry depends, in part, on continual improvement of existing technologies and rapid innovation of new solutions. For example, the semiconductor industry continues to shrink the size of semiconductor devices. This trend and other evolving customer needs require us to continually respond with new product developments. Technical innovations are inherently complex and require long development cycles and appropriate professional staffing. Our future success depends on our ability to develop and introduce new products, or new uses for existing products, that successfully address changing customer needs and gain market acceptance. We also must manufacture these new products in a timely and cost-effective manner. To realize future growth through technical innovations in the semiconductor industry, we must acquire the technology through product development, merger and acquisition activity or through the licensing of products from our technology partners. Potential disruptive technologies could have a material adverse effect on our business if we do not successfully develop and introduce new products, technologies or uses for existing products in a timely manner and continually find ways of reducing the cost to produce them in response to changing market conditions or customer requirements.

Third parties may violate our proprietary rights, in which we have made significant investments, resulting in a loss of value of some of our intellectual property or costly litigation.

Our success is dependent in part on our technology and other proprietary rights. We own various U.S. and international patents and have additional pending patent applications relating to some of our products and technologies. Protecting and defending our patents domestically, and especially internationally, is costly. In addition, the process of seeking patent protection is lengthy and expensive. Therefore, we cannot be certain that pending or future applications will result in issued patents, or that issued patents will be of sufficient scope or strength to provide meaningful protection or commercial advantage to us. Other companies and individuals, including our larger competitors, may develop

technologies that are similar or superior to our technology or design around the patents we own or license. In addition, the patent for the technology that we license and use in our manufacture of insert carriers has expired, which, along with the other risks related to our patents described above, may have the effect of diminishing or eliminating any competitive advantage we may have with respect to our manufacturing process.

We also maintain trademarks on certain of our products and claim copyright protection for certain proprietary software and documentation. We can give no assurance, however, that our trademarks and copyrights will be upheld or will successfully deter infringement by third parties.

We attempt to protect our trade secrets and other proprietary information through confidentiality agreements with our customers, suppliers, employees and consultants and through other security measures. We also maintain exclusive and non-exclusive licenses with third parties for the technology used in certain products. However, these employees, consultants and third parties may breach these agreements, and we may not have adequate remedies for wrongdoing. In addition, the laws of certain territories, such as China, in which we develop, manufacture or sell our products may not protect our intellectual property rights to the same extent as do the laws of the United States.

We may face intellectual property infringement claims that could be time-consuming and costly to defend and could result in our loss of significant rights and the assessment of treble damages.

From time to time, we have received communications from other parties asserting the existence of patent rights or other intellectual property rights that they believe cover certain of our products, processes, technologies or information. Some of these claims may lead to litigation. We cannot assure that we will prevail in these actions, or that other actions alleging misappropriation or misuse by us of third-party trade secrets, infringement by us of third-party patents and trademarks or the validity of our patents, will not be asserted or prosecuted against us. If there is a successful claim of infringement against us, we may be required to pay substantial damages (including treble damages if we were to be found to have willfully infringed a third party's patent) to the party claiming infringement, incur costs to develop non-infringing technology, stop selling or using technology that contains the allegedly infringing intellectual property, or enter into royalty or license agreements that may not be available on acceptable or commercially practical terms, if at all. Intellectual property litigation, regardless of outcome, is expensive and time-consuming, and could divert management's attention from our business. Our failure to successfully defend against infringement claims, or to develop non-infringing technologies or license the proprietary rights on a timely basis, could have a material negative effect on our business, operating results or financial condition.

Risks Related to Our Common Stock

Our stock price may be volatile.

Historically, our common stock has experienced substantial price volatility, particularly as a result of fluctuations in our revenue, earnings and margins over the past few years, and variations between our actual financial results and the published expectations of analysts. For example, during the two-year period ended September 30, 2024, the price of our common stock has ranged from $11.98 to $3.37. If our future operating results or margins are below the expectations of stock market analysts or our investors, our stock price will likely decline.

Speculation and opinions in the press or investment community about our strategic position, financial condition, results of operations or significant transactions can also cause changes in our stock price. Competition in some of the markets we address such as the SiC industry, and the effect of tariffs or COVID-19 or other pandemics on our business, may have a dramatic effect on our stock price.

Additional factors may affect our stock price, including sales of our common stock by us or our existing shareholders as well as changes to the coverage and/or rating of our stock by securities analysts.

Our officers, directors and largest shareholders could choose to act in their best interests and not necessarily those of our other shareholders.

Our directors, executive officers and holders of ten percent or more of our outstanding common stock and their affiliates represent a significant portion of our common stock held as of September 30, 2024, and, therefore, could

have significant influence over our management and corporate policies. These shareholders have significant influence over all matters submitted to our shareholders, including the election of our directors and approval of business combinations, and could potentially initiate or delay, deter or prevent a change of control. Circumstances may occur in which the interests of these shareholders may conflict with the interests of Amtech or those of our other shareholders, and these shareholders may cause us to take actions that align with their interests. Should conflicts of interest arise, we can provide no assurance that these shareholders would act in the best interests of our other shareholders or that any conflicts of interest would be resolved in a manner favorable to our other shareholders. In addition, involvement of certain activist shareholders may impact our ability to recruit and retain talent or otherwise distract management or make decisions that we believe are in the long-term interest of all shareholders.

Shareholder activists could cause a disruption to our business.

An activist investor may indicate disagreement with our strategic direction or capital allocation policies and may seek representation on our Board of Directors. Our business, operating results or financial condition could be adversely affected and may result in, among other things: (a) increased operating costs, including increased legal expenses, insurance, administrative expenses and associated costs incurred in connection with director election contests; (b) uncertainties as to our future direction, which could result in the loss of potential business opportunities and could make it more difficult to attract, retain, or motivate qualified personnel, and strain relationships with investors and customers; and (c) reduction or delay in our ability to effectively execute our current business strategy and to implement new strategies.

There are provisions in our corporate governing documents that could make an acquisition of the Company more difficult and limit attempts by our shareholders to replace or remove our current management.

Our amended and restated articles of incorporation and our amended and restated bylaws, as well as Arizona law, contain provisions that may have the effect of deterring takeovers or delaying or preventing a change in control of us or changes in our management that a shareholder might deem to be in his or her best interest. Our amended and restated articles of incorporation and amended and restated bylaws contain provisions that: (a) authorize "blank check" preferred stock, which could be issued by our Board of Directors without shareholder approval and may contain voting, liquidation, dividend and other rights superior to our common stock; (b) specify that special meetings of our shareholders can be called only by our Board of Directors, the Chairperson of our Board of Directors, our Chief Executive Officer, or a majority of the Board of Directors; (c) provide that vacancies on our Board of Directors may be filled only by a majority of directors then in office, though not less than a quorum; (d) specify that only our Board of Directors may change the size of our Board of Directors; (e) establish an advance notice procedure for shareholder proposals to be brought before an annual meeting of our shareholders, including proposed nominations of persons for election to our Board of Directors; and (f) expressly authorize our Board of Directors to modify, alter or repeal our bylaws. These provisions, alone or together, could delay or prevent hostile takeovers and changes in control or changes in our management or our Board of Directors.

In addition, because we are incorporated in the State of Arizona, we are governed by the provisions of the Arizona Revised Statutes Section 10-274, which prohibits certain business combinations between us and certain interested shareholders unless specified conditions are met. These provisions may also have the effect of delaying or preventing a change in control of Amtech. Any provision of our amended and restated articles of incorporation or amended and restated bylaws or Arizona law that has the effect of delaying or deterring a change in control could limit the opportunity for our shareholders to receive a premium for their shares of our common stock and could also affect the price that some investors are willing to pay for our common stock.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 1C. CYBERSECURITY

Our Board recognizes the importance of maintaining the trust and confidence of our customers, suppliers, business partners and employees. Our Board, through the Audit Committee, oversees our cybersecurity program as part of our enterprise-wide approach to risk management. Our cybersecurity policies, standards, processes and practices are fully

integrated into our risk management approach and are based on recognized frameworks established by the National Institute of Standards and Technology, the International Organization for Standardization and other applicable industry standards. In general, we seek to address cybersecurity risks through a comprehensive, cross-functional approach that is focused on preserving the confidentiality, security and availability of the information that we collect and store by identifying, preventing and mitigating cybersecurity threats and effectively responding to cybersecurity incidents when they occur.

Risk Management and Strategy

As one of the critical elements of enterprise-wide approach to risk management, our cybersecurity program is focused on the following key areas:

Governance: As discussed in more detail under the heading "Governance" below, our cybersecurity program is led by our IT Director, who reports to our Chief Financial Officer and is responsible for publishing cybersecurity policies and standards, conducting annual risk assessments and maintaining our compliance. Our IT Director leads our information technology team and regularly reports to our Audit Committee.

Collaboration: We have implemented a comprehensive, cross-functional approach to identifying, preventing and mitigating cybersecurity threats and incidents, while also implementing controls and procedures that provide for the prompt escalation of certain cybersecurity incidents so that decisions regarding the public disclosure and reporting of such incidents can be made by management in a timely manner. We work with third-party firms to monitor our cybersecurity environment and report findings to executive leadership, internal audit and the Audit Committee regularly.

Technical Safeguards: We deploy technical safeguards that are designed to protect our information systems from cybersecurity threats, including firewalls, intrusion prevention and detection systems, anti-malware functionality and access controls, which are evaluated and improved through vulnerability assessments, certifications, audits and cybersecurity threat intelligence.

Incident Response and Recovery Planning: We have established and maintained comprehensive incident response and recovery plans that fully address our response to a cybersecurity incident, and such plans are tested and evaluated on a regular basis.

Third-Party Risk Management: We maintain a comprehensive, risk-based approach to identifying and overseeing cybersecurity risks presented by third parties, including vendors, service providers and other external users of our systems, as well as the systems of third parties that could adversely impact our business in the event of a cybersecurity incident affecting those third-party systems. Additionally, we have in place insurance coverage designed to provide coverage in connection with cybersecurity breaches, provided, however, that such insurance coverage may be insufficient to cover all insured losses or all types of claims that may arise.

Education and Awareness: We provide regular, mandatory training for personnel regarding cybersecurity threats as a means to equip our personnel with effective tools to address cybersecurity threats, and to communicate our evolving information security policies, standards, processes and practices.

We engage in the periodic assessment and testing of our policies, standards, processes and practices that are designed to address cybersecurity threats and incidents. These efforts include a wide range of activities, including audits, assessments, vulnerability testing and other exercises focused on evaluating the effectiveness of our cybersecurity measures and planning. We regularly engage third parties to perform assessments on our cybersecurity measures, including information security maturity assessments, audits and independent reviews of our information security control environment and operating effectiveness. The results of such assessments, audits and reviews are reported to our Board and Audit Committee by our IT Director based on materiality. We adjust our cybersecurity policies, standards, processes and practices as necessary based on the information provided by these assessments, audits and reviews.

Governance

Our Board, through the Audit Committee, oversees our enterprise-wide approach to risk management, including the risks arising from cybersecurity threats. Our Audit Committee regularly receives presentations and reports on cybersecurity risks, which address a wide range of topics, including recent developments, evolving standards, vulnerability assessments, third-party and independent reviews, the threat environment, technological trends and information security considerations arising with respect to our peers and third parties. Our Audit Committee also receives prompt and timely information regarding any cybersecurity incident that meets established reporting thresholds, as well as ongoing updates regarding any such incident until it has been addressed. On an annual basis, our Audit Committee discusses our Company's approach to cybersecurity risk management with management.

Our Audit Committee, in connection with management led by our Chief Financial Officer, works collaboratively across our Company to implement a program designed to protect our information systems from cybersecurity threats and to promptly respond to any cybersecurity incidents in accordance with our incident response and recovery plans. To facilitate the success of our cybersecurity risk management program, multidisciplinary teams are deployed to address cybersecurity threats and respond to cybersecurity incidents. Through ongoing communications with these teams, our Audit Committee monitors the prevention, detection, mitigation, and remediation of cybersecurity threats and incidents in real-time and report such threats and incidents to management when appropriate.

Our IT Director has served in various roles in technology leadership for more than 20 years, including cybersecurity. With an undergraduate degree in Information Systems, an MBA, and certification as a Certified Information Systems Security Professional (CISSP) from ISC2, the IT Director plays a key role in managing risks at our company. This includes risks arising from cybersecurity threats, drawing on extensive experience gained from similar companies and leadership positions across the technology sector. Although the Company does not have both a Chief Technology Officer or a Vice President of Security, the IT Director's expertise ensures robust risk management practices are in place. Our Chief Executive Officer, Chief Financial Officer and IT Director each hold undergraduate and/or graduate degrees in their respective fields, and each has experience managing risks at our Company and at similar companies including risks arising from cybersecurity threats.

Cybersecurity Threats

As of the date of this Annual Report on Form 10-K, we do not believe that any risks from cybersecurity threats, including as a result of previous cybersecurity incidents, are reasonably likely to have a material effect on us, our business strategy, results of operations, cash flows or financial condition.

ITEM 2. PROPERTIES

We believe that our properties are adequate for our current needs. In addition, we believe that adequate space can be obtained to meet our foreseeable business needs. The following chart identifies the principal properties which we own or lease.

Location	Use	Own or Lease	Size
Corporate			
Tempe, Arizona	Corporate Headquarters	Lease	6,388 sf
Thermal Processing Solutions Segment			
Ashvale, Surrey, United Kingdom	Office	Lease	1,900 sf
Shanghai, China	Office, Mfg. & Warehouse	Lease	76,530 sf
Penang, Malaysia	Office	Lease	1,570 sf
Westford, Massachusetts	Office, Mfg. & Warehouse	Lease	57,025 sf
Semiconductor Fabrication Solutions Segment			
Phoenix, Arizona	Office & Mfg.	Lease	37,000 sf
Phoenix, Arizona	Manufacturing	Lease	8,200 sf
Bethel, Connecticut	Office & Mfg.	Lease	18,830 sf
Carlisle, Pennsylvania	Office & Mfg.	Lease	40,500 sf
Spartanburg, South Carolina	Manufacturing	Lease	23,100 sf
Singapore, Asia	Office	Lease	947 sf

ITEM 3. LEGAL PROCEEDINGS

Amtech and its subsidiaries are defendants from time to time in actions for matters arising out of their business operations. We do not believe that any matters or proceedings presently pending will have a material adverse effect on our consolidated financial position, results of operations or liquidity.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

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

MARKET INFORMATION

Our common stock, par value $0.01 per share (Common Stock), is trading on the NASDAQ Global Select Market, under the symbol "ASYS." The stock price details can be obtained from the Nasdaq website at *www.nasdaq.com*.

ISSUER PURCHASES OF EQUITY SECURITIES

Share Repurchase Programs

On February 7, 2023, the Board approved a stock repurchase program, pursuant to which we may repurchase up to $5 million of our outstanding Common Stock over a one-year period, commencing on February 10, 2023. Repurchases under the program will be made in open market transactions at prevailing market prices, in privately negotiated transactions, or by other means in compliance with the rules and regulations of the Securities and Exchange Commission; however, we have no obligation to repurchase shares and the timing, actual number, and value of shares to be repurchased is subject to management's discretion and will depend on our stock price and other market conditions. We may, in the sole discretion of the Board, terminate the repurchase program at any time while it is in effect. Repurchased shares may be retired or kept in treasury for further issuance. During the year ended September 30, 2023, did not repurchase any shares of our common stock.

On February 10, 2022, the Board approved a stock repurchase program, pursuant to which we may repurchase up to $5 million of our outstanding Common Stock over a one-year period, commencing on February 16, 2022. Repurchases under the program will be made in open market transactions at prevailing market prices, in privately negotiated transactions, or by other means in compliance with the rules and regulations of the SEC; however, we have no obligation to repurchase shares and the timing, actual number, and value of shares to be repurchased is subject to management's discretion and will depend on our stock price and other market conditions. We may, in the sole discretion of the Board, terminate the repurchase program at any time while it is in effect. Repurchased shares may be retired or kept in treasury for further issuance. During the year ended September 30, 2022, we repurchased 143,430 shares of our Common Stock on the open market at a total cost of approximately $1.4 million (an average price of $9.78 per share). All repurchased shares have been retired.

During the three months ended September 30, 2024, we did not repurchase any of our equity securities nor did we sell any equity securities that were not registered under the Securities Act of 1933, as amended. As of September 30, 2024, there are no amounts authorized for repurchase.

HOLDERS

As of November 29, 2024, there were 279 shareholders of record of our Common Stock. Based upon a recent survey of brokers, we estimate there were approximately an additional 911 beneficial shareholders who held shares in brokerage or other investment accounts as of that date.

DIVIDENDS

We have never paid dividends on our Common Stock. Our present policy is to apply cash to investments in product development and upgrades, acquisitions or expansion, and debt repayments; consequently, we do not expect to pay dividends on our Common Stock in the foreseeable future. However, once the above priorities have been met, we will evaluate the returning of capital to shareholders, as we have done in the past.

UNREGISTERED SALES OF EQUITY SECURITIES

There were no unregistered sales of equity securities in fiscal 2024.

ITEM 6. RESERVED

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

The following discussion of our financial condition and results of operations should be read together with our Consolidated Financial Statements and the accompanying notes included in "Item 8. Financial Statements and Supplementary Data" in this Annual Report on Form 10-K. This discussion contains forward-looking statements, which involve risks and uncertainties. Our actual results could differ materially from those anticipated in the forward-looking statements as a result of certain factors including, but not limited to, those described in "Risk Factors" and elsewhere in this Annual Report on Form 10-K. Please refer to page 5 for further information regarding forward-looking statements and "Item 1A. Risk Factors" for a description of our risk factors.

Overview

We provide equipment, consumables and services for semiconductor wafer fabrication and device packaging. Our products are used in fabricating semiconductor devices, such as silicon carbide (SiC) and silicon (Si) power devices, digital and analog devices, power electronic packages, advanced semiconductor packages and electronic assemblies. We sell these products to semiconductor device and module manufacturers worldwide, particularly in Asia, North America and Europe.

We operate in two reportable segments, based primarily on the industries they serve: (i) Thermal Processing Solutions (formerly called Semiconductor) and (ii) Semiconductor Fabrication Solutions (formerly called Material and Substrate). Our thermal processing solutions include reflow equipment for chip packaging and electronic assembly, diffusion furnaces and furnaces used to produce ceramic based power semiconductor packages and passive electronic components. Our semiconductor fabrication solutions include consumables, equipment and services for wafer polishing, cleaning, slicing and dicing.

The markets we serve are historically cyclical, but not seasonal, with constantly evolving technical requirements and can be subject to tariffs and sourcing restrictions driven by geopolitical tensions. Our revenue is impacted by these broad industry trends.

Growth and Investment Strategy

We believe there are three key secular trends that are key to our future growth:

- ***Advanced Mobility*** - Advanced Mobility encompasses both the development and adoption of electric vehicles and charging infrastructure, including both EV and HEV, as well as advanced automotive electronics including Advanced Driver Assistance Systems (ADAS), infotainment and telematics. Our products intersect these markets in multiple ways: CMP consumables and wafer cleaning systems for the SiC substrates used in the EV power invertors; thermal processing systems for producing EV battery cooling systems and ceramic substrates for HEV power semiconductor packaging; and reflow ovens for ADAS, infotainment and telematics component assemblies.
- ***Supply Chain Resiliency*** - There is a global trend of creating supply chain resiliency by expanding and/or relocating operations outside of mainland China. These new facilities will create demand for new equipment and services in growing regions like Mexico and Southeast Asia.
- ***Artificial Intelligence*** - With Artificial Intelligence (AI), our reflow oven systems are the favored choice for Outsourced Semiconductor Assembly and Test Services (OSATS) providers who perform advanced packaging of the AI chips.

