

Rubicon Technology, Inc.
Form 10-K
March 22, 2019

UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

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

For the fiscal year ended December 31, 2018

or

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

For the transition period from _____ to _____

Commission file number 001-33834

RUBICON TECHNOLOGY, INC.

(Exact Name of Registrant as Specified in Its Charter)

Delaware **36-4419301**
(State or Other Jurisdiction of
Incorporation or Organization) (I.R.S. Employer
Identification No.)

900 East Green Street
60106
Bensenville, Illinois
(Address of Principal Executive Offices) (Zip Code)

Registrant's Telephone Number, Including Area Code: (847) 295-7000

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

Title of each class	Name of each exchange on which registered
Common Stock, Par Value \$0.001 per share	The NASDAQ Capital Market

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

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

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 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

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Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, 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 is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes No

As of June 30, 2018, there were 2,368,834 shares of common stock outstanding held by non-affiliates of the registrant, with an aggregate market value of the common stock (based upon the closing price of these shares on the NASDAQ Capital Market) of approximately \$18,690,100.

The number of shares of the registrant's common stock outstanding as of the close of business on March 19, 2019 was 2,735,247.

Documents incorporated by reference:

Portions of the Registrant's Proxy Statement for its 2019 Annual Meeting of Stockholders are incorporated by reference into Part III of this Annual Report on Form 10-K provided, that if such Proxy Statement is not filed with the Commission within 120 days after the end of the fiscal year covered by this Form 10-K, an amendment to this Form 10-K shall be filed no later than the end of such 120-day period.

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PART I

All statements, other than statements of historical facts, included in this Annual Report on Form 10-K including statements regarding our estimates, expectations, beliefs, intentions, projections or strategies for the future, results of operations, financial position, net sales, projected costs, prospects and plans and objectives of management for future operations may be “forward-looking statements” within the meaning of the safe harbor provisions of the U.S. Private Securities Litigation Reform Act of 1995. We have based these forward-looking statements on our current expectations and projections about future events and financial trends that we believe may affect our financial condition, results of operations, business strategy, short-term and long-term business operations and objectives and financial needs. These forward-looking statements can be identified by the use of terms and phrases such as “believe,” “plan,” “intend,” “anticipate,” “target,” “estimate,” “expect,” “forecast,” “prospects,” “goals,” “potential,” “likely,” and the like, and future-tense or conditional constructions such as “will,” “may,” “could,” “should,” etc. (or the negative thereof). Items contemplating or making assumptions about actual or potential future sales, market size and trends or operating results also constitute forward-looking statements.

Moreover, we operate in a very competitive and rapidly changing environment. New risks emerge from time to time. It is not possible for our management to predict all risks, nor can we assess the impact of all factors on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements we may make. Before investing in our common stock, investors should be aware that the occurrence of the risks, uncertainties and events described in the section entitled “Risk Factors” and elsewhere in this Annual Report could have a material adverse effect on our business, results of operations and financial condition. These risks and uncertainties include the adoption of sapphire as a material in new applications, our successful development and the market’s acceptance of new products; our ability to sell certain assets, including those in Malaysia and underutilized assets in the U.S., and the prices we receive therefor; our ability to make effective acquisitions and successfully integrate newly acquired businesses into existing operations; our ability to effectively utilize net operating loss carryforwards; dependence on key customers; our ability to secure new business and retain customers; changes in demand or the average selling prices of sapphire products; the failure to achieve the margins we expect, whether due to our own operations or changes in the market for our products; our ability to successfully qualify our products with customers and potential customers; potential disruptions in our supply of electricity; changes in our product mix; the outcome of the testing of new products and processes or the testing of our existing products for new applications; the failure of third parties performing services for us to do so successfully; our ability to protect our intellectual property rights; the competitive environment; and the cost of compliance with environmental standards. Although we believe that the expectations reflected in the forward-looking statements are reasonable, forward-looking statements are inherently subject to known and unknown risks, including business, economic and other risks and uncertainties that may cause actual results to be materially different from those discussed in these forward-looking statements. Readers are urged not to place undue reliance on these forward-looking statements, which speak only as of the date of this Annual Report. We assume no obligation to update any forward-looking statements in order to reflect any event or circumstance that may arise after the date of this Annual Report, other than as may be required by applicable law or regulation. If one or more of these risks or uncertainties materialize, or if the underlying assumptions prove incorrect, our actual results may vary materially from those expected or projected.

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You should read this Annual Report and the documents that we reference in this Annual Report and have filed with the Securities and Exchange Commission (the “SEC”) as exhibits with the understanding that our actual future results, levels of activity, performance and events and circumstances may be materially different from what we expect.

Unless otherwise indicated, the terms “Rubicon,” the “Company,” “we,” “us,” and “our” refer to Rubicon Technology, Inc. and our consolidated subsidiaries.

ITEM 1. BUSINESS OVERVIEW

We are a vertically integrated, advanced materials provider specializing in monocrystalline sapphire for applications in optical and industrial systems. We design, assemble and maintain our own proprietary crystal growth furnaces to grow high-purity, low-stress, ultra-low-defect-density sapphire crystals. We use our proprietary crystal growth technology to produce high-quality sapphire products to meet our customers' exacting specifications. Sapphire is a desirable material for high-performance applications due to its hardness and strength, transparency in the visible and infrared spectrum, thermal conductivity, thermal shock resistance, abrasion resistance, high melting point and chemical inertness. As a result, it is ideally suited for extreme environments in a range of industries where material durability is just as important as optical clarity. We believe that we continue to have a reputation as one of the highest quality sapphire producers in the market. We provide optical and industrial sapphire products in various shapes and sizes, including round and rectangular windows and blanks, domes, tubes and rods.

Historically, we have also provided sapphire products to the LED and mobile device markets, which are the largest markets for sapphire. However, given competitive pressures in those markets, in the fourth quarter of 2016 we announced our decision to limit our focus to the optical and industrial sapphire markets and exit the LED market. Following this decision, we developed a plan to close our Malaysia facility and scale down and consolidate our remaining operations in the U.S. In 2017 and 2018, we completed individual sales and held auctions for assets located in Malaysia and at each of our U.S. properties, resulting in the sale of certain of our excess equipment and consumable assets. We continue to seek buyers for a few pieces of our remaining unsold Malaysia equipment. In September 2018, we completed the sale of our manufacturing and office facility located in Batavia, Illinois. We are pursuing the sale of our parcel of land in Batavia, Illinois, and the sale or lease of our 65,000 square-foot manufacturing facility in Penang, Malaysia. The timing on the sale or lease of this real estate is difficult to predict.

We manage direct sales, grow and fabricate sapphire parts and ship from our Bensenville, Illinois, facility. Previously, we leased this property, and it served as the headquarters of our operations and one of our growth facilities. In the third quarter of 2018, we vacated our leased Franklin Park, Illinois, facility due to the expiration of our lease. In September 2018, we completed the purchase of our Bensenville property and consolidated all of our operations into this facility.

We operate in a very competitive market. Our ability to expand our optical and industrial business and the acceptance of new product offerings are difficult to predict. Our total sales backlog was approximately \$1.2 million and \$470,000 as of February 28, 2019 and 2018, respectively.

In addition, since our optical and industrial sapphire business serves smaller markets than our historical undertakings, we are actively evaluating the acquisition of profitable companies outside of the sapphire market in order to utilize our substantial net operating loss ("NOL") tax carryforwards.

We are a Delaware corporation incorporated on February 7, 2001. Our common stock is listed on the NASDAQ Capital Market under the ticker symbol "RBCN."

INDUSTRY OVERVIEW

Sapphire is utilized in optical and industrial applications. It is used for windows and optics for aerospace, sensor, medical, semiconductor, instrumentation, electronics and laser applications due to its wide-band transmission, superior strength, chemical and scratch resistance and high strength-to-weight ratio. Sapphire's physical and optical properties also make it very well suited for defense applications such as electro-optical and sensor suite windows for military fighter jets, helicopters, unmanned air vehicles and ships, forward-looking infrared windows for commercial and business aircrafts, as well as missile domes, submarine windows and components and transparent armor for military vehicles. We believe that these markets may be growing as new applications for sapphire emerge for larger size and higher quality sapphire components.

TECHNOLOGY

Our proprietary crystal growth technique, which we refer to as ES2, produces high-quality sapphire crystals for use in our sapphire products. ES2 is derived from the standard Kyropoulos method of crystal growth. We developed this technique with the goal of establishing greater control over the crystal growth process while maintaining minimal temperature variations. Unlike other techniques, during the ES2 technique, the growing sapphire crystal exists in an unconstrained, low-stress environment inside a closed growth chamber. The closed system allows for enhanced control of the melt, resulting in a higher quality of crystals. The temperature gradient between the melt and the crystal in the ES2 technique is significantly lower than in other crystal growth techniques. We believe that these aspects of the ES2 technique enable us to grow crystals that have a significantly lower dislocation density, higher crystal purity and greater uniformity than sapphire crystals grown using other techniques. The ES2 technique provides an inherent annealing process once the crystal is fully grown. This thermal annealing is an integral means of relieving stress in the crystal during the ES2 process. We have demonstrated the ability to readily scale our ES2 technology in a production environment while maintaining high crystal quality even as crystal boule size is increased.