We continue to invest in research and development, including the introduction of our next-generation reflow platform, Aurora, in 2023. Historically, we have grown our business primarily through acquisitions, including the businesses that currently comprise our two reportable segments in the Thermal Processing Solutions and Semiconductor Fabrication Solutions industries: BTU, PR Hoffman, Intersurface Dynamics and Entrepix. Our 2023 acquisition of Entrepix bolstered our offerings in the CMP technology space and incorporated wafer cleaning into our existing capital

equipment product lines. We continue to believe this inorganic growth strategy is the backbone of who Amtech is as a company, we also have a complimentary strategy of pursuing organic growth, particularly during times when we lacked sufficient capital resources to pursue growth through acquisitions. We will continue to pursue acquisitions to supplement organic growth and have added market development resources globally to accelerate organic growth.

In June 2022, we completed the sale of the real property where our manufacturing facility in Massachusetts is located. In connection with this sale, we entered into a two-year leaseback of the facility. This sale-leaseback transaction resulted in a net cash inflow of approximately $14.9 million, after repayment of the existing mortgage and settlement of related sale expenses. In September 2023, we signed a lease for a new location with less square footage and completed the move to this location in June 2024. As we expand our use of contract manufacturers, we will continue to look for ways to reduce our real estate footprint. In March 2024, we completed the sale of our corporate headquarters real property in Arizona. The sale resulted in a net cash inflow of approximately $2.5 million, after settlement of related sale expenses. Following the closing of this transaction, we entered into a lease agreement for a new office for our corporate headquarters, which commenced during the third quarter of fiscal year 2024. In addition, we are evaluating business continuity and resiliency within our operations, our management information systems, and our needs to allow for greater efficiencies and to ensure our infrastructure can support our future growth plans. As a capital equipment manufacturer, we will continue to invest in our business to drive future growth.

Segment Reporting Changes

We evaluated our organizational structure and concluded that we have two reportable segments; Thermal Processing Solutions (formerly called Semiconductor) and Semiconductor Fabrication Solutions (formerly called Material & Substrate). Our Semiconductor Fabrication Solutions segment includes Entrepix beginning at the date of acquisition.

Industry Fluctuations

Our quarterly and annual operating results have been and will continue to be impacted by the timing of large system orders. Further, the semiconductor equipment industry is highly cyclical, and the conditions of this industry remain volatile. Therefore, our order flow fluctuates quarter to quarter. For additional information regarding the risks related to our business and industry, please refer to “Item 1A. Risk Factors” within this Form 10-K.

Fiscal Year

Our fiscal year is from October 1 to September 30. Unless otherwise stated, references to the years 2024, 2023 and 2022 relate to the fiscal years ended September 30, 2024, 2023 and 2022, respectively.

Results of Operations

The following table sets forth certain financial data as a percentage of net revenue for the periods indicated:

	Years Ended September 30,	
	2024	2023
Net revenue	100%	100%
Cost of sales	63%	65%
Intangible asset impairment	1%	4%
Gross margin	36%	31%
Selling, general and administrative	33%	37%
Research, development and engineering	4%	6%
Gain on sale of fixed assets	(2)%	—%
Goodwill impairment	6%	—%
Intangible asset impairment	1%	—%
Severance	1%	1%
Operating loss	(7)%	(13)%
Interest income	—%	—%
Interest expense	—%	—%
Foreign currency (loss) gain	—%	—%
Other	—%	—%
(Loss) income before income taxes	(7)%	(13)%
Income tax provision (benefit)	1%	(2)%
Net loss	(8)%	(11)%

Fiscal 2024 compared to Fiscal 2023

Net Revenue

Net revenue consists of revenue recognized upon shipment or delivery of equipment. Spare parts sales are recognized upon shipment and service revenue is recognized upon completion of the service activity, which is generally ratable over the term of the service contract. Since the majority of our revenue is generated from large system sales, revenue, gross profit and operating income can be significantly impacted by the timing of system shipments.

Our net revenue by reportable segment was as follows, dollars in thousands:

	Years Ended September 30,		Increase	
Segment	2024	2023	(Decrease)	% Change
Thermal Processing Solutions	$ 69,161	$ 77,595	$ (8,434)	(11)%
Semiconductor Fabrication Solutions	32,053	35,720	(3,667)	(10)%
Total net revenue	$ 101,214	$ 113,315	$ (12,101)	(11)%

Net revenue for the years ended September 30, 2024 and 2023 were $101.2 million and $113.3 million, respectively, a decrease of $12.1 million or 11%. Revenue from the Thermal Processing Solutions segment decreased $8.4 million, or 11%, over the prior year period. Our Thermal Processing Solution results for 2024 reflect decreases in belt furnace shipments partially offset by increases in shipments of our horizontal diffusion furnaces. We continue to experience softness in shipments of our advanced packaging and SMT equipment, primarily related to a slowdown in global demand in the consumer markets. Revenue from our Semiconductor Fabrication Solutions segment decreased $3.7 million, or 10%, due to decreases in shipments of our polishing equipment, which was eliminated at the end of 2023, with final shipments in 2024. Additionally, we experienced declines in our wafer cleaning equipment, partially offset by increases in our consumables shipments.

Orders and Backlog

New orders booked by reportable segment were as follows, dollars in thousands:

	Years Ended September 30,			
Segment	2024	2023	Increase (Decrease)	% Change
Thermal Processing Solutions	$ 49,318	$ 74,817	$ (25,499)	(34)%
Semiconductor Fabrication Solutions	29,959	29,080	879	3%
Total new orders	$ 79,277	$ 103,897	$ (24,620)	(24)%

Our backlog by reportable segment was as follows, dollars in thousands:

	September 30,			
Segment	2024	2023	Increase (Decrease)	% Change
Thermal Processing Solutions	$ 20,845	$ 45,233	$ (24,388)	(54)%
Semiconductor Fabrication Solutions	4,467	6,561	(2,094)	(32)%
Total backlog	$ 25,312	$ 51,794	$ (26,482)	(51)%

At the end of 2024, two customers individually accounted for 25% and 20% of our total backlog. No other customer accounted for more than 10% of our backlog as of September 30, 2024. The orders included in our backlog are generally credit approved customer purchase orders believed to be firm and are generally expected to ship within the next twelve months. Our backlog at any particular point in time is not necessarily representative of actual sales for succeeding periods, nor is backlog any assurance that we will realize profit from completing these orders. During the three months ended June 30, 2024, a horizontal diffusion customer notified us of the cancelation of a furnace project for $4.5 million, which we believe is due to the slow-down in electric vehicle adoption. Also during this period, the improvement in lead times across all of our product lines favorably contributed to the decline in our backlog.

Gross Profit and Gross Margin

Gross profit is the difference between net revenue and cost of goods sold and intangible asset impairment. Cost of goods sold consists of purchased material, labor and overhead to manufacture equipment and spare parts and the cost of service and support to customers for installation, warranty and paid service calls. Gross margin is gross profit as a percent of net revenue. Our gross profit and gross margin by reportable segment were as follows, dollars in thousands:

	Years Ended September 30,					
Segment	2024	Gross Margin	2023	Gross Margin	Increase (Decrease)	% Change
Thermal Processing Solutions	$ 24,269	35%	$ 29,184	38%	$ (4,915)	(17)%
Semiconductor Fabrication Solutions	11,962	37%	6,368	18%	5,594	88%
Total gross profit	$ 36,231	36%	$ 35,552	31%	$ 679	2%

Gross profit for the years ended September 30, 2024 and 2023 was $36.2 million and $35.6 million, respectively, representing an increase of $0.7 million, or 2%. Gross margin for 2024 and 2023 was 36% and 31%, respectively. Gross margin for the Thermal Processing Solutions segment decreased to 35% in 2024, compared to 38% in 2023, due primarily from product mix with decreases in shipments of our high-temperature furnaces, surface-mount technology (“SMT”) and packaging equipment, partially offset by increases in shipments of our horizontal diffusion furnaces. Gross margin for the Semiconductor Fabrication Solutions segment, increased to 37% in 2024, compared to 18% in 2023 due primarily to the 2023 impairment charge of $4.6 million for intangible assets and a charge in the amount of $1.5 million related to the write-off of inventory for our polishing machine products, partially offset by an additional intangible asset impairment charge in 2024 of $0.8 million. We are experiencing moderate material costs increases across all our segments. In response to such increased costs, we continually review our pricing plans and supplier agreements, with the objective of passing these increased costs to our customers where possible; however, we continue to experience pricing pressure from our customers. We are also continuing to explore additional

partnerships with contract manufacturers, who can leverage their buying power on a larger scale. Throughout fiscal 2024, we made targeted labor reductions as a result of the shift to contract manufacturing and the continuing slowdown in the broader semiconductor industry.

Selling, General and Administrative Expenses

Selling, general and administrative ("SG&A") expenses consist primarily of the cost of employees, consultants and contractors, facility costs, sales commissions, shipping costs, promotional marketing expenses, legal and accounting expenses and bad debt expense.

Our net SG&A expense by reportable segment was as follows, dollars in thousands:

Segment	Years Ended September 30, 2024	2023	Increase (Decrease)	% Change
Thermal Processing Solutions	$ 15,110	$ 18,284	$ (3,174)	(17)%
Semiconductor Fabrication Solutions	8,498	11,210	(2,712)	(24)%
Non-segment related	10,206	12,508	(2,302)	(18)%
Total selling, general and administrative expense	$ 33,814	$ 42,002	$ (8,188)	(19)%

Total SG&A expenses for the years ended September 30, 2024 and 2023 were $33.8 million and $42.0 million, respectively, representing a decrease of $8.2 million or 19.4%. This decrease was primarily due to staff reductions across all of our locations during 2024, resulting in lower employee expenses and employee-related expenses, such as travel, commissions and bonuses. Non-segment related SG&A expense includes $1.5 million and $1.3 million of non-cash stock-based compensation expense for 2024 and 2023, respectively.

Research, Development and Engineering

Research, development and engineering ("RD&E") expenses consist of the cost of employees, consultants and contractors who design, engineer and develop new products and processes as well as materials and supplies used in producing prototypes. RD&E expenses may vary from period to period depending on the engineering projects in process. Expenses related to engineers working on strategic projects or sustaining engineering projects are recorded in RD&E. However, from time to time, we add functionality to our products or develop new products during engineering and manufacturing to fulfill specifications in a customer's order, in which case the cost of development, along with other costs of the order, are charged to cost of goods sold.

Our net research and development expense by reportable segment was as follows, dollars in thousands:

Segment	Years Ended September 30, 2024	2023	Increase (Decrease)	% Change
Thermal Processing Solutions	$ 2,840	$ 3,993	$ (1,153)	(29)%
Semiconductor Fabrication Solutions	1,353	3,318	(1,965)	(59)%
Total research, development and engineering expense	$ 4,193	$ 7,311	$ (3,118)	(43)%

RD&E expenses for the years ended September 30, 2024 and 2023 were $4.2 million and $7.3 million, respectively, a decrease of $3.1 million. The decrease in RD&E expense is due to the timing of purchases related to specific strategic-development projects at our Thermal Processing Solutions and Semiconductor Fabrication Solutions segments. Additionally, the prior year period included expenditures related to new product development projects at our Semiconductor Fabrication Solutions segment, which were terminated in the fourth quarter of 2023.

Gain on Sale of Fixed Assets

Gain on sale of fixed assets consists of the gain on the sale of our corporate headquarters in Arizona in March 2024. This sale resulted in a net gain of approximately $2.2 million, after settlement of related sale expenses and disposal of assets. The sale price for our BTU building in Massachusetts was $20.6 million, of which $0.7 million was deducted

at closing for commission and other closing expenses. In connection with the sale, we recognized a pre-tax gain on sale of $12.5 million in the year ended 2022.

Intangible Asset Impairment

In the first quarter of fiscal year 2024, we recognized impairment of our definite lived intangible assets of $1.3 million at our Semiconductor Fabrication Solutions segment. Of the $1.3 million, $0.8 million of this impairment was recorded in cost of goods sold, and the remainder was recorded within operating expenses in our Consolidated Statement of Operations. Additionally, during the year ended September 30, 2023, we recognized impairment of our definite lived intangible assets of $5.2 million at our Semiconductor Fabrication Solutions segment. Of the $5.2 million, $4.6 million of this impairment was recorded in cost of goods sold, and the remainder was recorded within operating expenses in our Consolidated Statement of Operations. See Note 9 for a description of the facts and circumstances leading to the intangible asset impairment events.

Goodwill Impairment

In the first quarter of fiscal year 2024, we recognized impairment of our goodwill of $6.4 million at our Semiconductor Fabrication Solutions segment as a result of a triggering event identified at the end of the first quarter.

Severance Expense

Severance expense was $0.4 million and $0.7 million in 2024 and 2023, respectively. Severance expense for the year ended September 30, 2024 relates to staff reductions across all of our divisions. Severance expense for year ended September 30, 2023 relates primarily to the retirement of our founder.

Income Taxes

Our effective tax rate was (13.0)% and 17.1% in 2024 and 2023, respectively. The effective tax rate is the ratio of total income tax expense to pre-tax income. The effective tax rates for 2024 and 2023 were lower than the U.S. statutory rate of 21%. The 2024 effective tax rate was negatively impacted by non-deductible expenses, including goodwill impairment, includible foreign income, foreign withholding tax and losses for which no tax benefit can be recognized. The 2023 effective tax rate was negatively impacted by non-deductible expenses, includible foreign income, foreign withholding tax and losses for which no tax benefit can be recognized. The 2023 effective tax rate was favorably impacted by the recognition of previously unrecognized tax benefits and the release of a portion of our valuation allowance in connection with a deferred tax liability related to the Entrepix acquisition.

In 2024 and 2023, we recorded income tax expense and (benefit) of $1.0 million and $(2.6) million, respectively. The income tax provisions are based upon estimates of annual income, annual permanent differences, statutory tax rates and credits in the various jurisdictions in which we operate. Significant judgments and estimates are required in the determination of the consolidated income tax expense.

Generally accepted accounting principles of the United States (“GAAP”) require that a valuation allowance be established when it is “more likely than not” that all or a portion of deferred tax assets will not be realized. A review of all available positive and negative evidence needs to be considered, including a company’s performance, the market environment in which the company operates and the length of carryback and carryforward periods. According to those principles, it is difficult to conclude that a valuation allowance is not needed when the objective negative evidence includes cumulative losses in recent years. Such objective negative evidence limits the ability to consider other subjective evidence, such as future projections. Based on the consideration of all available evidence, we have concluded that we will maintain a full valuation allowance for all net deferred tax assets related to the carryforwards of U.S. net operating losses and tax credits. We will continue to monitor our cumulative income and loss positions in the U.S. and foreign jurisdictions to determine whether full valuation allowances on U.S. net deferred tax assets are appropriate.

The calculation of our tax liabilities involves dealing with uncertainties in the application of complex tax laws and regulations in a multitude of jurisdictions across our global operations. ASC 740, "Income Taxes", states that a tax benefit from an uncertain tax position may be recognized when it is more likely than not that the position will be

sustained upon examination, including resolutions of any related appeals or litigation processes, on the basis of the technical merits. In 2023, we recognized $1.0 million of previously unrecognized tax benefits, and as of September 30, 2024, we have no unrecognized tax benefits recorded within our financial statements. We record unrecognized tax benefits as liabilities in accordance with ASC 740 and adjust these liabilities when our judgment changes as a result of the evaluation of new information not previously available.

We expect to pay minimal U.S federal cash taxes for the foreseeable future as a result of our U.S. net operating losses that are carried forward.

Our future effective income tax rate depends on various factors, such as the amount of income (loss) in each tax jurisdiction, tax regulations governing each region, non-deductible expenses incurred as a percent of pre-tax income and the effectiveness of our tax planning strategies.

Selected Quarterly Data (Unaudited)

The following table sets forth selected unaudited consolidated quarterly financial information, in thousands, except percentages and per share amounts:

	Fiscal Year 2024			
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Revenue, net	$ 24,920	$ 25,433	$ 26,749	$ 24,112
Cost of sales	15,852	16,982	16,991	14,309
Intangible asset impairment	849	—	—	—
Gross profit	8,219	8,451	9,758	9,803
Selling, general and administrative	8,567	8,252	8,209	8,786
Research, development and engineering	1,588	921	693	991
Gain on sale of fixed assets	—	(2,197)	—	—
Goodwill impairment	6,370	—	—	—
Intangible asset impairment	430	—	—	—
Severance expense	198	112	40	—
Operating (loss) income	(8,934)	1,363	816	26
Interest income	19	14	2	22
Interest expense	(198)	(193)	(107)	(59)
Foreign currency (loss) gain	(187)	—	182	(340)
Other	—	9	2	52
(Loss) income before income taxes	(9,300)	1,193	895	(299)
Income tax provision	58	223	457	237
Net (loss) income	$ (9,358)	$ 970	$ 438	$ (536)
Gross margin	33.0%	33.2%	36.5%	40.7%
Operating margin	(35.9)%	5.4%	3.1%	0.1%
(Loss) income Per Share:				
Net (loss) income per basic share	$ (0.66)	$ 0.07	$ 0.03	$ (0.04)
Weighted average shares outstanding - basic	14,188	14,197	14,209	14,239
Net (loss) income per diluted share	$ (0.66)	$ 0.07	$ 0.03	$ (0.04)
Weighted average shares outstanding - diluted	14,188	14,209	14,254	14,239

	Fiscal Year 2023			
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Revenue, net	$ 21,558	$ 33,310	$ 30,740	$ 27,707
Cost of sales	13,255	19,840	19,755	20,268
Intangible asset impairment	—	—	—	4,645
Gross profit	8,303	13,470	10,985	2,794
Selling, general and administrative	9,190	11,434	10,300	11,078
Research, development and engineering	1,393	1,517	1,804	2,597
Intangible asset impairment	—	—	—	544
Severance expense	400	—	—	265
Operating (loss) income	(2,680)	519	(1,119)	(11,690)
Interest income	290	49	17	10
Interest expense	(2)	(155)	(185)	(178)
Foreign currency (loss) gain	(347)	(168)	456	(30)
Other	(9)	13	15	12
(Loss) income before income taxes	(2,748)	258	(816)	(11,876)
Income tax (benefit) provision	(4)	(2,946)	211	139
Net (loss) income	$ (2,744)	$ 3,204	$ (1,027)	$ (12,015)
Gross margin	38.5%	40.4%	35.7%	10.1%
Operating margin	(12.4)%	1.6%	(3.6)%	(42.2)%
(Loss) income Per Share:				
Net (loss) income per basic share	$ (0.20)	$ 0.23	$ (0.07)	$ (0.85)
Weighted average shares outstanding - basic	14,008	14,028	14,058	14,166
Net (loss) income per diluted share	$ (0.20)	$ 0.23	$ (0.07)	$ (0.85)
Weighted average shares outstanding - diluted	14,008	14,157	14,058	14,166

Liquidity and Capital Resources

Liquidity

We maintain a strong focus on liquidity and define our liquidity risk tolerance based on sources and uses to maintain a sufficient liquidity position to meet our obligations through our industry cycles, under both normal and stressed conditions. We manage our liquidity to provide access to sufficient funding to meet our business needs and financial obligations throughout business cycles. We operate in the semiconductor capital equipment industry, which is cyclical, and we must ensure we have sufficient liquidity during the down cycles and varying macroeconomic conditions. Our liquidity plans are established within the context of our financial and strategic planning processes and consider the liquidity necessary to fund our operating commitments, which include purchase obligations for inventory and equipment, rent, payroll and general expenses. We also take into consideration our capital allocation and growth objectives, including investing in research and development and capital expenditures (including capacity assessments and IT systems).

The success of our investment and growth strategy is dependent upon the availability of additional capital resources on terms satisfactory to management. Our sources of capital in the past have included a loan and security agreement with UMB Bank, the sale of equity securities, which includes common stock sold in private transactions and public offerings, and cash generated from operations. There can be no assurance that we can raise such additional capital resources when needed or on satisfactory terms. We believe that our principal sources of liquidity discussed above are sufficient to support operations for at least the next twelve months.

Capital Allocation

Our capital allocation strategy focuses on building shareholder value. We do this by first investing in ourselves and growing our capabilities. We then look to supplement and strengthen our capabilities through acquisitions and strategic investments. And finally, we provide the return realized by the investments to our stockholders. These three priorities are detailed as follows:

- Invest in R&D and capital expenditures to strengthen our competitive position. Historically, our R&D efforts have focused on upgrades to existing product platforms as well as new product designs. Capital expenditures consist primarily of capacity expansion as well as investments in IT systems.
- Invest in strategic acquisitions that will complement our strong platform of product offerings. In evaluating these opportunities, our objectives include enhancing our earnings and cash flows, adding complementary product offerings, expanding our geographic footprint, improving our production efficiency and expanding our customer base. As a result, we continue to manage our balance sheet to maintain adequate liquidity so that we may react quickly as opportunities arise.
- Once the above priorities have been met, we evaluate the return of capital to shareholders, as we have done in the past. We have never paid dividends on our common stock, and we do not expect to pay dividends on common stock in the foreseeable future. However, our Board has from time to time authorized annual stock repurchase plans.

Cash and Cash Flow

The following table sets forth for the periods presented certain consolidated cash flow information, in thousands:

	Years Ended September 30,		
	2024	2023	2022
Net cash provided by (used in) operating activities	$ 9,842	$ (7,701)	$ 5,204
Net cash (used in) provided by investing activities	$ (2,178)	$ (37,830)	$ 18,773
Net cash (used in) provided by financing activities	$ (10,633)	$ 11,738	$ (8,267)
Effect of exchange rate changes on cash	$ 922	$ 52	$ (1,672)
Net (decrease) increase in cash and cash equivalents	$ (2,047)	$ (33,741)	$ 14,038
Cash and cash equivalents, beginning of year	$ 13,133	$ 46,874	$ 32,836
Cash and cash equivalents, end of year	$ 11,086	$ 13,133	$ 46,874

A summary of our cash position, is as follows, in thousands, except working capital ratio:

	September 30,	
	2024	2023
Cash and cash equivalents	$ 11,086	$ 13,133
Restricted cash	$ —	$ —
Working capital	$ 44,777	$ 51,471
Current ratio (current assets to current liabilities)	3.3:1	2.7:1

The decrease in cash and cash equivalents from September 30, 2023 of $2.0 million was primarily due to the full repayment of our term loan and revolving credit agreement with UMB Bank, which was funded with cash generated in operations. We maintain a portion of our cash and cash equivalents in Renminbis, a Chinese currency, at our operations in China; therefore, changes in the exchange rates have an impact on our cash balances.

During periods of weakening demand, we typically generate cash from operating activities, which we may decide to reinvest in our business via strategic projects. Conversely, we are more likely to use operating cash flows for working capital requirements during periods of higher growth. Our sources of capital in the past have included the sale of equity securities, which includes common stock sold in private transactions and public offerings, the incurrence of long-term debt and customer deposits.

Cash Flows from Operating Activities

Cash provided by operating activities was $9.8 million in 2024 compared to cash used in operating activities of $7.7 million in 2023 and cash provided by operating activities of $5.2 million in 2022. During 2024, we decreased our accounts receivable, inventory, and contract asset balances as we completed shipments throughout the year, reducing our backlog. These cash inflows were partially offset by decreases in accounts payable and accrued liabilities as our purchasing activity decreased and the related liabilities were paid. During 2023, we used cash to increase our inventory balances in preparation for shipments scheduled over the next four quarters and to pay the related accounts payable. During 2022, we received several large customer deposits, primarily related to orders of our horizontal diffusion and high temp furnaces, which were expected to ship over the next four quarters.

Cash Flows from Investing Activities

Cash used in investing activities was $2.2 million in 2024, primarily consisting of $4.9 million in capital expenditures, partially offset by $2.7 million of proceeds from the sale of our real property in Arizona. Cash used in investing activities was $37.8 million in 2023, primarily consisting of $34.9 million in cash paid for the acquisition of Entrepix. Cash provided by investing activities was $18.8 million in 2022, primarily consisting of $19.9 million in proceeds from the sale of our real property in Massachusetts. Investing activities in 2024, 2023 and 2022 included capital expenditures of $4.9 million, $2.9 million and $1.1 million, respectively. We expect capital expenditures to decrease slightly in 2025, as we have completed our relocation projects but begain projects to implement new technology across our divisions.

Cash Flows from Financing Activities

In 2024, cash used in financing activities was $10.6 million, comprised primarily of $10.7 million payments on long-term debt. Our UMB term loan and revolving credit agreement has been paid in full and our remaining debt is a small amount of financing leases. In 2023, cash provided by financing activities was $11.7 million, comprised of $12.0 million in borrowings on our term loan and $1.2 million of proceeds received from the exercise of stock options partially offset by $1.5 million in payments on long-term debt. In 2022, cash used in financing activities was $8.3 million, comprised of $4.1 million of cash used for the repurchase of common stock and payments on long-term debt of $4.9 million, partially offset by $0.7 million of proceeds received from the exercise of stock options. Payments in long-term debt in 2022 include the full repayment of the $4.5 million mortgage balance on the real property in Massachusetts.

Off-Balance Sheet Arrangements

As of September 30, 2024, we had no off-balance sheet arrangements as defined in Item 303(a)(4) of Regulation S-K promulgated by the SEC that have or are reasonably likely to have a current or future effect on financial condition, changes in financial condition, revenues or expenses, results of operations, liquidity, capital expenditures or capital resources that are material to investors.

Contractual Obligations

We had the following contractual obligations as of September 30, 2024, in thousands:

Contractual obligations	Total	Less than 1 year	1-3 years	3-5 years	More than 5 years
Debt obligations	$ 290	$ 101	$ 184	$ 5	$ —
Lease obligations:					
Buildings	22,967	3,057	5,168	4,720	10,022
Office equipment	—	—	—	—	—
Vehicles	31	20	11	—	—
Total operating lease obligations	22,998	3,077	5,179	4,720	10,022
Purchase obligations	12,148	12,148	—	—	—
Total	$ 35,436	$ 15,326	$ 5,363	$ 4,725	$ 10,022

Acquisitions

Our business strategy includes the possible acquisition of or investments in other businesses to expand or complement our operations. The magnitude, timing and nature of any future acquisitions or investments will depend on a number of factors, including the availability of suitable acquisition candidates, the negotiation of acceptable terms, our financial capabilities and access to capital, and general economic and business conditions. Financing for future transactions would result in the utilization of cash, incurrence of additional debt, issuance of stock or some combination of the foregoing.

Critical Accounting Estimates

See "Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations" for a discussion of our consolidated financial statements that have been prepared in accordance with accounting principles generally accepted in the United States of America. The preparation of these consolidated financial statements requires us to make estimates and assumptions that affect the reported amount of assets and liabilities at the date of the consolidated financial statements, the disclosure of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenue and expenses during the reporting period.

On an on-going basis, we evaluate our estimates and judgments, including those related to income taxes, inventory valuation, business combinations, goodwill and long-lived assets. We base our estimates and judgments on historical experience, expectations regarding the future and on various other factors that we believe to be reasonable under the circumstances. The results of these estimates and judgments form the basis for making conclusions 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.

A critical accounting estimate is one that is both important to the presentation of our financial position and results of operations, and requires management's most difficult, subjective or complex judgments, often as a result of the need to make estimates about the effect of matters that are inherently uncertain. These uncertainties are discussed in "Item 1A. Risk Factors." We believe that the following accounting estimates we have identified as critical involve a greater degree of judgment and complexity than our other accounting policies. Accordingly, these are the estimates we believe are the most critical to understanding and evaluating our consolidated financial condition and results of operations. Refer to Note 1 to our consolidated financial statements included elsewhere in this report for a summary of each of the related accounting policies.

Income Taxes. We file consolidated federal income tax returns in the United States for all subsidiaries except those in China, Singapore and the UK, where separate returns are filed. The calculation of tax liabilities for all jurisdictions involves significant judgment in identifying uncertain tax positions, estimating the amount of deferred tax assets that will be realized in the future and the impact of uncertainties in the application of complex tax laws. Resolution of these uncertainties in a manner inconsistent with our expectations could have a material impact on our operations and financial condition. For the years ended September 30, 2024 and 2023, we had no unrecognized tax benefit.

Deferred income taxes arise from temporary differences between the tax basis of assets and liabilities and their reported amounts in the financial statements, which will result in taxable or deductible amounts in the future. We record a valuation allowance to reduce our deferred tax assets to the amount that is more likely than not to be realized. In evaluating our ability to recover our deferred tax assets in the jurisdiction from which they arise, we consider all available positive and negative evidence, including scheduled reversals of deferred tax liabilities, projected future taxable income, tax-planning strategies and results of recent operations. It is difficult to conclude that a valuation allowance is not needed when the negative evidence includes cumulative losses in recent years. If we were to determine that it is more likely than not that we would not be able to realize all or part of our net deferred tax assets in the future, an adjustment to the deferred tax assets would be charged to earnings in the period such determination is made. Likewise, if we later determine that it is more likely than not that all or part of the net deferred tax assets would be realized, a tax benefit would be realized when all or part of the previously provided valuation allowance would be reversed. As of September 30, 2024, we have significant U.S. deferred tax assets that have a full valuation allowance and foreign deferred tax assets that have a partial valuation allowance. Any changes to the judgments related

to our valuation allowance could have a material impact on our results of operations. For the years ended September 30, 2024 and 2023, we had net deferred tax assets of $0.2 and $0.1 million.

Inventory Valuation. We value our inventory at the lower of cost or net realizable value. Inventory cost includes the purchase price of parts or finished goods and freight and/or other overhead costs incurred to receive the inventory into our manufacturing facilities. We regularly review inventory quantities and record a write-down to net realizable value for excess and obsolete inventory. The write-down is primarily based on purchase history, historical inventory usage adjusted for expected changes in product demand, product offerings and production requirements. Our industry is characterized by customers in highly-cyclical industries, rapid technological changes, frequent new product developments and rapid product obsolescence. Changes in demand for our products or to our product offerings could result in further write-downs, which could have a material impact on our results of operations.

During the year ended September 30, 2024, we recorded provisions to reduce inventories to their lower of cost and net realizable value of approximately $2.8 million compared to $2.6 million during the year ended September 30, 2023.

Business Combination. We follow the acquisition method of accounting to record identifiable assets acquired and liabilities assumed in connection with acquired businesses at their estimated fair value as of the date of acquisition.

Identifiable intangible assets from business combinations are recognized at their estimated fair values as of the date of acquisition and consist of non-compete agreements, backlog, customer relationships, developed technology and trade names. Determination of the estimated fair value of identifiable intangible assets requires judgment. The fair value of acquired identifiable intangible assets were estimated using various valuation methodologies. The multi-period excess earnings method was used to value the acquired developed technology and the distributor method for the acquired customer relationships. Both approaches are income-based methods, which required judgment in estimating appropriate discount rates, obsolescence, customer attrition, and remaining useful lives. Any adverse change in these factors, among others, could have a significant effect on the valuation of the intangible assets and could have a material effect on our consolidated financial statements. The acquired intangible assets all had finite lives, ranging from one to ten years. The fair value of identifiable intangible assets acquired in connection with our acquisition of Entrepix was $13.6 million. Goodwill represents the excess of the fair value of the consideration conveyed in an acquisition over the fair value of net assets acquired.

Goodwill. We perform an annual impairment test as of September 30, or more frequently if indicators of potential impairment exist, to determine whether the fair value of a reporting unit in which goodwill resides is less than its carrying value. We perform the first step of the goodwill impairment test, which compares the fair value of the reporting unit to its carrying value. If the fair value of the reporting unit exceeds the carrying value of the net assets assigned to that unit, goodwill is not considered impaired, and we are not required to perform additional analysis. If the carrying value of the net assets assigned to the reporting unit exceeds the fair value of the reporting unit, we would recognize an impairment charge for the amount by which the carrying amount exceeds the reporting unit's fair value (although the loss would not exceed the total amount of goodwill allocated to the reporting unit).

Determining the fair value of a reporting unit involves the use of significant estimates and assumptions. Our goodwill impairment test uses a weighting of the income approach and the market approach to estimate a reporting unit's fair value. The income approach is based on a discounted future cash flow analysis that uses certain assumptions including: projections of revenues and expenses and related cash flows based on assumed long-term growth rates and demand trends; expected future investments and working capital requirements to sustain and grow the business; and estimated discount rates based on the reporting unit's weighted average cost of capital as derived by the Capital Asset Pricing Model and other methods, which includes observable market inputs and other data from identified comparable companies. The same estimates are also used internally for our capital budgeting process, and for long-term and short-term business planning and forecasting. We test the reasonableness of the inputs and outcomes of our discounted cash flow analysis against available comparable market data, and we also perform a reconciliation of our total market capitalization to the estimated fair value of all of our reporting units. The market approach is based on the application of appropriate market-derived multiples selected from (i) comparable publicly-traded companies and/or (ii) the implied transaction multiples derived from identified merger and acquisition activity in the market. Multiples are then selected based on a comparison of the reviewed data to that of the reporting unit and applied to relevant historical and

forecasted financial parameters such as levels of revenues, EBITDA, EBIT or other metrics. If actual results differ significantly from our projections, we may be required to record a material impairment charge.

At the end of December 2023, we identified a triggering event. As a result of the decline in our stock price as of December 31, 2023, our book value materially exceeded our market value leading to a $6.4 million impairment charge in fiscal 2024. The impairment testing as of September 30, 2024, resulted in the fair value of our Thermal Processing Solutions segment exceeding its carrying value by approximately 44%, and the fair value of our Semiconductor Fabrication Solutions segment exceeding its carrying value by approximately 18%, resulting in no additional goodwill impairment. See Note 10 for additional information on goodwill by segment.

Long-Lived Asset Impairment. Long-lived assets, including tangible and intangible assets with finite lives, are amortized over their respective lives to their estimated residual values and are also reviewed for impairment whenever certain triggering events may indicate impairment. When such events or changes in circumstances occur, a recoverability test is performed comparing projected undiscounted cash flows from the use and eventual disposition of an asset group to its carrying value. If the estimated undiscounted cash flows are not sufficient to recover the carrying value of the asset group, the Company then compares the carrying value of the individual long-lived assets with their estimated fair values. An impairment would be recorded for the excess of the carrying value over the fair value. If actual results differ significantly from our projections, we may be required to record a material impairment charge.

As of September 30, 2024, the Company performed a qualitative impairment test on intangible assets and goodwill and concluded there was no further impairment. As of December 31, 2023, we identified a triggering event due to the decline in our stock price driving our market value materially below our book value. As a result, we recorded a $1.3 million impairment charge in fiscal 2024 to the intangible assets in our Semiconductor Fabrication Solutions segment. As of September 30, 2023, we identified a triggering event in our Semiconductor Fabrication Solutions segment primarily related to the prolonged downturn and general economic conditions in the semiconductor market, in addition to delays in the adoption of next-gen polishing tools, which reduced our cash flow projections. As a result, we recorded intangible asset impairment of $5.2 million. There were no impairments on long-lived assets during the year ended September 30, 2022. See Note 9 for additional information on intangible assets.

Impact of Recently Issued Accounting Pronouncements

For discussion of recently issued accounting pronouncements, see “Recently Issued Accounting Pronouncements” within “Note 1. Summary of Operations and Significant Accounting Policies” in “Item 8. Financial Statements and Supplementary Data.”

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

As a smaller reporting company, as defined by Rule 12b-2 of the Exchange Act and in Item 10(f)(1) of Regulation S-K, we are electing scaled disclosure reporting obligations and, therefore, are not required to provide the information requested by this Item.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

The following documents are filed as part of this Annual Report on Form 10-K:

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Shareholders and Board of Directors
Amtech Systems, Inc.:

Opinions on the Consolidated Financial Statements and Internal Control Over Financial Reporting

We have audited the accompanying consolidated balance sheet of Amtech Systems, Inc. and subsidiaries (the Company) as of September 30, 2024, the related consolidated statements of operations, comprehensive loss, shareholders' equity, and cash flows for the year then ended, and the related notes (collectively, the consolidated financial statements). We also have audited the Company's internal control over financial reporting as of September 30, 2024, based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission.

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of September 30, 2024 and the results of its operations and its cash flows for the year ended September 30, 2024, in conformity with U.S. generally accepted accounting principles. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of September 30, 2024 based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission.

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, 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 consolidated financial statements and an opinion on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audit of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audit also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

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.

Critical Audit Matters

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

Valuation of Entrepix Inc. developed technology intangible asset

As discussed in Notes 1 and 9 to the consolidated financial statements, the Company regularly reviews intangible assets to determine if facts and circumstances exist which indicate the carrying amount of these assets may not be recoverable. When indicators exist, recoverability of assets is measured by comparison of the carrying value of the asset group to the estimated undiscounted future net cash flows expected to be generated by the asset group. If the asset group is determined not to be recoverable, the Company performs an analysis of the fair value of the individual long-lived assets and will recognize an impairment loss when fair value is less than the carrying value of such long-lived assets. In the first quarter of the year ended September 30, 2024, the Company recorded an impairment of the Entrepix Inc. developed technology intangible asset of $0.8 million.

We identified the evaluation of the fair value of the Entrepix, Inc. developed technology intangible asset as of the end of the first quarter 2024 as a critical audit matter. There was a high degree of subjective auditor judgment in evaluating the key assumptions used in the multi-period excess earnings method to estimate the fair value of the Entrepix, Inc. developed technology asset. Specifically, minor changes to the key assumptions, including projected revenues and expenses, the long-term growth rate, contributory asset charges, and the discount rate, could have a significant effect on the Company's assessment of the intangible asset fair value. Additionally, the use of professionals with specialized skills and knowledge was required to assess certain of these key assumptions.