Our furnace environments are controlled by closed-loop control systems and the overall crystal growth process is run with minimal operator intervention. A single operator can supervise the control of multiple ES2 furnaces simultaneously, which reduces costs.

We have now completed crystal growth development for our Large Area Net-Shaped Crystal Extraction (“LANCE”) technology, which is a technology designed to produce very large, thick sapphire windows. This technology was developed with government funding under a contract with the Air Force Research Laboratory. We have completed the growth of the window blank deliverables on this project, including the largest size sapphire window in the world at 36 x 18 x 0.8 inch dimensions. The project was completed in 2018. We will continue to refine the process to improve yield; however, our main focus now is the development of the market for these larger windows. The product has been displayed at trade shows and has attracted interest both from military and industrial product developers. In addition, we are exploring other potential strategies to maximize the value of the LANCE technology.

PRODUCTS

We believe the developing optical and industrial markets require large-diameter sapphire products, high-quality sapphire and ultra-thin double-side polished windows and wafers which may be beyond the capability of many sapphire suppliers. In addition, military and defense applications often require a U.S.-based source for their parts. We believe we continue to have a reputation for producing the highest quality optical-grade sapphire. We also have the ability to maintain the same high quality in crystals of very large sizes, to support a strong and developing U.S. customer base, and to provide very high performance ultra-thin double-side polished sapphire products, which we believe positions us well in the optical, laser, and epitaxial growth markets.

We provide optical and industrial sapphire products in various shapes and sizes, including round and rectangular windows and blanks, domes, tubes and rods. These optical sapphire products are qualified and used in equipment for a wide variety of end markets and high performance applications, including defense and aerospace, specialty lighting, instrumentation, sensors and detectors, semiconductor process equipment, electronic substrates, medical and laser applications.

We believe we offer the industry’s largest sapphire windows and highest quality, ultra-thin, double-side polished windows and substrates. Our product lines include very thin, double-side polished windows as thin as 300 microns for 6” optical diameter substrates, and also very large-area blanks and polished windows. We offer round C-plane sapphire windows up to 11” in diameter and A-plane windows up to 18” in diameter with UV grade windows up to 13.5” in diameter. We also have produced sapphire window blanks at 36” x 18” x 0.8” dimensions.

RESEARCH AND DEVELOPMENT

In 2018 and 2017, our research and development (“R&D”) expenses totaled \$122,000 and \$962,000, respectively. The scope of R&D projects has been reduced, and we expect R&D expenses to be lower in 2019.

MANUFACTURING

The process of growing crystal begins by heating the raw material, aluminum oxide, until it reaches an ideal temperature above its melting point. This ideal temperature is essential for our process because it allows us to produce high-purity crystals with very low defect rates. Following the heating, a seed rod is inserted in the melted material as the material is being cooled to crystallize into a boule. Following the growth process, each boule is rigorously inspected by using polarized lighting and magnification to find imperfections, such as bubbles, dislocations and granular deposits within the crystal. We then drill the resulting boules into cylindrical cores using our custom high-precision crystal orientation equipment and proprietary processes. For some of our parts, the cores are then finished through an outsourcing model using trusted partners.

We are dedicated to quality assurance throughout our entire operation. We employ detailed material traceability from raw material to finished product. Our quality system is certified as ISO9001:2000.

All of our long-lived assets are located in the U.S. and Malaysia. While there are long-lived assets in Malaysia, we are attempting to sell them, as that facility is shut down and is not an active part of our operations. For more information see Note 2 – Segment Information to our Consolidated Financial Statements included in this Annual Report on Form 10-K.

SALES AND MARKETING

We market and sell our products through our direct sales force to customers. Our direct sales force includes experienced and technically sophisticated sales professionals and engineers who are knowledgeable in the development, manufacturing and use of sapphire windows and other optical materials. Our sales staff works with customers during all stages of the manufacturing process, from developing the precise composition of the parts through manufacturing and processing the parts to the customers' specifications.

A key component of our marketing strategy is developing and maintaining strong relationships with our customers. We achieve this by working closely with our customers to optimize our products for their production processes. In addition, we are able to develop long-term relationships with key customers by offering product specification assistance, providing direct access to enable them to evaluate and audit our operations, delivering high-quality products and providing superior customer service. We believe that maintaining close relationships with our customers' senior management and providing technical support improves customer satisfaction.

In order to increase brand recognition of our products and our Company in general, we publish technical articles, distribute promotional materials and participate in industry trade shows and conferences.

CUSTOMERS

Our principal customers have been defense subcontractors, industrial manufacturers, fabricators and resellers. A substantial portion of our sales have been to a small number of customers. In 2018, our top three customers (each greater than 10% of our revenues) accounted for, in the aggregate, approximately 44% of our revenue and in 2017, the top two customers accounted for approximately 31% of our revenue. Although we are attempting to diversify and expand our customer base, we expect our sales to continue to be concentrated among a small number of customers. However, we also expect that our significant customers may change from time to time. No other customer accounted for 10% or more of our revenues during 2018 or 2017.

INTELLECTUAL PROPERTY

We rely primarily upon a combination of know-how, patents, trade secret laws and non-disclosure agreements with employees, customers and potential customers to protect our intellectual property. However, we believe that factors such as the technological and innovative abilities of our personnel, the success of our ongoing product development

efforts and our efforts to maintain trade secret protection are more important than patents in maintaining our competitive position.

COMPETITION

The markets for high-quality sapphire products are very competitive and have been characterized by rapid technological change. The products we produce must meet certain demanding requirements to succeed in the marketplace. Although we are a well established sapphire producer, we face significant competition from other established providers of similar products as well as from new and potential entrants into our markets.

We have several competitors that compete directly with us. We believe that the key competitive factors in our markets are:

consistently producing high-quality products in the desired size, orientation and finish;

pricing;

producing large-format high-quality crystal for certain applications;

providing U.S.-based source of sapphire for military applications; and

financial stability of a company.

We believe the developing optical and industrial markets require cost effective high-quality sapphire, large-diameter sapphire products and ultra-thin double-side polished windows and wafers, which we have the capabilities to provide while certain other sapphire producers may not. In addition, defense applications often require a U.S.-based source for sapphire. We believe we continue to have a reputation for producing the highest quality sapphire in the market. We believe this positions us well with competitive advantages in the markets for optical and industrial sapphire.

ENVIRONMENTAL REGULATION

In our manufacturing process, we use water, oils, slurries, acids, adhesives and other industrial chemicals. We are subject to a variety of federal, state and local laws regulating the discharge of these materials into the environment or otherwise relating to the protection of the environment. These include statutory and regulatory provisions under which we are responsible for the management of hazardous materials we use and the disposition of hazardous wastes resulting from our manufacturing processes. Failure to comply with such provisions, whether intentional or inadvertent, could result in fines and other liabilities to the government or third parties, injunctions requiring us to suspend or curtail operations or other remedies, which could have a material adverse effect on our business. The cost

of complying with environmental regulation is not material.

EMPLOYEES

As of December 31, 2018, we had 15 full-time employees and one part-time consultant, of which 10 employees worked in technology and operations. None of our employees are represented by a labor union. We consider our employee relations to be good.

OTHER INFORMATION

You may access, free of charge, our reports filed with the SEC (for example, our Annual Reports on Form 10-K, our Quarterly Reports on Form 10-Q and our Current Reports on Form 8-K and any amendments to those forms) over the Internet at the SEC's website at <http://www.sec.gov>. You may also read and copy any document we file at the SEC's public reference room at 100 F Street, N.E., Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for further information on the public reference room. Our SEC filings are also available through our Internet website (www.rubicontechnology.com). Reports filed with or furnished to the SEC will be available as soon as reasonably practicable after they are filed with or furnished to the SEC. Alternatively, if you would like a paper copy of any such SEC report (without exhibits) or document, write to Investor Relations, Rubicon Technology, Inc., 900 East Green Street, Bensenville, Illinois 60106, and a copy of such requested document will be provided to you, free of charge. The information found on our website is not part of this or any other report filed with or furnished to the SEC.

ITEM 1A. RISK FACTORS

You should carefully read the risk factors set forth below, together with the financial statements, related notes and other information contained in this Annual Report on Form 10-K. Our business is subject to a number of important risks and uncertainties, some of which are described below. The risks described below, however, are not the only risks that we face. Additional risks and uncertainties not currently known to us or that we currently deem to be immaterial may also impair our business operations. Any of these risks may have a material adverse effect on our business, financial condition, results of operations and cash flows. Please refer to the discussion of "forward-looking statements" on page one of this Annual Report on Form 10-K in connection with your consideration of the risk factors and other important factors that may affect future results described below.

We have incurred significant losses in prior periods and may incur losses in the future.

We have incurred significant losses in prior periods and may incur significant losses in the future. These losses may have an adverse effect on our ability to attract new customers or retain existing customers. We have incurred net

losses of \$17.8 million, \$62.9 million and \$77.8 million in 2017, 2016 and 2015, respectively. Although we have recorded net income of \$963,000 in 2018, there can be no assurance that we will have sufficient revenue to achieve profitability in future periods.

We are exploring, evaluating and have begun implementing certain strategic alternatives with a goal of providing greater value to our stockholders. There can be no assurance that we will be successful in identifying additional strategic alternatives or implementing any strategic alternative, or that any strategic alternative will yield additional value for stockholders.

Our management and Board of Directors are continuing to review strategic alternatives with a goal of providing greater value to our stockholders. These alternatives could result in, among other things, modifying or eliminating certain of our operations, selling material assets, seeking additional financing, selling the business, making investments, effecting a merger, consolidation or other business combination, partnering or other collaboration agreements, or potential acquisitions or recapitalizations, in one or more transactions. In connection with the Board of Directors' continuing review of alternatives, in 2016, the Board of Directors determined to exit the LED and mobile device markets, scale down and consolidate remaining operations in the U.S. and limit our focus on the optical and industrial sapphire markets. There is no assurance that we will be able to successfully expand our optical and industrial sapphire business or that we will obtain market acceptance for any new product offerings in these markets.

Pursuant to our decision to scale down and consolidate our operations in the U.S., in September 2018, we completed the sale of our manufacturing and office facility located in Batavia, Illinois. Additionally, during 2017 and 2018, we sold certain of our excess equipment located in the U. S. and Malaysia and we are continuing our efforts to sell remaining excess equipment. There is no assurance that we will be able to sell any additional excess equipment at prices favorable to us, or at all. Our Batavia, Illinois, parcel of land remains for sale and our Malaysia land and facility remain for sale or lease. There is no assurance that we will be able to sell or lease any land or facilities at prices favorable to us.

There can be no assurance that our continued exploration of strategic alternatives will result in the identification of additional alternatives or that any transaction will be consummated. The process of exploring strategic alternatives may be costly and may be time consuming, distracting to management and disruptive to our business operations. If we are unable to effectively manage the process, our business, financial condition and results of operations could be adversely affected. We also cannot provide assurance that any potential transaction, investment or other alternative identified, evaluated and consummated, will provide greater value to our stockholders than that reflected in the current stock price. Any potential transaction or investment would be dependent upon a number of factors that may be beyond our control, including, among other factors, market conditions, industry trends and the availability of financing to us on reasonable terms.

We may acquire other businesses, products or technologies; if we do, we may be unable to integrate them with our business effectively or at all, which may adversely affect our business, financial condition and operating results.

If we find appropriate opportunities and have adequate funding, we may acquire other businesses, product lines or technologies. However, if we acquire a business, product line or technology, the process of integration may produce unforeseen operating difficulties and expenditures and may absorb significant attention of our management that would otherwise be available for the ongoing development of our business. Further, the acquisition of a business may result in the assumption of unknown liabilities or create risks with respect to our existing relationships with suppliers and customers. If we make acquisitions, we may issue shares of stock that dilute other stockholders, expend cash, incur debt, assume contingent liabilities or create additional expenses related to amortizing intangible assets, any of which may adversely affect our business, financial condition or operating results.

If we are unable to raise additional capital when needed, we may not be able to execute our business plan or the acquisition of other businesses.

We may require additional capital to fund operations, capital expenditures and the introduction of new products or the acquisition of other businesses. We may finance future cash needs through public or private equity offerings, debt financings, corporate collaborations or licensing arrangements. Additional funds may not be available when we need them on terms that are acceptable to us, or at all. If adequate funds are not available, we may be required to delay, reduce the scope of or eliminate one or more of our acquisition opportunities. To the extent that we raise additional funds by issuing equity securities, our stockholders may experience dilution, and debt financing, if available, may involve restrictive covenants. To the extent that we raise additional funds through corporate collaborations or licensing arrangements, it may be necessary to relinquish some rights to our technologies or our new products, or grant licenses on terms that may not be favorable to us. We may seek to access the public or private capital markets whenever conditions are favorable, even if we do not have an immediate need for additional capital at that time. Introducing newly developed products to the market often requires investment before revenue is generated from those products. We currently have no commitments or arrangements for any additional financing to fund our product research and development programs. However, we may need to raise substantial additional capital in the future to complete the development and commercialization of our new products or to acquire new businesses or technology.

We believe our existing cash, cash equivalents and short-term investments and interest thereon, will be sufficient to fund our projected operating requirements for at least the next twelve months. However, if our success in generating sufficient operating cash flow or our use of cash in the next twelve months were to significantly adversely change, we may not have enough funds available to continue operating at our current level in future periods. A limitation of funds available may raise concerns about our ability to continue to operate. Such concerns may limit our ability to obtain financing and some customers may not be willing to do business with us.

Our future funding requirements, both near and long-term, will depend on many factors, including, but not limited to:

the amount of our revenues and ability to be operationally cash flow positive;

the extent to which we acquire or invest in businesses, products or technologies;

the level of capital expenditures required to maintain or expand our operations;

the initiation, progress, timing, costs and results of studies and trials required for our new products;

the terms and timing of any future collaboration, licensing or other arrangements that we may establish;

the cost of filing, prosecuting, defending and enforcing any patent claims and other intellectual property rights;

the effect of competing technological and market developments; and

the cost of establishing sales, marketing and distribution capabilities for any new products.

We rely on third parties for certain finishing steps for our products, including the slicing and polishing of our sapphire crystal.

In order to reduce product costs and improve cash flow, we use third parties for certain finishing functions for our products, including the slicing and polishing of our sapphire crystal inventory. These types of services are only available from a limited number of third parties. Our ability to successfully outsource these finishing functions will substantially depend on our ability to develop, maintain and expand our strategic relationship with these third parties. Any impairment in our relationships with the third parties performing these functions, in the absence of a timely and satisfactory alternative arrangement, could have a material adverse effect on our business, results of operations, cash flow and financial condition. In addition, we do not control any of these third parties or the operation of their facilities, and we may not be able to adequately manage and oversee the third parties performing our finishing functions. Accordingly, any difficulties encountered by these third parties that result in product defects, delays or defaults on their contractual commitments to us could adversely affect our business, financial condition and results of operations. In addition, their facilities may be vulnerable to damage or interruption from natural disasters, inclement weather conditions, power loss, acts of terrorism and similar events. A decision to close a facility without adequate notice as a result of these or other unanticipated problems at the facility could result in lengthy interruptions in their services to us; and any loss or interruption of these services could significantly increase our expenses, cause us to default on our obligations to our customers and/or otherwise adversely affect our business. Furthermore, the outsourcing of our finishing steps, such as slicing and polishing of wafers, may not continue to be available at reasonable prices or on commercially reasonable terms, or at all.

Our gross margins could fluctuate as a result of changes in our product mix and other factors, which may adversely impact our operating results.

We anticipate that our gross margins will fluctuate from period to period as a result of the mix of products that we sell in any given period. We are working to increase sales of higher margin products, introduce new differentiated products and lower our costs. There can be no assurance that we will be successful in improving our gross margin mix. If we are not successful, our overall gross margin levels and operating results in future periods would continue to be adversely impacted. Increased competition and the adoption of alternatives to our products, more complex engineering requirements, lower demand and other factors may lead to a further downward shift in our product margins, leading to price erosion and lower revenues for us in the future.

The markets in which we operate are very competitive, and many of our competitors and potential competitors are larger, more established and better capitalized than we are.

The markets for selling high-quality sapphire products are very competitive and have been characterized by rapid technological change. This competition could result in increased pricing pressure, reduced profit margins, increased sales and marketing expenses, and failure to increase, or the loss of, market share or expected market share, any of which would likely seriously harm our business, operating results and financial condition.

Some of our competitors and potential competitors are substantially larger and have greater financial, technical, marketing and other resources than we do. Given their capital resources, the large companies with which we compete, or may compete in the future, are in a better position to substantially increase their manufacturing capacity and research and development efforts or to withstand any significant reduction in orders by customers in our markets. Such larger companies typically have broader product lines and market focus and thus are not as susceptible to downturns in a particular market. Some of our competitors also receive government subsidies, which could create a competitive advantage. We would be at a competitive disadvantage if our competitors bring their products to market earlier, if their products are more technologically capable than ours, or if any of our competitors' products or technologies becomes preferred in the industry. Moreover, we cannot assure you that existing or potential customers will not develop their own products, or acquire companies with products that are competitive with our products. Any of these competitive threats could have a material adverse effect on our business, operating results or financial condition.