The following are the primary procedures we performed to address this critical audit matter. We evaluated the design and tested the operating effectiveness of certain internal controls over the Company's long-lived asset impairment analysis process. These included controls related to the development of the key assumptions used to estimate fair value of the Entrepix, Inc. developed technology intangible asset. We evaluated the projected revenue and expenses by comparing them with the historical results of the asset group and assessing the impacts of internal and/or external economic factors. We involved valuation professionals with specialized skills and knowledge, who assisted in:

- evaluating the long-term growth rate by comparing it to a long-term growth rate range that was independently developed using publicly available industry and economic growth rates
- evaluating the contributory asset charges by comparing the risk profile of each contributory asset to the risk profile of the developed technology intangible asset and the risk of the overall business (Entrepix, Inc.)
- evaluating the discount rate by comparing it to a discount rate that was independently developed using publicly available market data for comparable companies.

Valuation of the Semiconductor Fabrication Solutions reporting unit

As discussed in Notes 1 and 10 to the consolidated financial statements, the Company evaluates goodwill for impairment on an annual basis as of September 30, or when it is determined that it is more likely than not that the fair value of a reporting unit is less than its carrying amount. The Company's goodwill impairment test uses a weighting of the income and market approach to estimate a reporting unit's fair value. The income approach is based on a discounted cash flow analysis and involves the use of assumptions, including projections of revenues and expenses, the long-term growth rate, and the selection of discount rates. In the first quarter of the year ended September 30, 2024, the Company recorded an impairment of goodwill in the Semiconductor Fabrication Solutions reporting unit of $6.4 million. The Company has $21.3 million of goodwill as of September 30, 2024, of which $15.4 million relates to the Semiconductor Fabrication Solutions reporting unit.

We identified the evaluation of the fair value of the Semiconductor Fabrication Solutions reporting unit as of the end of the first quarter 2024 and as of September 30, 2024 as a critical audit matter. There was a high degree of subjective auditor judgment in evaluating the key assumptions used in the discounted cash flow analysis used to estimate the fair value of the Semiconductor Fabrication Solutions reporting unit. Specifically, minor changes to key assumptions, including projected revenue and expenses, the long-term growth rate, and the discount rate, could have a significant effect on the Company's assessment of the fair value of the reporting unit. Additionally, the use of professionals with specialized skills and knowledge was required to assess these key assumptions.

The following are the primary procedures we performed to address this critical audit matter. We evaluated the design and tested the operating effectiveness of certain internal controls over the Company's goodwill impairment process. These included controls related to the determination of the estimated fair value of the reporting unit and the development of the key assumptions. We evaluated the projected revenue and expenses by comparing them to the historical results of the reporting unit and assessing the impacts of internal and/or external economic factors. In addition, we involved valuation professionals with specialized skills and knowledge, who assisted in:

- evaluating the long-term growth rate by comparing it to a long-term growth rate range that was independently developed using publicly available industry and economic growth rates

- evaluating the discount rate by comparing it to a discount rate that was independently developed using publicly available market data for comparable companies.

/s/ KPMG LLP

We have served as the Company's auditor since 2024.

Phoenix, Arizona
December 12, 2024

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

Board of Directors and Shareholders
Amtech Systems, Inc.

Opinion on the financial statements

We have audited the accompanying consolidated balance sheet of Amtech Systems, Inc. (an Arizona corporation) and subsidiaries (the "Company") as of September 30, 2023, the related consolidated statements of operations, comprehensive income (loss), shareholders' equity, and cash flows for each of the two years in the period ended September 30, 2023, and the related notes (collectively referred to as the "financial statements"). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of September 30, 2023, and the results of its operations and its cash flows for each of the two years in the period ended September 30, 2023, in conformity with accounting principles generally accepted in the United States of America.

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.

/s/ GRANT THORNTON LLP

We served as the Company's auditor from 2021 to 2024.

Phoenix, Arizona
December 14, 2023

PART I. FINANCIAL INFORMATION
ITEM 1. Consolidated Financial Statements
AMTECH SYSTEMS, INC. AND SUBSIDIARIES
Consolidated Balance Sheets
(in thousands, except share and per share data)

Assets	September 30, 2024	2023
Current Assets		
Cash and cash equivalents	$ 11,086	$ 13,133
Accounts receivable - Net	21,989	26,474
Inventories	26,867	34,845
Income taxes receivable	132	632
Other current assets	4,302	6,105
Total current assets	64,376	81,189
Property, Plant and Equipment - Net	11,647	9,695
Right-of-Use Assets - Net	16,596	11,217
Intangible Assets - Net	4,004	6,114
Goodwill	21,261	27,631
Deferred Income Taxes - Net	185	101
Other Assets	884	1,074
Total Assets	$ 118,953	$ 137,021
Liabilities and Shareholders' Equity		
Current Liabilities		
Accounts payable	$ 5,356	$ 10,815
Accrued compensation and related taxes	2,057	3,481
Accrued warranty expense	602	965
Other accrued liabilities	477	1,551
Current portion of finance lease liabilities and long-term debt	101	2,265
Current portion of long-term operating lease liabilities	2,041	2,623
Contract liabilities	8,965	8,018
Total current liabilities	19,599	29,718
Finance Lease Liabilities and Long-Term Debt	189	8,422
Long-Term Operating Lease Liabilities	15,240	8,894
Income Taxes Payable	1,510	1,575
Other Long-Term Liabilities	57	47
Total Liabilities	36,595	48,656
Commitments and Contingencies (Note 15)		
Shareholders' Equity		
Preferred stock; 100,000,000 shares authorized; none issued	—	—
Common stock; $0.01 par value; 100,000,000 shares authorized; shares issued and outstanding: 14,258,879 and 14,185,977 in 2024 and 2023, respectively	143	142
Additional paid-in capital	128,466	126,963
Accumulated other comprehensive loss	(720)	(1,695)
Retained deficit	(45,531)	(37,045)
Total Shareholders' Equity	82,358	88,365
Total Liabilities and Shareholders' Equity	$ 118,953	$ 137,021

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

AMTECH SYSTEMS, INC. AND SUBSIDIARIES
Consolidated Statements of Operations
(in thousands, except per share data)

	Years Ended September 30,		
	2024	**2023**	**2022**
Revenue, net	$ 101,214	$ 113,315	$ 106,298
Cost of sales	64,134	73,118	66,787
Intangible asset impairment	849	4,645	—
Gross profit	36,231	35,552	39,511
Selling, general and administrative	33,814	42,002	28,300
Research, development and engineering	4,193	7,311	6,390
Gain on sale of fixed assets	(2,197)	—	(12,465)
Goodwill impairment	6,370	—	—
Intangible asset impairment	430	544	—
Severance expense	350	665	—
Operating (loss) income	(6,729)	(14,970)	17,286
Interest income	57	366	210
Interest expense	(557)	(520)	(164)
Foreign currency (loss) gain	(345)	(89)	1,066
Other	63	31	387
(Loss) income before income taxes	(7,511)	(15,182)	18,785
Income tax (benefit) provision	975	(2,600)	1,418
Net (loss) income	$ (8,486)	$ (12,582)	$ 17,367
(Loss) Income Per Share:			
Net (loss) income per basic share	$ (0.60)	$ (0.89)	$ 1.24
Net (loss) income per diluted share	$ (0.60)	$ (0.89)	$ 1.22
Weighted average shares outstanding:			
Basic	14,208	14,065	14,014
Diluted	14,208	14,065	14,184

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

AMTECH SYSTEMS, INC. AND SUBSIDIARIES
Consolidated Statements of Comprehensive Income (Loss)
(in thousands)

	Years Ended September 30,		
	2024	**2023**	**2022**
Net (loss) income	$ (8,486)	$ (12,582)	$ 17,367
Foreign currency translation adjustment	975	72	(1,781)
Comprehensive (loss) income	$ (7,511)	$ (12,510)	$ 15,586

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

AMTECH SYSTEMS, INC. AND SUBSIDIARIES
Consolidated Statements of Shareholders' Equity
(in thousands)

	Common Stock		Treasury Stock					
	Shares	Par Value	Shares	Cost	Additional Paid-in Capital	Accumulated Other Comprehensive Income (Loss)	Retained Deficit	Total Shareholders' Equity
Balances at September 30, 2021	14,304	$ 143	—	$ —	$ 126,380	$ 14	$ (40,903)	$ 85,634
Net income	—	—	—	—	—	—	17,367	17,367
Translation adjustment	—	—	—	—	—	(1,781)	—	(1,781)
Stock compensation expense	—	—	—	—	543	—	—	543
Repurchase of treasury stock	—	—	(434)	(4,115)	—	—	—	(4,115)
Retirement of treasury stock	(434)	(4)	434	4,115	(3,184)	—	(927)	—
Stock options exercised	124	1	—	—	719	—	—	720
Balances at September 30, 2022	13,994	$ 140	—	$ —	$ 124,458	$ (1,767)	$ (24,463)	$ 98,368
Net loss	—	—	—	—	—	—	(12,582)	(12,582)
Translation adjustment	—	—	—	—	—	72	—	72
Stock compensation expense	—	—	—	—	1,272	—	—	1,272
Stock options exercised	192	2	—	—	1,233	—	—	1,235
Balances at September 30, 2023	14,186	$ 142	—	$ —	$ 126,963	$ (1,695)	$ (37,045)	$ 88,365
Net loss	—	—	—	—	—	—	(8,486)	(8,486)
Translation adjustment	—	—	—	—	—	975	—	975
Stock compensation expense	—	—	—	—	1,530	—	—	1,530
Issuance of common stock under employee stock plans, net of shares withheld for payroll taxes	58	1	—	—	(112)	—	—	(111)
Stock options exercised	15	—	—	—	85	—	—	85
Balances at September 30, 2024	14,259	$ 143	—	$ —	$ 128,466	$ (720)	$ (45,531)	$ 82,358

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

AMTECH SYSTEMS, INC. AND SUBSIDIARIES
Consolidated Statements of Cash Flows
(in thousands)

	Years Ended September 30,		
	2024	**2023**	**2022**
Operating Activities			
Net (loss) income	$ (8,486)	$ (12,582)	$ 17,367
Adjustments to reconcile net (loss) income to net cash provided by (used in) operating activities:			
Depreciation and amortization	3,029	5,012	1,729
Write-down of inventory	2,813	2,620	102
Non-cash intangible asset impairment	7,649	5,189	—
Provision for allowance for doubtful accounts	18	14	(32)
Deferred income taxes	(84)	(2,513)	592
Non-cash stock-based compensation expense	1,530	1,272	543
Gain on sale of fixed assets	(2,197)	—	(12,465)
Other, net	—	196	—
Changes in operating assets and liabilities:			
Accounts receivable	4,468	4,410	(2,479)
Inventories	5,135	(6,294)	(3,684)
Contract and other assets	4,773	(529)	(2,203)
Accounts payable	(4,942)	1,459	(1,080)
Accrued income taxes	436	(2,897)	623
Accrued and other liabilities	(5,248)	(1,895)	584
Contract liabilities	948	(1,163)	5,607
Net cash provided by (used in) operating activities	9,842	(7,701)	5,204
Investing Activities			
Purchases of property, plant and equipment	(4,878)	(2,898)	(1,135)
Acquisitions, net of cash and cash equivalents acquired	—	(34,938)	—
Proceeds from sale of property, plant and equipment	2,700	6	19,908
Net cash (used in) provided by investing activities	(2,178)	(37,830)	18,773
Financing Activities			
Proceeds from the exercise of stock options	85	1,235	720
Repurchase of common stock	—	—	(4,115)
Payments on long-term debt	(10,671)	(1,497)	(4,872)
Borrowings on long-term debt	64	12,000	—
Payment of payroll taxes on stock-based compensation through shares withheld	(111)	—	—
Net cash (used in) provided by financing activities	(10,633)	11,738	(8,267)
Effect of Exchange Rate Changes on Cash and Cash Equivalents	922	52	(1,672)
Net (Decrease) Increase in Cash and Cash Equivalents	(2,047)	(33,741)	14,038
Cash and Cash Equivalents, Beginning of Year	13,133	46,874	32,836
Cash and Cash Equivalents, End of Year	$ 11,086	$ 13,133	$ 46,874
Supplemental Cash Flow Information:			
Income tax payments, net	$ 623	$ 2,818	$ 386
Interest paid	$ 558	$ 461	$ 164
Supplemental Non-cash Operating, Financing and Investing Activities:			
Transfer of inventory to property, plant, and equipment	$ 50	$ —	$ 169
Transfer of property, plant, and equipment to inventory	$ (20)	$ —	$ —
Payables due for fixed asset additions	$ 116	$ 633	$ 152
Return of fixed assets resulting in loan payoff	$ —	$ 184	$ —
Modification of leased assets resulting in a reduction of lease liabilities	$ —	$ 2,254	$ —
Leased assets obtained in exchange for new operating lease liabilities	$ 8,160	$ 57	$ 3,686
Leased assets obtained in exchange for new finance lease liabilities	$ 207	$ 46	$ 42

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

Notes to Consolidated Financial Statements
For the Years Ended September 30, 2024, 2023 and 2022

1. Summary of Operations and Significant Accounting Policies

Description of Business – Amtech provides equipment, consumables and services for semiconductor wafer fabrication and device packaging. Our products are used in fabricating semiconductor devices, such as silicon carbide (SiC) and silicon (Si) power devices, digital and analog devices, power electronic packages, advanced semiconductor packages and electronic assemblies. We sell these products to semiconductor device and module manufacturers worldwide, particularly in Asia, North America and Europe.

We serve niche markets in industries that are experiencing technological advances, and which historically have been very cyclical. Therefore, future profitability and growth depend on our ability to develop or acquire and market profitable new products and on our ability to adapt to cyclical trends.

Our fiscal year is from October 1 to September 30. Unless otherwise stated, references to the years 2024, 2023 and 2022 relate to the fiscal years ended September 30, 2024, 2023 and 2022, respectively.

Principles of Consolidation – The consolidated financial statements include the accounts of the Company and our wholly-owned subsidiaries. All intercompany balances and transactions have been eliminated in consolidation.

Use of Estimates – The preparation of Consolidated Financial Statements in conformity with US GAAP requires us to make estimates and judgments that affect the amounts reported in our Consolidated Financial Statements and the accompanying notes. Significant items subject to such estimates and assumptions include the useful lives of property, plant and equipment, realizability of intangible assets, deferred costs and deferred tax assets, standalone selling prices and future contract volumes and the direct costs to complete the performance obligation for revenue recognition, fair value of stock options, performance-based restricted stock units and warrants.

Cash and Cash Equivalents – We consider all highly liquid investments with a maturity of three months or less when purchased to be cash equivalents. Our cash and cash equivalents consist of amounts invested in U.S. money market funds and various U.S. and foreign bank operating and time deposit accounts.

We maintain our cash and cash equivalents in multiple financial institutions. Balances in the United States, which account for approximately 66% and 56% of total cash balances as of September 30, 2024 and 2023, respectively, are primarily invested in financial institutions insured by the FDIC as well as a money market account. The remainder of our cash is maintained with financial institutions with reputable credit in China, Singapore, the UK and Malaysia. We maintain cash in bank accounts in amounts which at times may exceed federally insured limits. At September 30, 2024 and 2023, account balances exceeded insured limits by approximately $5.7 million and $6.0 million, respectively. We have not experienced any losses on such accounts.

Accounts Receivable and Allowance for Credit Losses – Accounts receivable are recorded at the sales price of products sold to customers on trade credit terms. We establish a valuation allowance to reflect our best estimate of expected losses inherent in our accounts receivable balance. The allowance is based on our evaluation of the aging of the receivables, historical write-offs, the current economic environment and communications with the customer. We write off individual accounts against the allowance when we no longer believe that it is probable that we will collect the receivable because we become aware of a customer's inability to meet its financial obligations.

The following is a summary of the activity in our allowance for credit losses, in thousands:

	Years Ended September 30,		
	2024	2023	2022
Balance at beginning of year	$ 146	$ 114	$ 188
Acquired allowance	—	125	—
Provision	18	14	(34)
Write offs	(48)	(114)	6
Adjustment [(1)]	(13)	7	(46)
Balance at end of year	$ 103	$ 146	$ 114

(1) Primarily foreign currency translation adjustments.

Our net accounts receivable as of September 30, 2024, 2023 and 2022 was $22.0 million, $26.5 million and $25.0 million, respectively.

Inventories – We value our inventory at the lower of cost (first-in, first-out method) or net realizable value. Inventory cost includes the purchase price of parts or finished goods, labor, overhead and any freight cost incurred to receive the inventory into our manufacturing facilities. We regularly review inventory quantities and record a write-down to net realizable value for excess and obsolete inventory. The write-down is primarily based on historical inventory usage adjusted for expected changes in product demand and production requirements. Our industry is characterized by customers in highly-cyclical industries, rapid technological changes, frequent new product developments and rapid product obsolescence. Changes in demand for our products could result in further write-downs.

Other Current Assets – Other current assets consist of vendor deposits and prepaid expenses. No item included in other current assets makes up more than 5% of total current assets.

Property, Plant and Equipment – Property, plant and equipment are recorded at cost upon acquisition. We begin depreciation and amortization when an asset is both in the location and condition for its intended use. Maintenance and repairs are charged to expense as incurred. The cost of property retired or sold and the related accumulated depreciation and amortization are removed from the applicable accounts when disposition occurs and any gain or loss is recognized. Depreciation and amortization are computed using the straight-line method over the estimated useful life of the asset. Useful lives for equipment and machinery range from three to seven years; for leasehold improvements from three to fifteen years; for furniture and fixtures from five to ten years; for software from three to seven years and for buildings from 20 to 30 years.

Reviews are regularly performed to determine whether facts and circumstances exist which indicate that the useful life is shorter than originally estimated or the carrying amount of assets may not be recoverable. Impairment, if any, is based on the excess of the carrying amount over the estimated fair value of those assets.

Leases – We determine if a contract or arrangement is, or contains, a lease at inception. Balances related to operating leases are included in right-of-use ("ROU") assets in our Consolidated Balance Sheets. Balances related to financing leases are immaterial and are included in property, plant and equipment, operating lease liabilities, finance lease liabilities and long-term debt in our Consolidated Balance Sheets. ROU assets represent our right to use an underlying asset for the lease term and lease liabilities represent our obligation to make lease payments arising from the lease.

ROU assets and lease liabilities are recognized at commencement date based on the present value of lease payments over the lease term. As none of our leases provide an implicit rate, we use our incremental borrowing rate based on the information available at commencement date in determining the present value of lease payments. The ROU asset includes any prepaid lease payments and additional direct costs and excludes lease incentives. Our lease terms may include options to extend or terminate the lease, which we include in the recognition of the ROU asset and lease liability, when it is reasonably certain that we will exercise that option.

We lease office space, buildings, land, vehicles and equipment. We made an accounting policy election not to separate non-lease components from lease components for all existing classes of underlying assets with the exception of land and buildings. Lease agreements with an initial term of 12 months or less with no renewal options are not recorded on the balance sheet. Instead, we recognize the lease expense as incurred over the lease term. Our lease agreements do not contain any material residual value guarantees or material restrictive covenants. We have one lease that requires the underlying asset to be returned to its original condition at the end of the lease term. The related asset retirement obligation, which is immaterial, is reflected within other long-term liabilities in our Consolidated Balance Sheets.

Certain lease agreements include one or more options to renew, with individual option terms that can extend the lease term from one to five years. The exercise of lease renewal options is at our sole discretion. Some equipment leases also include options to purchase the leased property. The estimated life of assets and leasehold improvements are limited by the expected lease term, unless there is a transfer of title or purchase option reasonably certain of exercise.