The average selling prices of sapphire products have historically been volatile and in recent years sapphire product prices have been increasingly depressed.

Historically, our industry has experienced volatility in product demand and pricing. However, in the last five years, the sales prices for our sapphire products have trended downward due to an over-supply of products in the market. In some countries, government programs support sapphire producers who would otherwise be unprofitable; in such circumstances, sapphire may be sold at prices below cost for an extended period of time, depressing market prices, to the detriment of our gross margins. This has had a significant adverse impact on our profitability and our results of operations. Moreover, changes in average selling prices of our products as a result of competitive pricing pressures increased sales discounts and new product introductions by our competitors could have a significant impact on our profitability. Although we attempt to optimize our product mix, introduce new products, reduce manufacturing costs and pass along certain increases in costs to our customers in order to lessen the effect of decreases in selling prices, we may not be able to successfully do so in a timely manner or at all, and our results of operations and business may be harmed.

Our future operating results may fluctuate significantly, which makes our future results difficult to predict and could cause our operating results for particular periods to fall below expectations.

Our revenues and operating results have fluctuated in the past and are likely to fluctuate in the future. These fluctuations are due to a number of factors, many of which are beyond our control. In connection with the Board of Directors' continuing review of alternatives with a goal of providing greater value to our stockholders, on September 12, 2016, we announced the Board's decision to limit our business focus to the optical and industrial sapphire markets and to exit the LED and mobile device markets. The optical and industrial sapphire markets are smaller markets than our historical undertakings and there is no assurance that we will be able to successfully expand our optical and industrial sapphire business, or that such shift in focus will ultimately improve our profitability or operating results.

Some of the factors that will affect operating results include, among others:

our ability to attract new customers;

gain or loss of significant customers;

timing and size of orders from and shipments to customers;

volatility of sapphire product prices;

our ability to meet customer specifications for products;

our ability to retain key relationships with suppliers and contractor third parties, including for the slicing and polishing functions for our sapphire crystal;

performance of suppliers, contractors and other third parties on whom we depend;

our ability to reduce costs commensurate to our scaled down operations;

competitive market conditions, including pricing actions by our competitors and our customers' competitors;

additions or departures of key personnel;

interruption of operations at our manufacturing facilities or the facilities of our suppliers; and

The foregoing factors are difficult to forecast, and these, as well as other factors, could materially adversely affect our quarterly or annual operating results. Likewise, if we acquire any new business, whether or not in the sapphire market, the operating results of that business will be subject to the same risks as are listed above. If our revenues or operating results fall below the expectations of investors or any securities analysts that may publish research on our Company, the price of our common stock would likely decline.

We depend on a few customers for a major portion of our sales and our results of operations would be adversely impacted if they reduce their order volumes.

Historically, we have earned, and believe that in the future we will continue to earn, a substantial portion of our revenue from a small number of customers. In 2018 our top three customers accounted for, in the aggregate, approximately 44% of our revenue and in 2017 our top two customers accounted for approximately 31% of our revenue. If we were to lose one of our major customers or have a major customer significantly reduce its volume of

business with us, our revenues and profitability would be materially reduced unless we are able to replace such demand with other orders promptly. We expect to continue to be dependent on our major customers, the number and identity of which may change from period to period.

We generally sell our products on the basis of purchase orders. Thus, most of our customers could cease purchasing our products with little or no notice and without penalties. In addition, delays in product orders could cause our quarterly revenue to vary significantly. A number of factors could cause our customers to cancel or defer orders, including interruptions to their operations due to a downturn in their industries, natural disasters, delays in manufacturing their own product offerings into which our products are incorporated, securing other sources for the products that we manufacture or developing such products internally.

Our products must meet exacting specifications and undetected defects may cause customers to return or stop buying our products.

Our customers establish demanding specifications for quality, performance and reliability that our products must meet. While we inspect our products before shipment, they still may contain undetected defects. If defects occur in our products, we could experience lost revenue, increased costs, delays in, or cancellations or rescheduling of orders or shipments, product returns or discounts, or damage to our reputation, any of which would harm our operating results and our business.

If the market acceptance of newly developed products does not meet our expectations or our efforts to enhance existing products are not successful, our future operating results may be harmed.

The development of new products may require substantial investment in development efforts. If our newly developed products do not achieve market acceptance, we may be unable to generate anticipated revenue and our operating results could be harmed.

Our continuing efforts to enhance our current products and to develop new products involve several risks, including:

our ability to anticipate and respond in a timely manner to changes in customer requirements;

the significant research and development investment that we may be required to make before market acceptance of a particular new or enhanced product;

the possibility that the industry may not accept our new or enhanced products after we have invested a significant amount of resources in development; and

competition from new technologies, processes and products introduced by our current and/or future competitors.

If we are unable to attract or retain qualified personnel, our business and product development efforts could be harmed.

Our success depends on our continued ability to identify, attract, hire, train, retain and motivate highly skilled technical, managerial, manufacturing, administrative and sales and marketing personnel. Competition for these individuals is intense, and we may not be able to successfully recruit, assimilate or retain sufficiently qualified personnel. In particular, we may encounter difficulties in recruiting and retaining a sufficient number of qualified technical personnel. The inability to attract and retain necessary technical, managerial, manufacturing, administrative and sales and marketing personnel could harm our ability to obtain new customers and develop new products and could adversely affect our business and operating results. In addition, the loss of the services, or distraction, of our senior management for any reason could adversely affect our business, operating results and financial condition.

We are dependent on the continued services and performances of certain senior management employees such as sales management and the head of operations.

Our future success is dependent on the continued services and contributions of our senior management who must work together effectively in order to design and produce our products, expand our business, increase our revenue and improve our operating results. The loss of services of our senior management for any reason could adversely affect our business, operating results and financial condition.

We are subject to risks from international sales that may harm our operating results.

In 2018 and 2017, revenue from international sales for our optical and industrial markets products was approximately 30% and 37%, respectively, of our total optical and industrial markets revenue. We expect that revenue from international sales will continue to be a portion of our total revenue for the foreseeable future. Our international sales are subject to a variety of additional risks, including risks arising from:

sales variability as a result of transacting our foreign sales in U.S. dollars as prices for our products become less competitive in countries with currencies that are low or are declining in value against the U.S. dollar and more competitive in countries with currencies that are high or increasing in value against the U.S. dollar;

trading restrictions, tariffs, trade barriers and taxes;

economic and political risks, wars, acts of terrorism, political unrest, pandemics, boycotts, curtailments of trade and other business restrictions;

the difficulty of enforcing contracts and collecting receivables through some foreign legal systems;

unexpected changes in regulatory requirements and other governmental approvals, permits and licenses; and

periodic foreign economic downturns.

Our future success will depend on our ability to anticipate and effectively manage these and other risks associated with our international sales. Our failure to manage any of these risks could harm our business, operating results and financial condition.

Our gross margins and profitability may be adversely affected by energy costs.

Most of our power consumption takes place in our crystal growth facility in the U.S. Electricity prices could increase due to overall changes to the price of energy due to conditions in the Middle East, natural gas shortages in the U.S. and other economic conditions and uncertainties regarding the outcome and implications of such events. Once our current purchase agreements expire, if electricity prices increase significantly, we may not be able to pass these price increases through to our customers on a timely basis, if at all, which could adversely affect our gross margins and results of operations.

The protection of our intellectual property rights and the defense of claims of infringement against us by third parties may subject us to costly litigation.

Other companies might allege that we are infringing certain of their patents or other rights. If we are unable to resolve these matters satisfactorily, or to obtain licenses on acceptable terms, we may face litigation. Any litigation to enforce patents issued to us, to protect trade secrets or know-how possessed by us or to defend us or indemnify others against claimed infringement of the rights of others could have a material adverse effect on our financial condition and operating results. Regardless of the validity or successful outcome of any such intellectual property claims, we may need to expend significant time and expense to protect our intellectual property rights or to defend against claims of infringement by third parties, which could have a material adverse effect on us. If we lose any such litigation where we are alleged to infringe the rights of others, we may be required to:

pay substantial damages;

seek licenses from others; or

change, or stop manufacturing or selling, some or all of our products.

Any of these outcomes could have an adverse effect on our business, results of operations or financial condition.

We are subject to numerous environmental laws and regulations, which could expose us to environmental liabilities, increase our manufacturing and related compliance costs or otherwise adversely affect our business and operating results.

In our manufacturing process, we use water, oils, slurries, acids, adhesives and other industrial chemicals. We are subject to a variety of foreign, federal, state and local laws and regulations governing the protection of the environment. These environmental laws and regulations include those relating to the use, storage, handling, discharge, emission, disposal and reporting of toxic, volatile or otherwise hazardous materials used in our manufacturing processes. These materials may have been or could be released into the environment at properties currently or previously operated by us, at other locations during the transport of the materials, or at properties to which we send substances for treatment or disposal. If we were to violate or become liable under environmental laws and regulations or become non-compliant with permits required at some of our facilities, we could be held financially responsible and incur substantial costs, including investigation and cleanup costs, fines and civil or criminal sanctions, third-party property damages or personal injury claims. In addition, new laws and regulations or stricter enforcement of existing laws and regulations could give rise to additional compliance costs and liabilities.

Our operations are concentrated in one facility, and the unavailability of this facility could harm our business.

Our manufacturing, research and development, sales and marketing, and administrative activities are concentrated in one facility located in Bensenville, Illinois. Going forward, this will be our sole operating facility. Should a casualty, natural disaster, inclement weather, an outbreak of disease, power loss, an act of terrorism or similar event affect the Chicagoland area, our operations could be significantly impacted. We may not be able to replicate the manufacturing capacity and other operations of our Bensenville facility or such replication could take significant time and resources to accomplish. The disruption from such an event could adversely affect or interrupt entirely our ability to conduct our business.

We are dependent on information technology, and disruptions, failures or security breaches of our information technology infrastructure could have a material adverse effect on our operations. In addition, increased information technology security threats and more sophisticated computer crime pose a risk to our systems, networks, products and services.

We rely on information technology networks and systems, including the Internet and cloud services, many of which are managed by third parties, to securely process, transmit and store electronic information of financial, marketing, legal and regulatory nature to manage our business processes and activities. Although we have implemented enhanced controls around our information technology systems, these systems may be susceptible to damage, disruptions or shutdowns due to failures during the process of upgrading or replacing software, databases, power outages, hardware failures, telecommunication failures, user errors, natural disasters, terrorist attacks or other catastrophic events. If any of our significant information technology systems suffer severe damage, disruption or shutdown, and our disaster recovery and business continuity plans do not effectively resolve the issues in a timely manner, our product sales, financial condition and results of operations may be materially and adversely affected, and we could experience delays in reporting our financial results, or our operations may be disrupted, exposing us to performance failures with customers. In addition, cybersecurity threats, such as computer viruses, attacks by computer hackers or other cybersecurity threats pose a risk to the security of our systems and networks and the confidentiality, availability and integrity of our data. There can be no assurance that our security controls and safeguard measures taken to improve our cybersecurity protection will be sufficient to mitigate all potential risks to our systems, networks and data. Potential consequences of a cybersecurity attack include disruption to systems, corruption of data, unauthorized release of confidential or otherwise protected information, reputational damage, litigation with third parties. The amount of insurance coverage we maintain may be inadequate to cover claims or liabilities related to a cybersecurity attack.

Our U.S. NOL carryforwards may expire or could be substantially limited if we experience an ownership change as defined in the Internal Revenue Code (“IRC”) or if changes are made to the IRC.

We have significant U.S. NOL carryforwards. Under federal tax laws, we can carry forward and use our NOLs to reduce our future U.S. taxable income and tax liabilities until such NOL carryforwards expire in accordance with the IRC of 1986, as amended. Our NOL carryforwards provide a benefit to us, if fully utilized, of significant future tax savings. However, our ability to use these tax benefits in future years will depend upon the amount of our federal and state taxable income. If we do not have sufficient federal and state income in future years to use the benefits before they expire, we will permanently lose the benefit of the NOL carryforwards. Our ability to use the tax benefits associated with our NOL carryforwards is dependent upon our generation of future taxable profits and our ability to successfully identify and consummate suitable acquisitions or investment opportunities.

Additionally, Section 382 and Section 383 of the IRC provide an annual limitation on our ability to utilize our NOL carryforwards, as well as certain built-in losses, against the future U.S. taxable income in the event of a change in ownership, as defined under the IRC. While we have implemented a stockholder’s right plan to protect our NOL carryforwards, there is no assurance that we will not experience a change in ownership in the future as a result of changes in our stock ownership, and any such subsequent changes in ownership for purposes of the IRC could further limit our ability to use our NOL carryforwards.

Under the recently enacted Tax Cut and Jobs Act, U.S. NOLs generated on or after January 1, 2018, could be limited to 80% of taxable income. If other changes were made to the IRC, they could impact our ability to utilize our NOLs. Accordingly, any such occurrences could adversely affect our financial condition, operating results and cash flows.

RISKS RELATED TO OWNERSHIP OF OUR COMMON STOCK

The trading price of our common stock has been and will likely continue to be volatile due to various factors, some of which are beyond our control, and each of which could adversely affect our stockholders’ value.

Factors related to our Company and our business, as well as broad market and industry factors, may adversely affect the market price of our common stock, regardless of our actual operating performance. Such factors that could cause fluctuations in our stock price include, among other things:

changes in market valuations of other companies in our industry;

changes in financial guidance or estimates by us, by investors or by any financial analysts who might cover our stock or our industry;

our ability to meet the performance expectations of financial analysts or investors;

our ability to develop and market new and enhanced products on a timely basis;

credit conditions;

announcements by us or our competitors of significant products, contracts, acquisitions or strategic partnerships;

general market and economic conditions; and

the size of the public float of our stock.

Our certificate of incorporation, bylaws and Delaware law may discourage takeovers and business combinations that our stockholders might consider in their best interests.

A number of provisions in our certificate of incorporation and bylaws, as well as anti-takeover provisions of Delaware law, may have the effect of delaying, deterring, preventing or rendering more difficult a change in control of Rubicon that our stockholders might consider in their best interests. These provisions include:

a classified Board of Directors;

a tax benefits preservation plan designed to preserve our ability to utilize our net operating losses as a result of certain stock ownership changes, which may have the effect of discouraging transactions involving an actual or potential change in our ownership;

granting to the Board of Directors sole power to set the number of directors and to fill any vacancy on the Board of Directors, whether such vacancy occurs as a result of an increase in the number of directors or otherwise;

limitations on the ability of stockholders to remove directors;

the ability of our Board of Directors to designate and issue one or more series of preferred stock without stockholder approval, the terms of which may be determined at the sole discretion of the Board of Directors;

prohibition on stockholders from calling special meetings of stockholders;

prohibition on stockholders from acting by written consent; and

establishment of advance notice requirements for stockholder proposals and nominations for election to the Board of Directors at stockholder meetings.

These provisions may prevent our stockholders from receiving the benefit from any premium to the market price of our common stock offered by a bidder in a takeover context. Even in the absence of a takeover attempt, the existence of these provisions may adversely affect the prevailing market price of our common stock if they are viewed as discouraging takeover attempts in the future.

The foregoing provisions of our certificate of incorporation and bylaws may also make it difficult for stockholders to replace or remove our management. These provisions may facilitate management entrenchment that may delay, deter, render more difficult or prevent a change in our control, which may not be in the best interests of our stockholders.

We are subject to litigation risks, including securities class action litigation, which may be costly to defend.

All industries, including ours, are subject to legal claims, including securities litigation. When the market price of a stock declines significantly, due to factors such as trends in the stock market in general, broad market and industry fluctuations or operating performance, holders of that stock have sometimes instituted securities class action litigation against the company that issued the stock. This sort of litigation can be particularly costly and may divert the attention of our management and our resources in general. We have been subject to securities class action litigation in the past, as disclosed in our previous filings with the SEC. Due to the inherent uncertainty of the litigation process, the resolution of any particular legal claim or proceeding (including by settlement) could have a material effect on our business, financial condition, results of operations or cash flows. Further, uncertainties resulting from the initiation and continuation of securities or other litigation could harm our ability to obtain credit and financing for our operations and to compete in the marketplace.

Our Board of Directors does not intend to declare or pay any dividends to our stockholders in the foreseeable future.

The declaration, payment and amount of any future dividends will be made at the discretion of our Board of Directors and will depend upon, among other things, the results of our operations, cash flows and financial condition, operating and capital requirements, and other factors the Board of Directors considers relevant. There is no plan to pay dividends in the foreseeable future, and if dividends are paid, there can be no assurance with respect to the amount of any such dividend.

ITEM 1B.UNRESOLVED STAFF COMMENTS

Disclosure under this item is not required, as the registrant is a smaller reporting company.

ITEM 2.PROPERTIES

Our executive, research and development, growth and manufacturing functions are located in our Bensenville, Illinois, 30,000 square-foot facility that we purchased in September 2018. Previously, we leased this property, and it served as the headquarters of our operations and one of our growth facilities. In the third quarter of 2018, we vacated our leased Franklin Park, Illinois, facility due to the expiration of our lease. In September 2018, we completed the purchase of our Bensenville property and consolidated all of our operations into this facility.