In June 2022, we entered into a sale-leaseback transaction to facilitate a future move of our Massachusetts operations, pursuant to which we sold the property to a third party and agreed to lease the property back for two years. To determine whether the transfer of the property should be accounted for as a sale, we evaluated whether we transferred control to the third party in accordance with the revenue recognition guidance set forth in ASC 606. The transfer was

deemed to be a sale at market terms. Therefore, we recognized the transaction price for the sale based on the cash proceeds received, derecognized the carrying amount of the underlying assets and recognized a gain in the Consolidated Statements of Operations for the difference between the carrying value of the asset and the transaction price. We then accounted for the leaseback in accordance with our lease accounting policy.

Intangible Assets – Intangible assets acquired in business combinations are capitalized and subsequently amortized on a straight-line basis over their estimated useful life. We review our intangible assets for impairment when events or circumstances indicate the carrying value may not be recoverable. When indicators exist, recoverability of assets is measured by a comparison of the carrying value of the asset group to the estimated undiscounted future net cash flows expected to be generated by the asset group. If the asset group is determined not to be recoverable, the Company performs an analysis of the fair value of the individual long-lived assets and will recognize an impairment loss when the fair value is less than the carrying value of such long-lived assets. Patent costs consist primarily of legal and filing fees incurred to file patents on proprietary methods and technology we developed. Patent costs are expensed when incurred, as they are insignificant.

In the first quarter of the year ended September 30, 2024 and the fourth quarter of the year ended September 30, 2023, we recorded an impairment of definite lived intangible assets in our Semiconductor Fabrication Solutions segment. See Note 9 for a description of the facts and circumstances leading to the intangible asset impairment.

Goodwill – Goodwill is recorded when the purchase price paid for an acquisition exceeds the estimated fair value of net identified tangible and intangible assets acquired. Goodwill is not subject to amortization but is tested for impairment annually or when it is determined that it is more likely than not that the fair value of a reporting unit is less than its carrying amount. If it is concluded that there is impairment, we would recognize an impairment charge for the amount by which the carrying amount exceeds the reporting unit's fair value (although the loss would not exceed the total amount of goodwill allocated to the reporting unit). In the first quarter of the year ended September 30, 2024, we recorded an impairment of goodwill in our Semiconductor Fabrication Solutions segment. Additional information on impairment testing of goodwill is set forth in Note 10.

Revenue Recognition – We recognize revenue when a customer obtains control of promised goods or services in an amount that reflects the consideration expected to be received in exchange for those goods or services. A performance obligation is a promise in a contract to transfer a product or service to the customer. The transaction price of a contract is allocated to each distinct performance obligation based upon the relative standalone selling price ("SSP") for each performance obligation and is recognized as revenue upon satisfaction of the performance obligation. We have elected the practical expedient in ASC 606 whereby an entity need not adjust the promised amount of consideration for the effects of a significant financing component if the entity expects, at contract inception, that the period between when the entity transfers a promised good or service to a customer and when the customer pays for that good or service will be one year or less. We have also elected the practical expedient in ASC 606 whereby an entity may recognize revenue on an as-invoiced basis in certain cases where performance obligations are satisfied over time and the invoiced amount corresponds directly with the value the provided to the customer. To record revenue properly, we apply the following five steps:

1) *Identify the contract with the customer*

A contract with a customer exists when (i) we enter into an enforceable contract with a customer that defines each party's rights regarding the goods or services to be transferred and identifies the related payment terms, (ii) the contract has commercial substance, and (iii) we determine that collection of substantially all consideration for goods and services that will be transferred is probable based on the customer's intent and ability to pay the promised consideration.

2) *Identify the performance obligations in the contract*

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

Our equipment sales consist of multiple promises, including the delivery of the system itself and obligations that are not delivered simultaneously with the system, such as installation services and training. In most cases, these services require minimal effort and are immaterial in the context of the contract. Therefore, equipment and related services are treated as one performance obligation. Customers who purchase new systems are provided an assurance-type warranty, generally for periods of 12 to 36 months. Assurance-type warranties are not considered a performance obligation.

We account for shipping and handling activities that occur after control of the related good transfers as fulfillment activities instead of assessing such activities as performance obligations.

Our obligations for returns and/or refunds are immaterial in all periods presented.

3) *Determine the transaction price*

The transaction price is determined based on the consideration to which we will be entitled in exchange for transferring goods and services to the customer.

The transaction price is based on the price reflected in the individual customer's purchase order.

Occasionally, our customers earn a commission on the purchase and/or resale of our products. These payments to customers are recorded as a reduction of revenue and are less than 5% of our total revenues.

In substantially all of our sales transactions, we incur incremental costs to obtain contracts with customers, in the form of sales commissions. We maintain a commission program which rewards our sales representatives for system sales and our employees for system sales and other individual goals. We have elected a practical expedient to allow for the recognition of commission expense when incurred if the amortization period of the asset that the entity otherwise would have recognized is one year or less. Based on the nature of our contracts with customers, we expense all commissions as incurred based upon the expectation that the amortization period would be one year or less.

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

If the contract contains a single performance obligation, the entire transaction price is allocated to the single performance obligation. Contracts that contain multiple performance obligations require an allocation of the transaction price to each distinct performance obligation.

When required, the SSP for each performance obligation is based on observable data from standalone sales. To determine the SSP for labor-related performance obligations, we use directly observable inputs based on the standalone sale prices for these services.

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

We satisfy performance obligations either over time or at a point in time. Revenue is recognized over time if either (i) the customer simultaneously receives and consumes the benefits provided by our performance, (ii) our performance creates or enhances an asset that the customer controls as the asset is created or enhanced, or (iii) our performance does not create an asset with an alternative use to the entity and we have an enforceable right to payment for performance completed to date. If we do not satisfy a performance obligation over time, the related performance obligation is satisfied at a point in time by transferring the control of a promised good or service to a customer. For over time recognition, we are required to select a single revenue recognition method for the performance obligation that faithfully depicts our performance in transferring control of the goods and services.

Equipment and related product revenues (e.g., furnace systems, system add-ons, machinery, consumables and spare parts) are recognized at a point in time, when they are shipped or delivered, depending on contractual terms.

Revenue for services, including maintenance services, is recognized over time based on hours incurred, as the hours incurred align to the maintenance activities performed. We also utilize the as-invoiced practical expedient in certain

cases where performance obligations are satisfied over time and the invoiced amount corresponds directly with the value provided to the customer.

We exclude from the transaction price all sales taxes that are assessed by a governmental authority and that are imposed on and concurrent with a specific revenue-producing transaction and collected from a customer (for example, sales, use, value added, and certain excise taxes). Sales taxes are presented on a net basis (excluded from revenues) in our Consolidated Statements of Operations. Our remaining performance obligations as of September 30, 2024, have an original duration of one year or less. Our customers generally have payment terms of 30-90 days. We do not have any payment terms that exceed one year from the point we have satisfied the related performance obligations.

Management reviews disaggregated revenue at the reportable segment level. Revenue-generating transactions vary between our reportable segments due to several factors. For example, lead times vary among our reportable segments and among our products. Most of the revenue for our Semiconductor Fabrication Solutions segment results from the sale of consumables, rather than equipment sales. These consumables have a much shorter production period than equipment produced by our other reportable segment. Due to these variations between reportable segments, management determined that disaggregated revenue by reportable segment sufficiently depicts how economic factors affect the nature, amount, timing and uncertainty of our revenue and cash flows. See Note 16 for additional information on our reportable segments.

Contract Assets – Contract assets consist of amounts we are not legally able to invoice but have completed the related performance obligation. These amounts generally arise from variances between the contractual payment terms and the transaction price assigned to the open performance obligations (e.g., we have recognized revenue in an amount greater than the amount that is billable under the contract). There were no contract assets at September 30, 2024 and 2023.

Contract Liabilities – Contract liabilities are reflected in current liabilities on the Consolidated Balance Sheets as all performance obligations are expected to be satisfied within the next 12 months. Contract liabilities include customer deposits and deferred revenue. Contract liabilities relate to payments invoiced or received in advance of completion of performance obligations under a contract. Contract liabilities are recognized as revenue upon the fulfillment of performance obligations.

The following is a summary of activity for contract liabilities, in thousands:

	Years Ended September 30,		
	2024	2023	2022
Beginning balance	$ 8,018	$ 7,231	$ 1,624
New deposits	5,442	4,058	7,231
Deferred revenue	168	169	—
Revenue recognized	(4,663)	(3,005)	(1,624)
Adjustment	—	(435)	—
Ending balance	$ 8,965	$ 8,018	$ 7,231

As of September 30, 2024, we had approximately $25.3 million of remaining performance obligations, which included recognized contract liabilities as well as amounts to be invoiced and recognized in future periods. As of September 30, 2023, we had approximately $51.8 million of remaining performance obligations. The orders included in our remaining performance obligations are expected to ship within the next twelve months.

Warranty – A limited warranty is provided free of charge, generally for periods of 12 to 36 months to all purchasers of our new products and systems. Accruals are recorded for estimated warranty costs at the time revenue is recognized. While our warranty costs have historically been within our expectations and we believe that the amounts accrued for warranty expenditures are sufficient for all systems sold through September 30, 2024, we cannot guarantee that we will continue to experience a similar level of predictability with regard to warranty costs. In addition, technological changes or previously unknown defects in raw materials or components may result in more extensive and frequent warranty service than anticipated, which could result in an increase in our warranty expense.

The following is a summary of activity in accrued warranty expense, in thousands:

	Years Ended September 30,		
	2024	2023	2022
Beginning balance	$ 965	$ 871	$ 545
Additions for warranties issued during the period	226	590	821
Costs incurred during the period	(19)	(64)	(36)
Changes related to pre-existing warranties	(570)	(432)	(459)
Ending balance	$ 602	$ 965	$ 871

Shipping Expense – Shipping expenses were $2.0 million, $2.6 million and $2.4 million for 2024, 2023 and 2022, respectively, and are included in selling, general and administrative expenses.

Advertising Expense – Advertising costs are expensed as incurred. Advertising expenses were $0.5 million, $0.6 million and $0.4 million for 2024, 2023 and 2022, respectively, and are included in selling, general and administrative expenses.

Stock-Based Compensation – We measure compensation costs relating to share-based payment transactions based upon the grant-date fair value of the award. Those costs are recognized as expense over the requisite service period, which is generally the vesting period, with forfeitures recognized as they occur. We estimate the fair value of stock option awards on the date of grant using the Black-Scholes option-pricing model. The Black-Scholes model requires us to apply estimates, including expected stock price volatility, expected life of the option and the risk-free interest rate. We issue new shares under our existing equity plans upon the exercise of stock options.

We recognize compensation expense associated with the issuance of RSUs over the requisite service period for each respective grant. The total compensation expense associated with RSUs represents the value based upon the number of RSUs awarded multiplied by the closing price of our common stock on the date of grant. Recipients of RSUs do not have voting or dividend rights until the vesting conditions are satisfied and shares are released. We issue new shares under our existing equity plans upon the vesting of RSUs.

Research, Development and Engineering Expenses – RD&E expenses consist primarily of the cost of employees, consultants and contractors who design, engineer and develop new products and processes as well as materials and supplies used in producing prototypes. RD&E expenses may vary from period to period depending on the engineering projects in process. Expenses related to engineers working on strategic projects or sustaining engineering projects are recorded in RD&E. However, from time to time we add functionality to our products or develop new products during engineering and manufacturing to fulfill specifications in a customer's order, in which case the cost of development, along with other costs of the order, are charged to cost of goods sold.

Foreign Currency Transactions and Translation – We use the U.S. dollar as our reporting currency. Our operations in the UK, China and other countries are primarily conducted in their functional currencies, the Euro, Renminbi, or the local country currency, respectively. Accordingly, assets and liabilities of the subsidiaries are translated into U.S. dollars at the exchange rate in effect at the balance sheet dates. Income and expense items are translated at the average exchange rate for each month within the year. The resulting translation adjustments are recorded directly in accumulated other comprehensive income (loss), net of tax - foreign currency translation adjustments as a separate component of shareholders' equity. Net foreign currency transaction gains/losses, including transaction gains/losses on intercompany balances that are not of a long-term investment nature and non-functional currency cash balances, are reported as a separate component of non-operating (income) expense in our Consolidated Statements of Operations.

Income Taxes – We file consolidated federal income tax returns in the United States for all subsidiaries except those in China, Singapore and the UK, where separate returns are filed. We account for income taxes under the asset and liability method, which requires the recognition of deferred tax assets and deferred tax liabilities for the expected future tax consequences of events that have been included in the financial statements. Under this method, we determine deferred tax assets and deferred tax liabilities on the basis of the differences between the financial statement and tax bases of assets and liabilities by using enacted tax rates in effect for the year in which the differences are expected to

reverse. The effect of a change in tax rates on deferred tax assets and deferred tax liabilities is recognized in income in the period that includes the enactment date.

We recognize deferred tax assets to the extent that we believe that these assets are more likely than not to be realized. In making such a determination, we consider all available positive and negative evidence, including future reversals of existing taxable temporary differences, projected future taxable income, tax-planning strategies, carryback potential if permitted under the tax law and results of recent operations. If we determine that we are not be able to realize our deferred tax assets, we make an adjustment to the deferred tax asset to recognize only the portion of the asset that is more likely than not to be realized by recording a valuation allowance.

We record uncertain tax positions in accordance with ASC 740 on the basis of a two-step process in which (1) we determine whether it is more likely than not that the tax positions will be sustained on the basis of the technical merits of the position and (2) for those tax positions that meet the more-likely-than-not recognition threshold, we recognize the largest amount of tax benefit that is more than 50 percent likely to be realized upon ultimate settlement with the related tax authority. We recognize interest and penalties related to uncertain tax benefits on the income tax expense line in the accompanying consolidated statement of operations. Accrued interest and penalties, if applicable, are included on the income taxes payable long-term line in the Consolidated Balance Sheets.

Concentrations of Credit Risk – Our customers are primarily manufacturers of semiconductor substrates and devices and electronic assemblies. Financial instruments that potentially subject us to significant concentrations of credit risk consist principally of cash and trade accounts receivable. Credit risk is managed by performing credit evaluations of the customers' financial condition, by requiring significant deposits where appropriate, and by actively monitoring collections. Letters of credit are required of certain customers depending on the size of the order, type of customer or its creditworthiness, and country of domicile.

As of September 30, 2024, one Thermal Processing Solutions customer individually represented 12% of accounts receivable. As of September 30, 2023, two Thermal Processing Solutions customers individually represented 17% and 17% of accounts receivable.

Refer to Note 18 for information regarding revenue and assets in other countries subject to fluctuation in foreign currency exchange rates.

Fair Value of Financial Instruments – We group our financial assets and liabilities measured at fair value on a recurring basis into three levels, based on the markets in which the assets and liabilities are traded and the reliability of the assumptions used to determine fair value. These levels are:

Level 1 – Valuation is based upon quoted market price for identical instruments traded in active markets.

Level 2 – Valuation is based on quoted market prices for similar instruments in active markets, quoted prices for identical or similar instruments in markets that are not active, and model-based valuation techniques for which all significant assumptions are observable in the market.

Level 3 – Valuation is generated from model-based techniques that use significant assumptions not observable in the market. Valuation techniques include use of discounted cash flow models and similar techniques.

It is our policy to use observable inputs whenever reasonably practicable in order to minimize the use of unobservable inputs when developing fair value measurements. When available, we use quoted market prices to measure fair value. If market prices are not available, the fair value measurement is based on models that use primarily market-based parameters including interest rate yield curves, option volatilities and currency rates. In certain cases, where market rate assumptions are not available, we are required to make judgments about assumptions market participants would use to estimate the fair value of a financial instrument. Changes in the underlying assumptions used, including discount rates and estimates of future cash flows, could significantly affect current or future valuations.

Cash, and Cash Equivalent – Included in cash and cash equivalents in the Consolidated Balance Sheets are money market funds and time deposit accounts. Cash equivalents are classified as Level 1 in the fair value hierarchy.

Receivables and Payables – The recorded amounts of these financial instruments, including accounts receivable and accounts payable, approximate their fair value because of the short maturities of these instruments.

Debt – The Loan Agreement was fully repaid in the fourth quarter of 2024, and was subsequently terminated effective September 11, 2024. The carrying value of debt under our Loan Agreement was based on fixed interest rates. At September 30, 2023, the carrying value of the Company's total debt was $10.6 million, which approximated fair value. The fair value for the Loan Agreement was estimated by discounting the future cash flows using the current rates at which similar loans would be made to borrowers with similar credit ratings and is therefore classified as Level 2 in the fair value hierarchy.

Recently Issued Accounting Pronouncements

In November 2024, the FASB issued ASU 2024-03, "Income Statement - Reporting Comprehensive Income - Expense Disaggregation Disclosures (Subtopic 220-40): Disaggregation of Income Statement Expenses" ("ASU 2023-07"), which requires disclosure of additional information about specific expense categories underlying certain income statement expense line items. This ASU is effective for our annual periods beginning October 1, 2027, and requires either prospective or retrospective application. We are currently evaluating the impact of this ASU on our disclosures.

In December 2023, the FASB issued ASU 2023-09, "Income Taxes (Topic 740): Improvements to Income Tax Disclosures" ("ASU 2023-09"), which enhances the transparency and decision usefulness of income tax disclosures. Adjustments to the annual disclosure of income taxes include: A tabular rate reconciliation comprised of eight specific categories. Income taxes paid, disaggregated between significant federal, state, and foreign jurisdictions. Eliminating requirements to disclose the nature and estimate of reasonably possible changes to unrecognized tax benefits in the next 12 months or that an estimated range cannot be made. Adds a requirement to disclose income (or loss) from continuing operations before income tax expense (or benefit) and income tax expense (or benefit) from continuing operations disaggregated between domestic and foreign. The ASU is effective for public business entities for fiscal years beginning on or after December 15, 2024, with early adoption permitted. The amendments in ASU 2023-09 should be applied on a prospective basis. Retrospective application is permitted. This ASU is not expected to have a material effect on our financial condition or results of operations.

In November 2023, the FASB issued ASU 2023-07, "Segment Reporting (Topic 280): Improvements to Reportable Segment Disclosures" ("ASU 2023-07"), which improves reportable segment disclosure requirements, primarily through enhanced disclosures about significant segment expenses. The ASU is effective for public business entities for fiscal years beginning after December 15, 2023, and for interim reporting periods within fiscal years beginning after December 15, 2024. Early adoption is permitted. The amendments in ASU 2023-07 should be applied retrospectively to all prior periods presented in the financial statements. We are currently evaluating the impact this ASU will have on our disclosures.

There were no other new accounting pronouncements issued or effective as of September 30, 2024 that had or are expected to have a material impact on our consolidated financial statements.

2. Acquisition

On January 17, 2023 (the "Closing Date"), the Company acquired through a reverse triangular merger 100% of the issued and outstanding shares of capital stock of Entrepix, Inc., an Arizona corporation ("Entrepix"), which primarily manufactures chemical mechanical polishing ("CMP") technology. Entrepix's CMP technology portfolio and water cleaning equipment complements our existing substrate polishing and wet process chemical offerings. Under the terms of the Agreement and Plan of Merger dated January 17, 2023 (the "Merger Agreement"), Emerald Merger Sub, Inc., a wholly-owned subsidiary of the Company ("Merger Sub"), merged with and into Entrepix (the "Merger"), resulting in Entrepix surviving the Merger and becoming a wholly-owned subsidiary of the Company (the "Acquisition").