In addition, we own a parcel of land in Batavia, Illinois, which was acquired in 2012 for future expansion, and a 65,000 square-foot facility in Penang, Malaysia, previously used for manufacturing operations. Both of these properties are currently available for sale or lease and being marketed.

ITEM 3.LEGAL PROCEEDINGS

From time to time, we, our subsidiaries and/or our directors and officers may be named in claims arising in the ordinary course of business. Management believes that there are no pending legal proceedings involving us or any of our subsidiaries that will, individually or in the aggregate, have a material adverse effect on our consolidated results of operations or financial condition.

In October 2018, we received a summons from Bartmann, Perales & Dolter, LLC, the former lessor of the Franklin Park, Illinois, property we leased previously, alleging that we owe \$175,000 in overdue rent payments, property taxes and restoration costs. We intend to vigorously defend against these allegations and have asserted a counterclaim pursuant to the terms of the lease agreement for reimbursement of costs and expenses to maintain the condition and

repair for said property.

ITEM 4.MINE SAFETY DISCLOSURES

Not applicable.

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PART II

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

Market Information

Our common stock trades on the NASDAQ Capital Market under the symbol “RBCN”. The following table sets forth the high and low sales prices for our common stock as reported on the NASDAQ for the periods indicated:

	High	Low
Fiscal year ended December 31, 2018		
First Quarter	\$8.39	\$6.95
Second Quarter	\$8.06	\$6.76
Third Quarter	\$9.46	\$7.80
Fourth Quarter	\$9.12	\$7.24

	High	Low
Fiscal year ended December 31, 2017		
First Quarter	\$9.60	\$4.90
Second Quarter	\$10.45	\$6.40
Third Quarter	\$9.41	\$6.71
Fourth Quarter	\$9.05	\$7.51

Holders

As of March 6, 2019, our common stock was held by approximately 19 stockholders of record and there were 2,735,247 shares of our common stock outstanding.

Dividend Policy

We have never declared or paid cash dividends on our common stock. We currently intend to retain future earnings to finance the growth and development of our business and we do not anticipate declaring or paying any cash dividends in the foreseeable future. The declaration, payment and amount of any future dividends will be made at the discretion of our Board of Directors.

ITEM 6. SELECTED FINANCIAL DATA

Disclosure under this item is not required as the registrant is a smaller reporting company.

Recent Sales of Unregistered Securities

None.

Issuer Purchases of Equity Securities

In November 2018, our Board of Directors authorized a program to repurchase up to \$3 million of our common stock. Our share repurchase program does not obligate us to acquire any specific number of shares. Under the program, shares may be repurchased in privately negotiated and/or open market transactions. The timing, price and volume of repurchases will be based upon market conditions, relevant securities laws and other factors. The stock repurchase program expires on November 19, 2021, and may be terminated at any time.

Share repurchase activity during the year ended December 31, 2018, was as follows:

Periods	Total number of shares purchased	Average price paid per share	Total number of shares purchased as part of publicly announced program	Approximate dollar value of shares that may yet be purchased under the program (in thousands)
December 1, 2018, to December 31, 2018	8,457	\$ 7.69	8,457	2,935
Total	8,457			\$ 2,935

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

The following discussion and analysis of our financial condition and results of operations should be read together with our financial statements and related notes appearing elsewhere in this Annual Report on Form 10-K. This discussion and analysis contains forward-looking statements that involve risks, uncertainties and assumptions. You should review the "Risk Factors" section of this Annual Report for a discussion of important factors that could cause actual results to differ materially from the results described in or implied by the forward-looking statements described in the following discussion and analysis.

OVERVIEW

We are a vertically integrated, advanced materials provider specializing in monocrystalline sapphire for applications in optical and industrial systems. We design, assemble and maintain our own proprietary crystal growth furnaces to grow high-purity, low-stress, ultra-low-defect-density sapphire crystals. We use our proprietary crystal growth technology to produce high-quality sapphire products to meet our customers' exacting specifications. Sapphire is a desirable material for high-performance applications due to its hardness and strength, transparency in the visible and infrared spectrum, thermal conductivity, thermal shock resistance, abrasion resistance, high melting point and chemical inertness. As a result, it is ideally suited for extreme environments in a range of industries where material durability is just as important as optical clarity. We believe that we continue to have a reputation as one of the highest quality sapphire producers in the market. We provide optical and industrial sapphire products in various shapes and sizes, including round and rectangular windows and blanks, domes, tubes and rods.

Historically, we have also provided sapphire products to the LED and mobile device markets, which are the largest markets for sapphire. However, given competitive pressures in those markets, in the fourth quarter of 2016 we announced our decision to limit our focus to the optical and industrial sapphire markets and exit the LED market. Following this decision, we developed a plan to close our Malaysia facility, and scale down and consolidate our remaining operations in the U.S. In 2017 and 2018, we completed individual sales and held auctions for assets located in Malaysia and at each of our U.S. properties, resulting in the sale of certain of our excess equipment and consumable assets. We continue to seek buyers for a few pieces of our remaining unsold Malaysia equipment. In September 2018, we completed the sale of our manufacturing and office facility located in Batavia, Illinois. We are pursuing the sale of our parcel of land in Batavia, Illinois, and the sale or lease of our 65,000 square-foot manufacturing facility in Penang, Malaysia. The timing on the sale or lease of this real estate is difficult to predict.

We manage direct sales, grow and fabricate sapphire parts and ship from our facility located in Bensenville, Illinois. Previously, we leased this property, and it served as the headquarters of our operations and one of our growth facilities. In the third quarter of 2018, we vacated our leased Franklin Park, Illinois, facility due to the expiration of our lease. In September 2018, we completed the purchase of our Bensenville property and consolidated all of our

operations into this facility.

We operate in a very competitive market. Our ability to expand our optical and industrial business and acceptance of new product offerings are difficult to predict.

In addition, our current optical and industrial sapphire business serves smaller markets than our historical undertakings, therefore, we are actively evaluating the acquisition of profitable companies outside of the sapphire market to utilize our substantial NOL carryforwards.

Historically, a significant portion of our revenue has been derived from sales to relatively few customers. For the year ended December 31, 2018, we had three customers individually that accounted for approximately 18%, 16% and 10% of revenue. For the year ended December 31, 2017, we had two customers individually that accounted for approximately 18% and 13% of revenue. Our principal customers have been defense subcontractors, industrial manufacturers, fabricators and resellers. No other customer individually accounted for 10% or more of our revenues during the years ended December 31, 2018 and 2017. We expect our sales to continue to be concentrated among a small number of customers. However, we also expect that our significant customers may change from time to time.

We sell our products on a global basis and historically derived a significant portion of our revenue from customers outside of the U.S., with the majority of our sales to the Asian and European markets. Following the decision to limit our focus to the optical and industrial sapphire markets, a major source of our revenue is derived from the North American market. For the year ended December 31, 2018, the North American and Asian markets accounted for 87% and 12% of our revenue, respectively. For the year ended December 31, 2017, the North American and Asian markets accounted for 80% and 19% of our revenue, respectively. All of our revenue and corresponding accounts receivable are denominated in U.S. dollars. Substantially all of our revenue is generated by our direct sales force and we expect this to continue in the future. For more information about our revenues by country, see Note 2 – Segment Information of our Consolidated Financial Statements included in this Annual Report on Form 10-K. For a discussion of risks associated with our international sales see the risk factor captioned “*We are subject to risks from international sales that may harm our operating results*” under Item 1A “Risk Factors”.

Financial operations

Revenue. Our revenue consists of sales of optical and industrial sapphire products sold as blanks or polished windows. Products are made to varying specifications, such as crystal planar orientations and thicknesses. With the focus on smaller optical and industrial markets and the consolidation of our operations in the U.S., we expect in future periods our revenue will continue to be primarily from the sale of optical materials. Our R&D revenue in recent years has been related to LANCE, our large rectangular window development project which was completed in 2018. As a result, our R&D revenue, as a percentage of total revenue, was lower in 2018. We recognize revenue once the performance obligation is satisfied, when the product is manufactured to the customer's specification and, based upon shipping terms, title, control of the product and risk of loss transfer to the customer. Research and development revenue from our government contract is recognized as related costs and fees are incurred. Delays in product orders or changes to the timing of shipments could cause our quarterly revenue to vary significantly. All of our revenue and corresponding accounts receivable are denominated in U.S. dollars. Substantially all of our revenue is generated by our direct sales force and we expect this to continue in the future.

Cost of goods sold. Our cost of goods sold consists primarily of manufacturing materials, labor, manufacturing-related overhead such as utilities, depreciation, rent, provisions for excess and obsolete inventory reserves, idle plant charges, outsourcing costs, freight and warranties. We purchase materials and supplies to support current and future demand for our products. We are subject to variations in the cost of consumable assets from period to period because we do not have long-term fixed-price agreements with our suppliers. We currently outsource some of our production processes and needs.

Gross profit (loss). Our gross profit (loss) has been and will continue to be affected by a variety of factors, including average sales prices of our products, product mix, our ability to reduce manufacturing costs, idle plant charges and fluctuations in the costs of electricity, production supplies and other manufacturing overhead costs.

General and administrative expenses. General and administrative expenses ("G&A") consist primarily of compensation and associated costs for employees in finance, information technology and administrative activities, charges for accounting, legal services, insurance and stock-based compensation.

Sales and marketing expenses. Sales and marketing expenses consist primarily of salaries and associated costs for employees engaged in sales activities, product samples, charges for participation in trade shows and travel.

Research and development expenses. Research and development ("R&D") expenses include costs related to engineering personnel, materials and other product development related costs. R&D is expensed as incurred.

(Gain) loss on sale or disposal of assets. (Gain) loss on sale or disposal of assets represents the difference between the amount of proceeds from sale of our property, equipment and consumable assets and their respective net book values. When the amount of proceeds exceeds the net book value of an underlying asset, we record this favorable variance as a gain on sale or disposal of assets. Alternatively, when the net book value of an asset exceeds the amount of proceeds recovered from sale or disposal of this asset, such unfavorable variance is recorded as a loss on sale or disposal of assets.

Other income (expense). Other income (expense) consists of interest income and gains and losses on investments and currency translation.

Provision for income tax. We account for income taxes under the asset and liability method whereby the expected future tax consequences of temporary differences between the book value and the tax basis of assets and liabilities are recognized as deferred tax assets and liabilities, using enacted tax rates in effect for the year in which the differences are expected to be recognized. Our analysis of ownership changes that limit the utilization of our NOL carryforwards as of December 31, 2018, shows no impact on such utilization. We are in a cumulative loss position for the past three years which is considered significant negative evidence that is difficult to overcome on a “more likely than not” standard through objectively verifiable data. Based on an evaluation in accordance with the accounting standards, as of December 31, 2018 and 2017, a valuation allowance has been recorded against the net U.S. and Malaysia deferred tax assets in order to measure only the portion of the deferred tax assets that are more likely than not to be realized based on the weight of all the available evidence. Until an appropriate level of sustained profitability is attained, we expect to maintain a full valuation allowance on our U.S. and Malaysia net deferred tax assets. Any U.S. and Malaysia tax benefits or tax expense recorded on the Consolidated Statement of Operations will be offset with the corresponding adjustment from the use of the NOL carryforward asset which currently has a full valuation allowance. In the event that we change our determination as to the amount of deferred tax assets that can be realized, we will adjust our valuation allowance with a corresponding impact to the provision for income taxes in the period in which such determination is made.

Stock-based compensation. The majority of our stock-based compensation relates primarily to our Board of Directors and administrative personnel and is accounted for as a G&A expense. For the years ended December 31, 2018 and 2017, our stock-based compensation expense was \$381,000 and \$897,000, respectively.

RESULTS OF OPERATIONS

The following table sets forth our statements of operations for the periods indicated:

	Year ended December 31, 2018 2017 (in millions)	
Revenue	\$3.9	\$5.0
Cost of goods sold	3.9	10.5
Gross profit (loss)	—	(5.5)
Operating expenses:		
General and administrative	2.2	4.5
Sales and marketing	0.4	0.8
Research and development	0.1	1.0
Long-lived asset impairment charge	—	5.0
(Gain) loss on sale or disposal of assets	(3.4)	1.1
Total operating (income) expenses	(0.7)	12.4
Income (loss) from operations	0.7	(17.9)
Other income	0.3	0.2
Income (loss) before income taxes	1.0	(17.7)
Income tax expense	—	(0.1)
Net income (loss)	\$1.0	\$(17.8)

The following table sets forth our statements of operations as a percentage of total revenue for the periods indicated:

	Year ended December 31, 2018 2017	
Revenue	100 %	100 %
Cost of goods sold	100	210
Gross profit (loss)	—	(110)
Operating expenses:		
General and administrative	56	90
Sales and marketing	10	16
Research and development	3	20
Long-lived asset impairment charge	-	100
(Gain) loss on sale or disposal of assets	(87)	22

Total operating (income) expenses	(18)	248
Income (loss) from operations	18	(358)
Other income	8	4
Income (loss) before income taxes	26	(354)
Income tax expense	—	(2)
Net income (loss)	26 %	(356 %)

Comparison of years ended December 31, 2018 and 2017

Revenue. Revenue was \$3.9 million for the year ended December 31, 2018, and \$5.0 million for the year ended December 31, 2017, a decrease of \$1.1 million. Revenue from our optical and industrial sapphire business decreased by \$828,000 due to an increased emphasis on limiting our sales to profitable orders in 2018, fluctuations in demand and timing of orders. Additionally, as we have completed our government contract, the total revenue attributable to this contract recorded in the year ended December 31, 2018, amounted to \$56,000, which resulted in a decrease in such revenue of \$338,000 from the year ended December 31, 2017.

Gross profit (loss). Gross profit was \$16,000 for the year ended December 31, 2018 and gross loss was \$5.5 million for the year ended December 31, 2017, a difference of \$5.5 million. This decrease in gross loss was primarily related to the cost of write-down of excess raw material, crystal boule and core inventories and consumable assets of \$3.0 million recorded during the year ended December 31, 2017. For the year ended December 31, 2018, we experienced a decrease in gross loss due to an increase in pricing and a decrease in production costs of \$2.4 million, as a result of improved production efficiency. Additionally, we recorded lower costs incurred in connection with our consolidation of operations and moving of manufacturing equipment of \$191,000. This was partially offset by \$66,000 of estimated expenses for the restoration of our leased facilities that we may incur in order to comply with the terms of their respective leases.

General and administrative expenses. G&A expenses were \$2.2 million and \$4.5 million for the years ended December 31, 2018 and 2017, respectively, a decrease of \$2.3 million. The decrease was partially attributable to a reduction in employee compensation costs of \$852,000 on a lower headcount, of which \$93,000 of the decrease was related to a lower executive stock grant compensation and \$458,000 was related to the employee severance compensation cost recorded for the year ended December 31, 2017. We also recorded lower legal and stockholders meeting expenses of \$560,000 for the year ended December 31, 2018. This decrease was related to the SEC compliance counsel cost incurred in the year ended December 31, 2017. In addition, we experienced a decrease in the administrative office maintenance and connectivity costs of \$340,000 on renegotiated contracts, a decrease in the board of directors' compensation costs of \$260,000 and a decrease in insurance costs of \$121,000 on renegotiated policy contracts. We also recorded lower audit and tax consulting expense of \$127,000.

Sales and marketing expenses. Sales and marketing expenses were \$376,000 and \$775,000 for the years ended December 31, 2018 and 2017, respectively, a decrease of \$399,000. The decrease in sales and marketing expenses was primarily attributable to a decrease in employee compensation costs of \$367,000 on lower headcount and a decrease in travel and other costs related to sales and marketing of \$32,000.

Research and development expenses. R&D expenses were \$122,000 and \$962,000 for the years ended December 31, 2018 and 2017, respectively, a decrease of \$840,000. The decrease in research and development expenses was attributable to a decrease in employee compensation costs of \$738,000 on a lower headcount and a decrease in project and equipment costs and other related expenses of \$102,000.

(Gain) loss on sale or disposal of assets. Following the decision in 2016 to limit our focus to the smaller optical and industrial sapphire markets, we have held multiple auctions and completed individual sales of a significant amount of the excess equipment and consumable assets located in the U.S. and Malaysia. As a result of these sales, for the year ended December 31, 2018, we recorded gain on sale or disposal of assets of \$3.4 million, of which \$2.5 million was attributable to the sale of fully depreciated and previously written down equipment, and \$380,000 was attributable to the sale of previously written down consumable assets, small tools and equipment. Additionally, in the third quarter of 2018, we completed the sale of our manufacturing and office facility located in Batavia, Illinois, which had a net book value of \$5.9 million. The net proceeds for the property were approximately \$6.4 million, and we recorded a gain on sale of this asset of \$504,000.

For the year ended December 31, 2017, we recorded a loss on sale or disposal of assets of \$1.1 million, which was primarily attributable to the loss on the sale of machinery and equipment.

Long-lived asset impairment charges. With the scaling down of our U.S. operations, for the year ended December 31, 2017, we reduced the net book value of certain U.S. and Malaysia machinery and equipment and recorded an asset impairment charge of \$1.0 million on lower than expected sales prices for assets held for sale and identification of

additional assets that will not be needed to support current operations. Additionally, for the year ended December 31, 2017, the expected sale price for the Batavia, Illinois, facility and the parcel of land we own in Batavia, Illinois, was further reduced resulting in recording of an additional impairment charge of \$4.0 million.