On the Closing Date, in contemplation of the Acquisition, the Company entered into a Loan and Security Agreement with UMB Bank, N.A. (the "Lender"), under which the Lender provided the Company with (i) a $12.0 million term loan maturing January 17, 2028 ("Term Loan"), and (ii) an $8.0 million revolving loan facility maturing January 17, 2024 (see Note 12). The proceeds of the Term Loan were used to partially fund the Acquisition.

The Acquisition is accounted for using the acquisition method of accounting for business combinations under FASB ASC Topic No. 805, Business Combinations ("ASC 805"), with Amtech representing the accounting acquirer under this guidance. The Company elected to apply pushdown accounting per ASC 805-50-50-5.

Summary of Consideration Transferred – The total consideration for the Acquisition was $39.2 million, consisting of $35.2 million cash consideration to the sellers and $4.0 million cash paid for debt and Entrepix transaction costs.

Goodwill is calculated as the excess of the consideration transferred over the net assets recognized and represents the estimated future economic benefits arising from other assets acquired that could not be individually identified and separately recognized. Such assets include synergies the Company expects to achieve, such as deeper penetration into an overlapping customer base, complementary product offerings, and cost redundancy reductions. In accordance with the measurement principles in ASC 820, "Fair Value Measurement", the purchase consideration for the Acquisition has been allocated under the acquisition method of accounting to the estimated fair market value of the net assets acquired, including a residual amount of goodwill, none of which is deductible for tax purposes. The recorded amounts of acquired accounts receivable and accounts payable approximate their fair value because of the short maturities of these assets and liabilities. The fair value of acquired property, plant and equipment was based on quoted market prices for similar assets in active markets. The fair value of acquired identifiable intangible assets were estimated using various valuation methodologies, including the multi-period excess earnings method, the relief from royalty method and the distributor method. Amtech's acquisition costs incurred were $2.5 million as of the year ended September 30, 2023, and were recorded as selling, general and administrative expenses in the accompanying Consolidated Statements of Operations. The following table summarizes the provisional fair values assigned to identifiable assets acquired and liabilities assumed, in thousands:

	September 30, 2023
Fair value of total cash consideration transferred	$ 39,227
Estimated fair value of identifiable assets acquired and liabilities assumed:	
Cash and cash equivalents	$ 4,289
Accounts receivable, net	5,884
Inventories	5,683
Other current assets	179
Property, plant, and equipment	2,040
Right-of-use assets	2,246
Intangible assets	13,600
Goodwill	16,463
Other assets	80
Total assets acquired	50,464
Accounts payable	1,574
Other accrued liabilities	1,994
Contract liabilities	1,949
Income taxes payable	985
Current portion of long-term operating lease liabilities	515
Long-term operating lease liabilities	1,730
Deferred tax liability	2,490
Total liabilities assumed	11,237
Net assets acquired	$ 39,227

The establishment of the allocation to goodwill requires the extensive use of accounting estimates and management judgment. In accordance with ASC 805, the Company has up to one year from the acquisition date (referred to as the measurement period) to account for changes in the fair values of the identifiable assets acquired and the liabilities assumed in the acquired entity. As of January 17, 2024, the measurement period is closed.

The fair value associated with acquired intangible assets and their associated weighted-average amortization periods consist of the following, in thousands:

	Classification of Amortization	Amount	Weighted-Average Amortization Period
Developed technology	Cost of sales	$ 6,700	5.0 years
Customer relationships	Selling, general and administrative	2,800	10.0 years
Backlog	Selling, general and administrative	2,100	1.0 year
Trade names	Selling, general and administrative	1,800	10.0 years
Noncompetition agreements	Selling, general and administrative	200	5.0 years
Total intangible assets		$ 13,600	6.1 years

Unaudited Pro Forma Financial Information – Entrepix is included in the Company's consolidated results beginning January 17, 2023. Total revenues and net loss attributable to Entrepix for the period from January 17, 2023 to September 30, 2023 were $18.6 million and $(3.7) million, respectively.

The following unaudited pro forma financial information presents the combined results of operations of Amtech and Entrepix, in thousands, as if the acquisition occurred on October 1, 2021. The unaudited pro forma financial information is presented for informational purposes only and is not indicative of the results of operations that would have been achieved if the acquisition had taken place on the date indicated or of results that may occur in the future.

	Year Ended September 30, 2023	2022
Revenues, Net	$ 121,020	$ 129,781
Net (Loss) Income	$ (13,099)	$ 13,946

The unaudited pro forma financial information presented above include the following adjustments:

Year ended September 30, 2023 and September 30, 2022

- incremental of amortization expense on intangible assets acquired of $1.0 million and $3.9 million for the year ended September 30, 2023 and September 30, 2022, respectively;
- reversal of depreciation expense for property, plant, and equipment of $0.2 million and $0.2 million for the year ended September 30, 2023 and September 30, 2022, respectively;
- incremental interest expense on the Term Loan of $0.6 million and $0.7 million for the year ended September 30, 2023 and September 30, 2022, respectively; and
- non-recurring adjustments directly attributable to the business combination, including acquisition related costs of $2.5 million for the year ended September 30, 2022.

The unaudited pro forma financial information includes adjustments to align accounting policies, which were materially similar to the Company's accounting policies. Any differences in accounting policies were adjusted to reflect the accounting policies of the Company in the unaudited pro forma financial information presented.

3. Earnings Per Share & Diluted Earnings Per Share

Basic EPS is computed by dividing net income by the weighted average number of common shares outstanding for the period. Diluted EPS is computed similarly to basic EPS except that the denominator is increased to include the number of additional common shares that would have been outstanding if potentially dilutive common shares had been issued. Dilutive potential common shares include outstanding RSUs and stock options. In the case of a net loss, diluted EPS is calculated in the same manner as basic EPS.

For the years 2024, 2023 and 2022, 798,000, 327,000 and 189,000 weighted average shares, respectively, were excluded from the diluted EPS calculations because they were anti-dilutive. These share-based awards could become dilutive in the future.

A reconciliation of the denominators of the basic and diluted EPS calculations follows, in thousands, except per share amounts:

	Years Ended September 30,		
	2024	2023	2022
Numerator:			
Net (loss) income	$ (8,486)	$ (12,582)	$ 17,367
Denominator:			
Weighted-average shares used to compute basic EPS	14,208	14,065	14,014
Dilutive potential common shares due to stock options (1)	—	—	170
Dilutive potential common shares due to RSUs (1)	—	—	—
Weighted-average shares used to compute diluted EPS	14,208	14,065	14,184
(Loss) Income per share:			
Net (loss) income per basic share	$ (0.60)	$ (0.89)	$ 1.24
Net (loss) income per diluted share	$ (0.60)	$ (0.89)	$ 1.22

(1) The number of common stock equivalents is calculated using the treasury stock method and the average market price during the period.

4. Severance

In 2024, we recorded severance expense of $0.4 million. This related primarily to staff reductions across our locations as we shifted more work to contract manufacturers and dealt with decreasing demand. We recorded severance expense of $0.7 million in 2023. This charge primarily relates to the retirement of our founder. The outstanding obligations are as follows, in thousands:

	Years Ended September 30,		
	2024	2023	2022
Balance at beginning of the year	$ 154	$ —	$ 17
Severance expense, net of adjustments	350	665	—
Cash payments	(504)	(511)	(17)
Balance at the end of the year	$ —	$ 154	$ —

5. Inventories

The components of inventories are as follows, in thousands:

	September 30,	
	2024	2023
Purchased parts and raw materials	$ 17,958	$ 22,627
Work-in-process	6,934	7,774
Finished goods	1,975	4,444
	$ 26,867	$ 34,845

In the Semiconductor Fabrication Solutions segment, we recorded $0.4 million and $1.5 million related to the write-off of inventory for our polishing machine products in the years ended September 30, 2024 and 2023, respectively.

6. Property, Plant and Equipment

The following is a summary of property, plant and equipment, in thousands:

	September 30,	
	2024	2023
Land	$ —	$ 189
Buildings	—	717
Building and leasehold improvements	5,985	2,881
Equipment and machinery	9,928	9,200
Furniture and fixtures	2,588	3,160
Software	1,986	1,970
	20,487	18,117
Accumulated depreciation and amortization	(8,840)	(8,422)
	$ 11,647	$ 9,695

Depreciation was $2.1 million, $1.9 million and $1.6 million in 2024, 2023 and 2022, respectively.

7. Sale and Leaseback of Real Estate

On June 23, 2022, BTU completed the sale and leaseback of its building in Massachusetts (the "Property"). The sale price was $20.6 million, of which $0.7 million was deducted at closing for commission and other closing expenses. Simultaneously with the closing, BTU entered into a two-year leaseback of the Property. The lease terms include annual base rent of $1.5 million in an absolute triple net lease. In connection with the sale, BTU recognized a pre-tax gain on sale of $12.5 million in 2022, which is recorded within operating expenses on the Consolidated Statement of Operations. This sale-leaseback transaction resulted in a net cash inflow of approximately $14.9 million in 2022, after repayment of the existing mortgage and settlement of related sale expenses. The leaseback ended in the third quarter of 2024.

8. Leases

The following table provides information about the financial statement classification of our lease balances reported within the Consolidated Balance Sheets, in thousands:

	September 30, 2024	2023
Assets		
Right-of-use assets - operating	$ 16,596	$ 11,217
Right-of-use assets - finance	227	123
Total right-of-use assets	$ 16,823	$ 11,340
Liabilities		
Current		
Operating lease liabilities	$ 2,041	$ 2,623
Finance lease liabilities	101	64
Total current portion of long-term lease liabilities	2,142	2,687
Long-term		
Operating lease liabilities	15,240	8,894
Finance lease liabilities	189	50
Total long-term lease liabilities	15,429	8,944
Total lease liabilities	$ 17,571	$ 11,631

The following table provides information about the financial statement classification of our lease expenses reported in the Consolidated Statements of Operations, in thousands:

		Years Ended September 30,		
Lease cost	**Classification**	**2024**	**2023**	**2022**
Operating lease cost	Cost of sales	$ 2,202	$ 2,318	$ 822
Operating lease cost	Selling, general and administrative expenses	1,409	781	359
Operating lease cost	Research, development and engineering	12	13	14
Finance lease cost	Cost of sales	2	4	4
Finance lease cost	Selling, general and administrative expenses	114	76	71
Short-term lease cost	Cost of sales	—	25	—
Total lease cost		$ 3,739	$ 3,217	$ 1,270

Future minimum lease payments under non-cancelable leases as of September 30, 2024 are as follows, in thousands:

Years Ending September 30,	Operating Leases	Finance Leases	Total
2025	$ 3,077	$ 118	$ 3,195
2026	2,881	118	2,999
2027	2,298	78	2,376
2028	2,338	5	2,343
2029	2,382	—	2,382
Thereafter	10,022	—	10,022
Total lease payments	22,998	319	23,317
Less: Interest	5,717	29	5,746
Present value of lease liabilities	$ 17,281	$ 290	$ 17,571

Operating lease payments include $2.3 million related to options to extend lease terms that are reasonably certain of being exercised. During 2023, we reassessed the options to extend the term of the lease on our manufacturing facility in Carlisle, Pennsylvania, and determined it was not reasonably certain that Amtech would exercise those options. As a result, we reduced our ROU Asset and the related ROU Operating Lease liability by $2.7 million.

The following table provides information about the remaining lease terms and discount rates applied:

	September 30,	
	2024	2023
Weighted average remaining lease term		
Operating leases	8.47 years	7.31 years
Finance leases	2.73 years	2.54 years
Weighted average discount rate		
Operating leases	6.58%	5.50%
Finance leases	6.43%	4.91%

9. Intangible Assets

Intangible assets consist of the following, in thousands:

		September 30,	
	Amortization Period	2024	2023
Backlog	1 year	$ 2,100	$ 2,100
Customer relationships	6-10 years	4,409	4,409
Developed technology	1.75 years	6,700	6,700
Noncompetition agreements	5 years	200	200
Trade names	3-15 years	2,679	2,679
		16,088	16,088
Accumulated amortization		(5,616)	(4,785)
Less asset impairments:			
Backlog		(425)	(425)
Customer relationships		(339)	(119)
Developed technology		(5,494)	(4,645)
Noncompetition agreements		(160)	—
Trade names		(50)	—
Intangible assets, net		$ 4,004	$ 6,114

Intangible assets are amortized over a weighted-average amortization period of 8.0 years. Our customer relationship and trade name intangible assets are amortized over weighted-average amortization periods of 4.6 and 3.4 years, respectively.

We review our intangible assets for impairment when events or circumstances indicate the carrying value may not be recoverable. Except as discussed below, we concluded that a triggering event had not occurred that would more likely than not reduce the fair value of intangible assets below their carrying value. We identified a triggering event at the end of September 2023, primarily related to the prolonged downturn and general economic conditions in the semiconductor market, in addition to delays in the adoption of next-gen polishing tools, which reduced our cash flow projections. This triggering event indicated we should test the related long-lived assets for impairment in our Semiconductor Fabrication Solutions segment. We tested each identified asset group within our Semiconductor Fabrication Solutions segment by first performing a recoverability test, comparing projected undiscounted cash flows from the use and eventual disposition of each asset group to its carrying value. This test indicted that the undiscounted cash flows were not sufficient to recover the carrying value of certain asset groups. We then compared the carrying value of the individual long-lived assets within those asset groups against their fair value in order to determine if impairment existed. Determining the fair value of those asset groups involves the use of significant estimates and assumptions, including projections of revenues and expenses and related cash flows based on assumed long-term growth rates and demand trends, and estimated discount rates based on the asset group's weighted average return on assets, as derived from various methods. The fair value of the intangible assets were estimated using various valuation methodologies, including the multi-period excess earnings method, the relief from royalty method and the distributor method. These fair value measurements fall under Level 3 of the fair value hierarchy. As a result, we recorded a total impairment charge for intangible assets in our Semiconductor Fabrication Solutions segment of $5.2 million during

the year ended September 30, 2023. This impairment charge relates to developed technology and backlog at Entrepix and customer relationships at Intersurface Dynamics.

Additionally, at the end of December 2023, we identified a triggering event. As a result of the decline in our stock price as of December 31, 2023, our book value materially exceeded our market value. As discussed in the Goodwill section below, this resulted in a triggering event for impairment of goodwill. The results of the goodwill impairment test indicated that the book value of our Semiconductor Fabrication Solutions reporting unit was in excess of the fair value, and, thus, was impaired. Prior to recognizing any impairment of goodwill, we tested the related long-lived assets for impairment in our Semiconductor Fabrication Solutions segment. We tested each identified asset group within our Semiconductor Fabrication Solutions segment by first performing a recoverability test, comparing projected undiscounted cash flows from the use and eventual disposition of each asset group to its carrying value. This test indicated that the undiscounted cash flows were not sufficient to recover the carrying value of certain asset groups. We then compared the carrying value of the individual long-lived assets within those asset groups against their fair value in order to determine if impairment existed. Determining the fair value of those asset groups involves the use of significant estimates and assumptions, including projections of revenues and expenses and related cash flows based on assumed long-term growth rates and demand trends, and estimated discount rates based on the asset group's weighted average return on assets, as derived from various methods. The fair value of the intangible assets were estimated using various valuation methodologies, including the multi-period excess earnings method, the relief from royalty method and the distributor method. These fair value measurements fall under Level 3 of the fair value hierarchy. As a result, we recorded a total impairment charge for intangible assets in our Semiconductor Fabrication Solutions segment of $1.3 million during the quarter ended December 31, 2023. This impairment charge relates to developed technology, trade name, customer relationships and non-competition agreements at Entrepix.

Amortization expense related to intangible assets was $0.8 million, $3.1 million and $0.1 million in 2024, 2023 and 2022, respectively. Future amortization expense for the remaining unamortized balance as of September 30, 2024 is estimated as follows, in thousands:

Years Ending September 30,	Amortization Expense
2025	$ 511
2026	511
2027	511
2028	511
2029	511
Thereafter	1,449
Total	$ 4,004

10. Goodwill

The changes in the carrying amount of goodwill, by reportable segment, are as follows, in thousands:

	Thermal Processing Solutions	Semiconductor Fabrication Solutions	Total Goodwill
Goodwill	$ 5,905	$ 21,726	$ 27,631
Accumulated impairment losses	—	—	—
Balance at September 30, 2023	5,905	21,726	27,631
Goodwill acquired	—	—	—
Impairment of goodwill	—	(6,370)	(6,370)
Balance at September 30, 2024	$ 5,905	$ 15,356	$ 21,261
Goodwill	$ 5,905	$ 21,726	$ 27,631
Accumulated impairment losses	—	(6,370)	(6,370)
Balance at September 30, 2024	$ 5,905	$ 15,356	$ 21,261

On January 17, 2023, we acquired Entrepix, which has been integrated into our Semiconductor Fabrication Solutions segment. Under the purchase method of accounting, the purchase price for the acquisition was allocated to the tangible

and identifiable intangible assets acquired and liabilities assumed based on their estimated fair values. The excess purchase price over fair value of net assets acquired of approximately $16.5 million was recorded as goodwill in the Semiconductor Fabrication Solutions segment. The primary driver for this acquisition was to add CMP and wafer cleaning equipment to our existing substrate polishing and wet process chemical offerings.

We review goodwill for impairment when events or circumstances indicate the carrying value may not be recoverable. We performed our annual test of goodwill impairment as of September 30. The results of the goodwill impairment test indicated that the fair value of both our Thermal Processing and Semiconductor Fabrication Solutions reporting units were in excess of the carrying value, and, thus, were not impaired. At the end of December 2023, we identified a triggering event. As a result of the decline in our stock price as of December 31, 2023, our book value materially exceeded our market value leading to a $6.4 million impairment charge in fiscal 2024.

Determining the fair value of a reporting unit involves the use of significant estimates and assumptions. Our goodwill impairment test uses a weighting of the income approach and the market approach to estimate a reporting unit's fair value. The income approach is based on a discounted future cash flow analysis that uses certain assumptions including: projections of revenues and expenses and related cash flows based on assumed long-term growth rates and demand trends; expected future investments and working capital requirements to sustain and grow the business; and estimated discount rates based on the reporting unit's weighted average cost of capital as derived by the Capital Asset Pricing Model and other methods, which includes observable market inputs and other data from identified comparable companies. The same estimates are also used internally for our capital budgeting process, and for long-term and short-term business planning and forecasting. We test the reasonableness of the inputs and outcomes of our discounted cash flow analysis against available comparable market data, and we also perform a reconciliation of our total market capitalization to the estimated fair value of all of our reporting units. The market approach is based on the application of appropriate market-derived multiples selected from (i) comparable publicly-traded companies and/or (ii) the implied transaction multiples derived from identified merger and acquisition activity in the market. Multiples are then selected based on a comparison of the reviewed data to that of the reporting unit and applied to relevant historical and forecasted financial parameters such as levels of revenues, EBITDA, EBIT or other metrics. The calculation of fair value falls under Level 3 of the fair value hierarchy.

11. Income Taxes

Income Tax (Benefit) Provision

The components of (loss) income before (benefit) provision for income taxes are as follows, in thousands:

	Years Ended September 30,		
	2024	2023	2022
Domestic	$ (9,563)	$ (17,271)	$ 15,275
Foreign	2,052	2,089	3,510
	$ (7,511)	$ (15,182)	$ 18,785

The components of the (benefit) provision for income taxes are as follows, in thousands:

	Years Ended September 30,		
	2024	2023	2022
Current:			
Domestic federal	$ (49)	$ —	$ —
Foreign	793	(327)	711
Foreign withholding taxes	279	159	255
Domestic state	36	81	77
Total current	1,059	(87)	1,043
Deferred:			
Domestic federal	—	(2,207)	(39)
State	—	(284)	—
Foreign	(84)	(22)	414
Total deferred	(84)	(2,513)	375
Total provision (benefit)	$ 975	$ (2,600)	$ 1,418

A reconciliation of actual income taxes to income taxes at the expected U.S. federal corporate income tax rate is as follows, in thousands, except percentages:

	Years Ended September 30,					
	2024		2023		2022	
Tax (benefit) expense at the federal statutory rate	$ (1,577)	21.0%	$ (3,188)	21.0%	$ 3,945	21.0%
Effect of permanent book-tax differences	152	-2.0%	757	-5.0%	11	0.1%
State tax provision	18	-0.3%	(395)	2.6%	554	2.9%
Valuation allowance for net deferred tax assets	1,179	-15.7%	1,594	-10.5%	(3,138)	-16.7%
Uncertain tax items	—	0.0%	(1,004)	6.6%	55	0.3%
Tax rate differential	580	-7.7%	358	-2.4%	535	2.8%
Goodwill impairment	1,334	-17.8%	—	0.0%	—	0.0%
Other items	(711)	9.5%	(722)	4.8%	(544)	-2.9%
	$ 975	-13.0%	$ (2,600)	17.1%	$ 1,418	7.5%

Deferred Income Taxes and Valuation Allowance

Deferred income taxes reflect the tax effects of temporary differences between the financial statement and tax bases of assets and liabilities by using enacted tax rates in effect for the year in which the differences are expected to be realized. The components of deferred tax assets and deferred tax liabilities are as follows, in thousands:

	September 30, 2024	2023
Deferred tax assets:		
Net operating loss carryforwards	$ 17,699	$ 17,112
Accruals and reserves	1,983	2,865
Income tax credits	2,163	1,618
Operating lease liabilities	4,150	2,719
Research and development costs	1,531	1,011
Foreign service fee	1,579	1,579
Other assets	878	731
Total deferred tax assets	29,983	27,635
Valuation allowance	(22,658)	(21,506)
Deferred tax assets, net of valuation allowance	7,325	6,129
Deferred tax liabilities:		
Goodwill and identifiable intangible assets	(1,124)	(1,616)
Property and equipment, net	(1,860)	(1,356)
Operating lease, right-of-use assets	(3,987)	(2,720)
Prepaid assets	(169)	(336)
Total deferred tax liabilities	(7,140)	(6,028)
Total deferred tax assets, net	$ 185	$ 101

Changes in the deferred tax valuation allowance are as follows, in thousands:

	Years Ended September 30, 2024	2023
Balance at the beginning of the year	$ 21,506	$ 20,000
Additions to valuation allowance	1,152	1,506
Balance at the end of the year	$ 22,658	$ 21,506

The deferred tax valuation allowance increased by $1.2 million and $1.5 million for the years ended September 30, 2024 and 2023, respectively. During the year ended September 30, 2023, we released a portion of our valuation allowance in connection with a deferred tax liability related to the Entrepix acquisition.

In assessing the realizability of deferred tax assets, we consider whether it is more likely than not that some portion or all of the deferred tax assets will be realized. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income during the periods in which those temporary differences become deductible. We consider the scheduled reversal of deferred tax liabilities, projected future income and tax planning strategies in making this assessment. We have established valuation allowances on all net U.S. deferred tax assets, after considering all of the available objective evidence, both positive and negative, historical and prospective, with greater weight given to historical objective evidence, and determined it is not more likely than not that these assets will be realized. We have established a partial valuation allowance on certain foreign deferred tax assets that we consider it is more likely than not will not be realized.

We intend to permanently reinvest undistributed earnings of our foreign subsidiaries. It is not practicable to estimate the amount of tax that might be payable on the undistributed amounts.

Net Operating Losses

As of September 30, 2024, we have federal net operating loss carryforwards of approximately $10.0 million that expire at various times between 2032 and 2035. The utilization of those federal net operating losses is limited to approximately $0.8 million per year. Additionally, we have federal net operating loss carryforwards of approximately $69.4 million that have an indefinite carryforward period. The utilization of those federal net operating losses is limited to 80% of taxable income after 2021. We have no foreign net operating loss carryforwards as of September 30, 2024. We have approximately $16.7 million of state net operating loss carryforwards, with various expiration dates and limitations on utilization, depending on the state. As of September 30, 2024, we have approximately $1.8 million of Foreign Tax Credit carryforwards that expire at various times between 2030 and 2034 and approximately $0.5 million of Federal and State Research and Development credits that expire at various times between 2029 and 2043.

Uncertain Tax Positions

We have included all of our liabilities for uncertain tax positions with income taxes payable long-term. A reconciliation of the beginning and ending amount of our unrecognized tax benefits is summarized as follows, in thousands:

	Years Ended September 30,		
	2024	2023	2022
Balance at beginning of the year	$ —	$ 1,004	$ 949
Additions related to tax positions taken in prior years	—	—	55
Reductions due to resolution of uncertain tax position	—	(1,004)	—
Balance at the end of the year	$ —	$ —	$ 1,004

During fiscal 2023, we reversed our previous accrual of uncertain tax positions in the amount of $1.0 million. This reversal was reflected in the income tax (benefit) provision line of the Consolidated Statements of Operations. The reversal resulted from the expiration of the applicable statute of limitations.

Tax Return Matters

We file income tax returns in China and other foreign jurisdictions, as well as the U.S. and various states in the U.S. We have not signed any agreements with the Internal Revenue Service, any state or foreign jurisdiction to extend the statute of limitations for any fiscal year. As such, the number of open years is the number of years dictated by statute in each of the respective taxing jurisdictions. U.S. Federal tax returns generally have a 3-year statute of limitations. Therefore, U.S. federal returns for tax years ending on or after September 30, 2021 remain open for examination. In addition, the IRS may adjust attribute carryforwards utilized in an open year even though the year the attributes originated may be closed. State and foreign statutes are generally 3 to 5 years but vary by jurisdiction. These open years contain certain matters that could be subject to differing interpretations of applicable tax laws and regulations as they relate to the amount, timing, or inclusion of revenues and expenses, or the sustainability of income tax positions of Amtech and our subsidiaries.

12. Long-Term Debt

Our finance lease liabilities and long-term debt consists of the following, in thousands:

	September 30,	
	2024	2023
Revolving credit facility	$ —	$ —
Term loan	—	10,573
Finance leases	290	114
Total	290	10,687
Less: current portion of finance lease liabilities and long-term debt	(101)	(2,265)
Finance Lease Liabilities and Long-Term Debt	$ 189	$ 8,422

Interest expense on finance lease liabilities and long-term debt was $0.6 million, $0.5 million and $0.1 million in 2024, 2023 and 2022, respectively.

Annual maturities relating to our long-term debt as of September 30, 2024 are as follows, in thousands:

	Annual Maturities
2025	$ 101
2026	109
2027	75
2028	5
2029	—
Thereafter	—
Total long-term debt	$ 290

Loan and Security Agreement

On January 17, 2023, we entered into a Loan and Security Agreement (the "Loan Agreement") by and among Amtech, its U.S. based wholly owned subsidiaries Bruce Technologies, Inc., a Massachusetts corporation, BTU International, Inc., a Delaware corporation, Intersurface Dynamics, Incorporated, a Connecticut corporation, P.R. Hoffman Machine Products, Inc., an Arizona corporation, and Entrepix, Inc., an Arizona corporation (collectively the "Borrowers") and UMB Bank, N.A., national banking association (the "Lender"). The Loan Agreement provides for (i) a term loan (the "Term Loan") in the amount of $12.0 million maturing January 17, 2028, and (ii) a revolving loan facility (the "Revolver") with an availability of $8.0 million maturing January 17, 2024. The recorded amount of the Term Loan has a fixed interest rate of 6.38%. The Revolver has a floating per annum rate of interest equal to the Prime Rate, adjusted daily. Under the Loan Agreement, we are required to pay a non-utilization fee equal to 0.125% of any unused portion of the Revolver in excess of any letter of credit obligations.

The Term Loan and Revolver are secured by a first priority lien on substantially all of the Borrowers' assets (other than certain customary excluded assets) and the Loan Agreement contains customary events of default, representations and warranties, and covenants that restrict the Borrowers' ability to, among other things, incur additional indebtedness, other than permitted indebtedness, enter into mergers or acquisitions, sell or otherwise dispose of assets, or pay dividends, subject to customary exceptions.

The Loan Agreement additionally contains financial covenants such that, as of the end of each of their fiscal quarters, beginning March 31, 2023, the Borrowers must maintain (i) a ratio of consolidated debt owed to Lender to consolidated EBITDA (as defined in the Loan Agreement) for such fiscal quarter, of not greater than 1.50 to 1.00, through December 31, 2024, based on a building four quarters (as described in the Loan Agreement), and then 1.00 to 1.00 each fiscal quarter thereafter, (ii) a ratio of (a) the total for such fiscal quarter of EBITDAR (as defined in the Loan Agreement) minus the sum of all income taxes paid in cash plus cash dividends/distributions plus maintenance Capital Expenditures (as defined in the Loan Agreement) plus management fees paid in cash, to (b) the sum for such fiscal quarter of (1) Interest Charges (as defined in the Loan Agreement) plus (2) required payments of principal on

Debt (as defined in the Loan Agreement) (including the Term Loan, but excluding the Revolver) plus (3) operating lease/rent expense, of not less than 1.30 to 1.00 based on a building four quarters (as described in the Loan Agreement), and (iii) a consolidated working capital of current assets (excluding related party receivables and prepaid expenses) minus current liabilities of at least $35.0 million.

At September 30, 2023, we were not in compliance with the Debt to EBITDA and Fixed Charge Coverage Ratio financial covenants under our Loan Agreement. On December 5, 2023, we entered into a Forbearance & Modification Agreement (the "Forbearance Agreement") with UMB Bank related to such non-compliance, pursuant to which UMB Bank agreed to forbear from exercising its rights and remedies available to it as a result of such defaults. We will be operating under the terms of such Forbearance Agreement through January 17, 2025 (the "Forbearance Period").

The Forbearance Agreement also amends the Loan Agreement to, among other things, (i) increase the availability under the revolving line of credit from $8.0 million to $14.0 million (the "Revolver"), and (ii) reduce the term loan commitment from $12.0 million to $4,423,200 (the "Term Loan"). The Revolver maturity date was extended one year to January 17, 2025 and the Term Loan maturity date was extended from January 17, 2028 to January 17, 2029. Both the Revolver and the Term Loan have a floating per annum rate of interest equal to the Prime Rate, adjusted daily, plus the Applicable Margin (as such terms are defined in the Loan Agreement). We are required to pay a non-utilization fee equal to 0.125% of any unused portion of the Revolver in excess of any letter of credit obligations. As of September 30, 2023, no amounts were borrowed against the Revolver and there were no letters of credit outstanding. As of the effective date of the Forbearance Agreement, $10.0 million will be drawn under the Loan Agreement, which includes $4.4 million under the Term Loan and $5.6 million under the Revolver.

Future borrowings, if any, under the Loan Agreement are subject to, among other things, having sufficient unencumbered Eligible Accounts, Eligible Foreign Accounts and Eligible Inventory (as such terms are defined in the Loan Agreement) to meet the borrowing base requirements included in the amended Loan Agreement.

Under the amended Loan Agreement, the Company is required to comply with the following financial covenants: (i) maintaining, on a consolidated basis, a minimum consolidated EBITDA (as defined in the Loan Agreement) for the fiscal quarter ending December 31, 2023 through the twelve-month period ending September 30, 2024, based on a building four quarters (as described in the Loan Agreement) (the "Minimum EBITDA Covenant"); (ii) commencing for the fiscal year ending September 30, 2024, a ratio of (a) the total for such fiscal year of EBITDAR (as defined in the Loan Agreement) minus the sum of all income taxes paid in cash plus cash dividends/distributions plus maintenance Capital Expenditures (as defined in the Loan Agreement) plus management fees paid in cash, to (b) the sum for such fiscal quarter of (1) Interest Charges (as defined in the Loan Agreement) plus (2) required payments of principal on Debt (as defined in the Loan Agreement) (including the Term Loan, but excluding the Revolver) plus (3) operating lease/rent expense, of not less than 1.30 to 1.00 based on a trailing four (4) quarter basis (the "Fixed Charge Coverage Ratio Covenant"); and (iii) a consolidated working capital of current assets (excluding related party receivables and prepaid expenses) minus current liabilities of at least $35.0 million. The Minimum EBITDA Covenant replaced the Senior Debt to EBITDA covenant sent forth in the original Loan Agreement.

The Loan Agreement was fully repaid in the fourth quarter of 2024, and was subsequently terminated effective September 11, 2024.

Finance Lease Obligations

Our finance lease obligations totaled $0.3 million and $0.1 million as of September 30, 2024 and September 30, 2023, respectively.

The current and long-term portions of our finance leases are included in the current and long-term portions of finance lease liabilities and long-term debt in the table above and in our Consolidated Balance Sheets as of September 30, 2024 and 2023.

13. Equity and Stock-Based Compensation

Stock Repurchase Plans

The following table summarizes information related to our stock repurchase plans, in thousands, except share and per share amounts:

Name of Stock Repurchase Plan	Date Approved by Board	Plan Term	Amount Authorized ($)	Amount Used for Repurchases ($)	Average Price Paid per Share ($)	Shares Repurchased (#)	Amount Available for Repurchases ($)	Plan Status	Fiscal Year of Repurchases
2023 Stock Repurchase Plan	2/7/2023	1 year	5,000	—	—	—	—	Expired	NA
2022 Stock Repurchase Plan	2/10/2022	1 year	5,000	1,400	9.78	143,430	—	Expired	2022
2021 Stock Repurchase Plan	2/9/2021	1 year	4,000	2,700	9.31	291,383	—	Expired	2022

All repurchased shares have been retired.

Stock-Based Compensation Expense

Stock-based compensation expenses of $1.5 million, $1.3 million and $0.5 million for 2024, 2023 and 2022, respectively, are included in selling, general and administrative expenses. As of September 30, 2024, total compensation cost related to non-vested stock options not yet recognized is $1.3 million, which is expected to be recognized over the next 1.33 years on a weighted-average basis. As of September 30, 2024, total compensation cost related to nonvested RSUs not yet recognized is $0.1 million, which is expected to be recognized over the next year.

Amtech Equity Compensation Plans

The 2022 Plan, under which 1,000,000 shares could be granted, was adopted by the Board of Directors in November 2021, and approved by the shareholders in March 2022.

The 2007 Plan, under which 500,000 shares could be granted, was adopted by the Board in April 2007, and approved by the shareholders in May 2007. The 2007 Plan was amended in 2009, 2014 and 2015 to add 2,500,000 shares. The plan was also amended in 2019 to extend the term of the plan and allow for the grant of restricted stock units. Upon the adoption of the 2022 Plan, no further awards will be granted from the 2007 Plan. Previously issued awards will remain outstanding in accordance with their terms.

The Non-Employee Directors Stock Option Plan was approved by the shareholders in 1996 for issuance of up to 100,000 shares of common stock to directors. The Non-Employee Directors Stock Option Plan was amended in 2005, 2009 and 2014 to add 400,000 shares. The plan was also amended in 2020 to extend the term of the plan. Upon the adoption of the 2022 Plan as stated above, no further awards will be granted from the Non-Employee Directors Stock Option Plan. Previously issued awards will remain outstanding in accordance with their terms.

Equity compensation plans as of September 30, 2024 are summarized in the table below:

Name of Plan	Shares Authorized	Shares Available for Grant	Options Outstanding	Unvested RSUs Outstanding	Plan Expiration
2022 Plan	1,000,000	22,871	851,250	24,897	Mar. 2032
2007 Plan	3,000,000	—	151,766	—	Mar. 2024
Non-Employee Directors Stock Option Plan	500,000	—	84,000	—	Mar. 2024
		22,871	1,087,016	24,897	

Stock Options

Stock options issued under the terms of our equity compensation plans have, or will have, an exercise price equal to or greater than the fair market value of the common stock at the date of the option grant and expire no later than 10 years from the date of grant. Options issued under the plans vest over 1 to 3 years. We estimated the fair value of stock option awards on the date of grant using the Black-Scholes option pricing model using the following assumptions:

	Years Ended September 30,		
	2024	2023	2022
Risk free interest rate	4%	4%	2%
Expected life	5 years	5 years	5 years
Dividend rate	0%	0%	0%
Volatility	60%	56%	57%

The following table summarizes our stock option activity:

	Years Ended September 30,					
	2024		2023		2022	
	Options	Weighted Average Exercise Price	Options	Weighted Average Exercise Price	Options	Weighted Average Exercise Price
Outstanding at beginning of period	672,924	$ 8.76	589,341	$ 8.06	608,269	$ 6.48
Granted	620,500	$ 5.66	322,500	$ 9.04	135,500	$ 12.80
Exercised	(15,000)	$ 5.67	(168,318)	$ 6.01	(124,475)	$ 5.78
Forfeited/expired	(191,408)	$ 9.12	(70,599)	$ 10.73	(29,953)	$ 6.92
Outstanding at end of period	1,087,016	$ 6.97	672,924	$ 8.76	589,341	$ 8.06
Exercisable at end of period	532,185	$ 7.64	374,728	$ 8.25	358,343	$ 6.92
Weighted average grant-date fair value of options granted during the period	$ 2.50		$ 4.73		$ 6.39	

The following table summarizes information for stock options outstanding and exercisable as of September 30, 2024:

	Options Outstanding			Options Exercisable	
Range of Exercise Prices	Number Outstanding	Remaining Contractual Life (in years)	Weighted Average Exercise Price Per Share	Number Exercisable	Weighted Average Exercise Price Per Share
$4.32-$4.70	8,000	9.41	$ 4.51	—	$ —
$4.73-$4.73	109,500	9.45	$ 4.73	—	$ —
$4.77-$5.52	118,233	4.62	$ 5.15	88,233	$ 5.08
$5.67-$5.91	93,541	5.88	$ 5.76	63,541	$ 5.69
$6.00-$6.00	400,000	4.42	$ 6.00	133,334	$ 6.00
$6.58-$8.82	81,750	6.87	$ 8.21	52,250	$ 8.06
$9.00-$9.00	150,000	8.87	$ 9.00	100,001	$ 9.00
$9.27-$10.22	76,000	7.26	$ 9.61	50,167	$ 9.78
$11.51-$11.51	12,000	6.48	$ 11.51	12,000	$ 11.51
$15.43-$15.43	37,992	5.90	$ 15.43	32,659	$ 15.43
$4.32-$15.43	1,087,016	6.18	$ 6.97	532,185	$ 7.64

The aggregate intrinsic values of options outstanding and options exercisable as of September 30, 2024 were approximately $0.2 million and $0.1 million, respectively, which represents the total pre-tax intrinsic value, based on our closing stock price of $5.80 per share as of September 30, 2024, the last business day of our fiscal year, which would have been received by the option holders had all option holders exercised their options as of that date. The total

intrinsic value of stock options exercised was $17,000, $0.6 million and $0.8 million in 2024, 2023 and 2022, respectively.

The following table summarizes our RSU activity during the year ended September 30, 2024:

	Number	Weighted Average Grant Date Fair Value	Fair Value	
Nonvested at beginning of year	75,977	$ 9.15		
Granted	24,897	4.82	120,004	
Vested, including shares withheld to cover taxes	(75,977)	9.15	695,022	(1)
Forfeited	—	—		
Nonvested at end of period	24,897	$ 4.82	$ 144,403	(2)

(1) The aggregate fair value of vested RSU's represent the total pre-tax fair value, based on the closing stock price on the day of vesting, which would have been received by holders of RSU's had all such holders sold their underlying shares on that date.
(2) The aggregate fair value of the nonvested RSU's and represents the total pre-tax fair value, based on our closing stock price of $5.80 as of September 30, 2024, the last trading day of our fiscal year, which would have been received by holders of RSU's had all such holders sold their underlying shares on that date.

14. Benefit Plans

We have retirement plans covering substantially all our employees. The principal plans are our defined contribution plan that covers substantially all of our employees in the United States and the multi-employer pension plan for hourly union employees in Pennsylvania.

Defined Contribution Plan – Domestic employees of Amtech and its subsidiaries who meet certain eligibility requirements may participate, at the employee's option, in the 401(k) Plan. The 401(k) Plan is a defined contribution plan subject to the provisions of ERISA. We match employee contributions to the 401(k) Plan equal to 60% of the participants' elective deferrals, up to 3.6% of the participants' eligible compensation each payroll period. Employees are auto-enrolled upon eligibility at a 6% contribution rate; however, an employee may opt out at their election. The match expense was $0.4 million, $0.5 million and $0.4 million in 2024, 2023 and 2022, respectively.

Pension Plan – Our hourly union employees in Pennsylvania participate in a multi-employer pension plan, the NIGPP, in accordance with the union agreement between PR Hoffman and the United Automobile, Aerospace and Agriculture Implement Workers of America. The agreement was renewed in 2022 for a three-year term that expires September 30, 2025. Every company participating in the plan pays a contribution per hour worked for each employee of the company that is eligible to participate in the NIGPP. Our contributions to the NIGPP were $35,000, $36,000 and $38,000 in 2024, 2023 and 2022, respectively.

15. Commitments and Contingencies

Purchase Obligations – As of September 30, 2024, we had unrecorded purchase obligations in the amount of $12.1 million. These purchase obligations consist of outstanding purchase orders for goods and services. While the amount represents purchase agreements, the actual amounts to be paid may be less in the event that any agreements are renegotiated, canceled or terminated.

Legal Proceedings and Other Claims – From time to time, we are a party to claims and actions for matters arising out of our business operations. We regularly evaluate the status of the legal proceedings and other claims in which we are involved to assess whether a loss is probable or there is a reasonable possibility that a loss, or an additional loss, may have been incurred and determine if accruals are appropriate. If accruals are not appropriate, we further evaluate each legal proceeding to assess whether an estimate of possible loss or range of possible loss can be made for disclosure. Although the outcome of claims and litigation is inherently unpredictable, we believe that we have adequate provisions for any probable and estimable losses. It is possible, nevertheless, that our consolidated financial position, results of operations or liquidity could be materially and adversely affected in any particular period by the

resolution of a claim or legal proceeding. Legal expenses related to defense, negotiations, settlements, rulings and advice of outside legal counsel are expensed as incurred.

Employment Contracts – We have employment contracts and change in control agreements with, and severance plans covering, certain officers and management employees under which severance payments would become payable in the event of specified terminations without cause or terminations under certain circumstances after a change in control. If severance payments under the current employment contracts or severance plans were to become payable, the severance payments would generally range from six to twelve months of salary.

16. Reportable Segments

Amtech has two operating segments that are structured around the types of product offerings provided to our customers. In addition, the operating segments may be further distinguished by the Company's respective brands. These two operating segments comprise our two reportable segments discussed below. Our two reportable segments are as follows:

Thermal Processing Solutions (formerly Semiconductor) – We design, manufacture, sell and service thermal processing equipment and related controls for use by leading semiconductor manufacturers, and in electronics, automotive and other industries.

Semiconductor Fabrication Solutions (formerly Material and Substrate) – We provide consumables, parts and service, and equipment for producing silicon carbide, silicon and gallium nitride wafers, optical components and a variety of crystalline materials.

Information concerning our reportable segments is as follows, in thousands:

	Years Ended September 30,		
	2024	2023	2022
Net revenue:			
Thermal Processing Solutions	$ 69,161	$ 77,595	$ 87,982
Semiconductor Fabrication Solutions	32,053	35,720	18,316
	$ 101,214	$ 113,315	$ 106,298
Operating income (loss):			
Thermal Processing Solutions	$ 6,196	$ 6,907	$ 20,672
Semiconductor Fabrication Solutions	(4,875)	(8,765)	3,728
Non-segment related	(8,050)	(13,112)	(7,114)
	$ (6,729)	$ (14,970)	$ 17,286

	Years Ended September 30,		
	2024	2023	2022
Capital expenditures:			
Thermal Processing Solutions	$ 3,431	$ 345	$ 452
Semiconductor Fabrication Solutions	1,276	1,092	411
Non-segment related	171	1,461	272
	$ 4,878	$ 2,898	$ 1,135
Depreciation and amortization expense:			
Thermal Processing Solutions	$ 788	$ 886	$ 1,101
Semiconductor Fabrication Solutions	2,154	4,045	565
Non-segment related	87	81	63
	$ 3,029	$ 5,012	$ 1,729

	September 30,	
	2024	2023
Identifiable assets:		
Thermal Processing Solutions	$ 68,051	$ 72,466
Semiconductor Fabrication Solutions	46,915	61,576
Non-segment related*	3,987	2,979
	$ 118,953	$ 137,021

* Non-segment related assets include cash, property and other assets.

17. Major Customers and Sales by Country

In 2024, no customers accounted for 10% of net revenues. In 2023, one Thermal Processing Solutions customer accounted for 11% of net revenues. In 2022, two Thermal Processing Solutions customers accounted for 14% and 12% of net revenues.

The percentages of our net revenues were to customers in the following geographic regions:

	Years Ended September 30,		
	2024	2023	2022
United States	39%	39%	27%
Canada	1%	6%	3%
Mexico	1%	1%	2%
Other	—%	2%	4%
Total Americas	**41 %**	**48 %**	**36 %**
China	20%	14%	17%
Malaysia	12%	6%	7%
Taiwan	8%	5%	14%
Other	3%	6%	6%
Total Asia	**43 %**	**31 %**	**44 %**
Czech Republic	3%	5%	—%
Austria	1%	4%	10%
Germany	6%	2%	4%
Other	6%	10%	6%
Total Europe	**16 %**	**21 %**	**20 %**
	100 %	**100 %**	**100 %**

18. Geographic Regions

We have operations in the United States and China, as well as satellite offices in Europe and Asia. Revenues, operating income (loss) and identifiable assets by geographic region are as follows, in thousands:

	Years Ended September 30,		
	2024	2023	2022
Net revenue:			
United States*	$ 73,340	$ 84,549	$ 89,197
China	24,048	24,969	13,854
Other	3,826	3,797	3,247
	$ 101,214	$ 113,315	$ 106,298
Operating (loss) income:			
United States*	$ (9,111)	$ (17,874)	$ 14,163
China	1,836	714	2,003
Other	546	2,190	1,120
	$ (6,729)	$ (14,970)	$ 17,286

* United States revenue includes $14.7 million, $17.0 million and $22.7 million in 2024, 2023 and 2022, respectively, related to the products manufactured in our China facility but sold through our Massachusetts facility.

	September 30,	
	2024	2023
Net property, plant and equipment:		
United States	$ 10,572	$ 8,396
China	1,005	1,262
Other	70	37
	$ 11,647	$ 9,695

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

None.

ITEM 9A. CONTROLS AND PROCEDURES

Conclusion Regarding the Effectiveness of Disclosure Controls and Procedures

Our management, including our Chief Executive Officer ("CEO") and Chief Financial Officer ("CFO"), has carried out an evaluation of the effectiveness of our disclosure controls and procedures as defined in Exchange Act Rules 13a-15(e) and 15(d)-15(e). Based upon that evaluation, our CEO and CFO have concluded that our disclosure controls and procedures in place were effective as of September 30, 2024 as described further below.

Management's Report on Internal Control Over Financial Reporting

To the Shareholders of Amtech Systems, Inc.

Our management is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) to provide reasonable assurance regarding the reliability of our financial reporting and the preparation of financial statements for external purposes in accordance with GAAP. Internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that in reasonable detail accurately and fairly reflect the transactions and dispositions of the assets of the Company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with GAAP, and that receipts and expenditures of the Company are being made only in accordance with authorizations of management and directors of the Company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the Company's assets that could have a material effect on the financial statements.

Internal control over financial reporting is designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements prepared for external purposes in accordance with 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 risks that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Management conducted an assessment of the effectiveness of internal control over financial reporting based on the framework in Internal Control – Integrated Framework (2013) as issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on our evaluation we believe that, as of September 30, 2024, our internal controls over financial reporting was effective based on those criteria.

Our independent registered public accounting firm, KPMG LLP, has issued a Report of Independent Registered Public Accounting Firm related to our internal control over financial reporting, which can be found in Item 8 of this Annual Report on Form 10-K.

Remediation of Previously Disclosed Material Weaknesses

As previously disclosed in our Annual Report on Form 10-K for the fiscal year ended September 30, 2023, we identified two material weaknesses in our internal controls over financial reporting. A material weakness is a deficiency, or combination of deficiencies, in internal control over financial reporting such that there is a reasonable possibility that a material misstatement of our annual or interim financial statements will not be prevented or detected on a timely basis.

In relation to the material weakness identified in the areas of goodwill and intangible assets, we have evaluated the design of internal controls over non-routine and complex transactions, including the preparation and review of the

third-party service provider valuation reports. As a result of our evaluation, our management, under the oversight of our Audit Committee, has redesigned existing controls and implemented new controls to remediate the control deficiencies giving rise to the material weakness.

With respect to the material weakness related to general information technology controls, our management, under the oversight of our Audit Committee, has evaluated the current processes and has redesigned existing controls and implemented new controls to remediate the control deficiencies giving rise to this material weakness. Remediation efforts include, but are not limited to:

- Assessing and formalizing the design of certain information technology policies.
- Developing monitoring controls and protocols that will allow us to timely assess the design and operating effectiveness of the new controls.
- Strengthening of user access reviews and enhanced procedures surrounding program change management for systems supporting substantially all of the Company's internal control processes.
- Assessing segregation of duties within the Company's business processes.

Based upon the above, we believe the steps taken have improved the effectiveness of our internal control over financial reporting and we have determined that these new or redesigned controls are operating effectively

Changes in Internal Control Over Financial Reporting

There have not been any changes in the Company's internal control over financial reporting (as such term is defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) during the quarter ended September 30, 2024 that materially affected, or are reasonably likely to materially affect, the internal control over financial reporting of the Company.

ITEM 9B. OTHER INFORMATION

None.

ITEM 9C. DISCLOSURE REGARDING FOREIGN JURISDICTIONS THAT PREVENT INSPECTIONS

Not applicable.

PART III

Pursuant to Paragraph G(3) of the General Instructions to Form 10-K, the information required by Part III of Form 10-K is incorporated by reference to the Proxy Statement to be filed within 120 days of September 30, 2024, our fiscal year end. In the event the Proxy Statement is not filed within 120 days, the information required by Part III of this Form 10-K will be filed pursuant to an amendment to this Annual Report on Form 10-K within the 120-day period.

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND GOVERNANCE

The information required by this item (i) is incorporated herein by reference to the Proxy Statement or (ii) will be filed pursuant to an amendment to this Annual Report on Form 10-K, in each case, within 120 days of September 30, 2024, our fiscal year end.

ITEM 11. EXECUTIVE COMPENSATION

The information required by this item (i) is incorporated herein by reference to the Proxy Statement or (ii) will be filed pursuant to an amendment to this Annual Report on Form 10-K, in each case, within 120 days of September 30, 2024, our fiscal year end.

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

The information required by this item (i) is incorporated herein by reference to the Proxy Statement or (ii) will be filed pursuant to an amendment to this Annual Report on Form 10-K, in each case, within 120 days of September 30, 2024, our fiscal year end.

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

The information required by this item (i) is incorporated herein by reference to the Proxy Statement or (ii) will be filed pursuant to an amendment to this Annual Report on Form 10-K, in each case, within 120 days of September 30, 2024, our fiscal year end.

ITEM 14. PRINCIPAL ACCOUNTING FEES AND SERVICES

The information required by this item (i) is incorporated herein by reference to the Proxy Statement or (ii) will be filed pursuant to an amendment to this Annual Report on Form 10-K, in each case, within 120 days of September 30, 2024, our fiscal year end.

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

(a) Financial Statements and Schedules

The consolidated financial statements required by this item are set forth on the pages indicated in Item 8.

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

(b) Exhibits

The exhibits filed as part of this Annual Report on Form 10-K are listed on the Exhibit Index immediately preceding the signature page hereto, which is incorporated herein by reference.

ITEM 16. FORM 10-K SUMMARY

None.

EXHIBIT INDEX

EXHIBIT NO.	EXHIBIT DESCRIPTION	INCORPORATED BY REFERENCE				FILED HEREWITH
		FORM	FILE NO.	EXHIBIT NO.	FILING DATE	
3.1	Amended and Restated Articles of Incorporation, as amended through February 6, 2012	10-Q	000-11412	3.1	February 9, 2012	
3.2	Amended and Restated Bylaws of Amtech Systems, Inc., dated as of September 23, 2020	8-K	000-11412	3.1	September 25, 2020	
3.3	First Amendment to Amended and Restated and Restated Bylaws (effective as of November 16, 2021)	8-K	000-11412	3.1	November 19, 2021	
4.1	Description of Capital Stock					X
10.1	Non-Employee Directors Stock Option Plan, effective July 8, 2005 as amended through May 8, 2014*	8-K	000-11412	10.1	May 14, 2014	
10.1a	Amendment to the Non-Employee Directors Stock Option Plan, effective March 4, 2020*	DEF14A	000-11412	Appendix A	January 24, 2020	
10.2	2007 Employee Stock Incentive Plan of Amtech Systems, Inc., as amended, effective April 9, 2015*	8-K	000-11412	10.4	April 10, 2015	
10.2a	Amendment to 2007 Employee Stock Incentive Plan of Amtech Systems, Inc., effective March 6, 2019*	DEF14A	000-11412	Appendix A	January 25, 2019	

10.3	Amtech Systems, Inc. 2022 Equity Incentive Plan*	S-8	333-263875	99.1	March 25, 2022	
10.4	Employment Agreement between Amtech Systems, Inc. and Robert C. Daigle, dated August 14, 2023*	10-K	000-11412	10.4	December 14, 2023	
10.5	Amendment No. 1 to Employee Agreement between Amtech Systems, Inc. and Robert C. Daigle, dated effective as of February 29, 2024					X
10.6	Amendment No. 2 to Employee Agreement between Amtech Systems, Inc. and Robert C. Daigle, dated effective as of August 6, 2024					X
10.7	Agreement and Plan of Merger, dated January 17, 2023, by and among the Registrant, Emerald Merger Sub, Inc., an Arizona corporation and wholly owned subsidiary of the Registrant, Entrepix, Inc., an Arizona corporation, Timothy P. Tobin, solely in his capacity as the shareholders' representative, and the Key Shareholders (as defined in the Agreement and Plan of Merger).	10-Q	000-11412	10.1	February 8, 2023	
10.8	Loan and Security Agreement, dated as of January 17, 2023, by and among the Registrant, its U.S. based wholly owned subsidiaries Bruce Technologies, Inc., a Massachusetts corporation, BTU International, Inc., a Delaware corporation, Intersurface Dynamics, Incorporated, a Connecticut corporation, P.R. Hoffman Machine Products, Inc., an Arizona corporation, and Entrepix, Inc., an Arizona corporation, as borrowers, and UMB Bank, N.A., national banking association, as lender.	10-Q	000-11412	10.2	February 8, 2023	
10.9**	Forbearance & Modification Agreement entered into effective as of December 5, 2023 by and between the Registrant, its U.S. based wholly owned subsidiaries Bruce Technologies, Inc., a Massachusetts corporation, BTU International, Inc., a Delaware corporation, Intersurface Dynamics, Incorporated, a Connecticut corporation, P.R. Hoffman Machine Products, Inc., an Arizona corporation, Entrepix, Inc., an Arizona corporation, and Advanced Compound Materials, Inc., a Delaware corporation, as borrowers, and UMB Bank, N.A., national banking association, as lender.	10-K	000-11412	10.7	December 14, 2023	
21.1	Subsidiaries of the Registrant					X

23.1	Consent of Independent Registered Public Accounting Firm - KPMG LLP					X
23.2	Consent of Independent Registered Public Accounting Firm - Grant Thornton LLP					X
24	Powers of Attorney					X
31.1	Certification Pursuant to Rule 13a-14(a)/15d-14(a) of the Securities Exchange Act of 1934, as Amended					X
31.2	Certification Pursuant to Rule 13a-14(a)/15d-14(a) of the Securities Exchange Act of 1934, as Amended					X
32.1	Certification Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002					X
32.2	Certification Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002					X
97	Clawback Policy	10-K	000-11412	97	December 14, 2023	
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					X
101.SCH	Inline XBRL Taxonomy Extension Schema Document					X
101.PRE	Inline Taxonomy Presentation Linkbase Document					X
101.CAL	Inline XBRL Taxonomy Calculation Linkbase Document					X
101.LAB	Inline XBRL Taxonomy Label Linkbase Document					X
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document					X
104	The cover page for the Company's Annual Report on Form 10-K for the year ended September 30, 2024, has been formatted in Inline XBRL					X

* Indicates management contract or compensatory plan.
** Schedules have been omitted pursuant to Item 601(a)(5) of Regulation S-K. The Company hereby undertakes to furnish copies of any of the omitted schedules upon request by the Securities and Exchange Commission.

SIGNATURES

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

AMTECH SYSTEMS, INC.

December 12, 2024

By: /s/ Wade M. Jenke
Wade M. Jenke, Vice President and Chief Financial Officer
(Principal Financial Officer)

Pursuant to the requirements of the Securities Exchange Act of 1934, as amended, this report on Form 10-K has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated:

SIGNATURE	TITLE	DATE
*	Chairman and Chief Executive Officer	December 12, 2024
Robert C. Daigle	(Principal Executive Officer)	
/s/ Wade M. Jenke	Vice President and Chief Financial Officer	December 12, 2024
Wade M. Jenke	(Principal Financial Officer and Principal Accounting Officer)	
*	Director	December 12, 2024
Robert M. Averick		
*	Director	December 12, 2024
Michael Garnreiter		
*	Director	December 12, 2024
Michael M. Ludwig		

*By: /s/ Wade M. Jenke
Wade M. Jenke, Attorney-In-Fact**

** By authority of the power of attorney filed as Exhibit 24 hereto.