We did not record any additional asset impairment expenses for the year ended December 31, 2018. We will continue to assess our long-lived assets to ensure the carrying amount of these assets is still appropriate given any changes in the asset usage, marketplace and other factors used in determining the current fair value.

Other income. Other income was \$352,000 and \$161,000 for the years ended December 31, 2018 and 2017, respectively, an increase in other income of \$191,000. The increase in other income was primarily due to better money management and an increase in interest rates, causing an increase in the interest income of \$245,000 on short-term investment securities. This was partially offset by an increase in the realized loss on foreign currency translation of \$54,000.

Income tax (expense) benefit. We are subject to income taxes in the U.S. and Malaysia. On a quarterly basis, we assess the recoverability of deferred tax assets and the need for a valuation allowance. For the year ended December 31, 2018, a valuation allowance has been included in the 2018 forecasted effective tax rate. At December 31, 2018, we continue to be in a three-year cumulative loss position; therefore, as of December 31, 2018, we maintained a full valuation allowance on our U.S. and Malaysia net deferred tax assets and until an appropriate level of profitability is attained, we expect to maintain a full valuation allowance going forward. In the event that we change our determination as to the amount of deferred tax assets that can be realized, we will adjust our valuation allowance with a corresponding impact to the provision for income taxes in the period in which such determination is made.

On December 22, 2017, the U.S. enacted the Tax Cuts and Jobs Act (the “Act”) which, among other provisions, reduced the U.S. corporate tax rate from 35% to 21% effective January 1, 2018. The SEC issued guidance, Staff Accounting Bulletin 118, on accounting for the tax effects of the Act. The guidance allowed us to record provisional amounts for those impacts, with the requirement that the accounting be completed in a period not to exceed one year from the date of enactment. We have completed our accounting for the tax effects of enactment of the Act. The deemed inclusion from the repatriation tax increased from \$3.9 million at the time of provision to \$5.0 million at the time the calculation was finalized for the tax return. The increase of the inclusion related primarily to the refinement of Malaysia earnings and profits. As we are in a full valuation allowance position (as described above), an equal benefit adjustment was recorded for the impact of the increase of the deemed repatriation tax. The tax provision for the years ended December 31, 2018 and 2017, is based on an estimated combined statutory effective tax rate. For the year ended December 31, 2018 and 2017, we recorded a tax expense of \$24,000 and \$88,000, respectively, for an effective tax rate of 2.4% and (0.5%), respectively. For the years ended December 31, 2018 and 2017, the difference between our effective tax rate and the U.S. federal 21% statutory rate and state 7.5% (net of federal benefit) statutory rate was primarily related to the change in our U.S. and Malaysia NOL valuation allowances, U.S. R&D credit, Malaysia foreign tax rate differential and Malaysia withholding taxes.

At December 31, 2018, we had separate Federal and Illinois NOL carryforwards of \$181.1 million and \$195.0 million, respectively, which begin to expire in 2021 and 2020, respectively. With the adoption of ASU 2016-09 in 2017, we recorded a deferred tax asset related to \$26.4 million of unrecorded federal and state NOLs attributable to stock option exercises. NOLs attributable to the stock option exercise were fully offset by the valuation allowance (as described above). We have recorded an uncertain tax position of \$2.6 million that further reduces the net operating loss deferred tax assets reported in the financial statements. In addition, at December 31, 2018, we had Federal and Illinois research and development credits and Illinois investment tax credit of \$662,000, \$66,000 and \$23,000, respectively, which begin to expire in 2019.

LIQUIDITY AND CAPITAL RESOURCES

We have historically funded our operations using a combination of issuances of common stock and cash generated from our operations.

As of December 31, 2018, we had cash and short-term investments totaling \$25.6 million, including cash of \$8.4 million held in deposits at major banks, \$2.8 million invested in money market funds and \$14.4 million of short-term investments including U.S. Treasury securities, investment grade commercial paper, FDIC guaranteed certificates of deposit, common stock and corporate notes.

We plan to limit our capital expenditures to only those required under existing obligations or as otherwise necessary to realize value from the development, commercialization or sale of products.

Cash flows from operating activities

The following table represents the major components of our cash flows from operating activities for the years ended December 31, 2018 and 2017:

	Year ended December 31, 2018 2017 (in millions)	
Net income (loss)	\$ 1.0	\$(17.8)

Non-cash items:		
Depreciation and amortization	0.3	1.2
Net (gain) loss on sale or disposal of assets	(3.4)	1.1
Stock-based compensation	0.4	0.9
Long-lived asset impairment charge	-	5.1
Total non-cash items:	(2.7)	8.3
Changes in working capital:		
Accounts receivable	-	1.9
Inventories	0.9	5.0
Prepaid expenses and other assets	0.2	1.5
Accounts payable	(0.2)	(0.4)
Other accruals	(0.3)	(0.5)
Total working capital items:	0.6	7.5
Net cash used in operating activities	\$(1.1)	\$(2.0)

Cash used in operating activities was \$1.1 million for the year ended December 31, 2018. During such period, we generated a net income of \$963,000, including non-cash items of (\$2.7) million, and an increase in cash from net working capital of \$602,000. The net working capital cash increase was primarily driven by a decrease in the work-in-process, finished goods and consumable asset inventories of \$976,000. Additionally, we experienced a decrease in prepaid expenses and other assets of \$146,000 due to a decrease in prepaid lease expense and deposits on expired lease agreements and consolidation of operations in our Bensenville property, which we purchased in the third quarter of 2018. This was partially offset by a decrease in accounts payable of \$182,000 and a decrease in other accruals of \$185,000 on lower spending. Additionally, we recorded lower net accrued real estate taxes of \$153,000 due to the sale of our Batavia facility and the purchase of our Bensenville facility.

Cash used in operating activities was \$2.0 million for the year ended December 31, 2017. During such period, we generated a net loss of \$17.8 million, which included non-cash charges of \$8.3 million, and an increase in cash from net working capital of \$7.5 million. The net working capital cash increase was driven by a decrease in inventory of \$5.0 million primarily related to a decrease in raw materials of \$2.6 million due to sales and a write-down of excess raw materials and decrease in work-in-process and finished goods inventories of \$2.4 million due to a write-down of excess inventory and downsized operations. Additionally, we experienced a decrease in accounts receivable of \$1.9 million on decreased revenue and improved collections and a decrease in prepaid and other assets of \$1.6 million due to excess consumable asset disposals and write-downs and on amounts collected on asset sales. This decrease was partially offset by a decrease in accounts payable and other accruals of \$569,000 on timing of payments and due to downsized operations and a decrease in corporate income and franchise tax accrual of \$273,000 on a reduced state franchise tax.

Cash flows from investing activities

The following table represents the major components of our cash flows from investing activities for the years ended December 31, 2018 and 2017:

	Year ended December 31, 2018 2017 (in millions)	
Purchases of assets	\$ (2.3)	\$ —
Proceeds from sale or disposal of assets	11.0	2.5
Purchases of investments	(8.1)	(6.5)
Proceeds from sales of investments	0.2	0.1
Net cash (used in) provided by investing activities	\$ 0.8	\$ (3.9)

Net cash provided by investing activities was \$831,000 for the year ended December 31, 2018, primarily due to the proceeds from sales of our Batavia facility of approximately \$6.4 million and proceeds from sales of equipment and other assets of \$4.6 million, as the result of the auctions we held and completion of individual sales at our U.S. and Malaysia locations. Additionally, we recorded \$201,000 of proceeds from sale of investments on an increased investment activity. This was partially offset by the purchases of investments in U.S. Treasury securities and commercial paper of \$8.1 million and the purchase of our Bensenville office and manufacturing facility of \$2.3 million.

Net cash used in investing activities was \$3.9 million for the year ended December 31, 2017. We used proceeds from disposal of assets in connection with our decision to exit the LED market of \$2.5 million and proceeds from the sale of investments of \$57,000 to fund our operations. This was partially offset by the \$6.5 million used to purchase investment securities.

Cash flows from financing activities

Net cash used in financing activities was \$79,000 for the year ended December 31, 2018, which was primarily due to purchases of our treasury stock. Additionally, cash used to settle net equity awards was \$14,000.

Net cash used in financing activities was \$189,000 for the year ended December 31, 2017, which represents cash used to settle net equity awards.

Future liquidity requirements

We believe that our existing cash, cash equivalents, anticipated cash flows from operating activities and proceeds from sales or lease of fixed assets will be sufficient to meet our anticipated cash needs for at least the next twelve months from the date of filing of this report. However, if our ability to generate sufficient operating cash flow or our use of cash in the next twelve months were to significantly adversely change, we may not have enough funds available to continue operating at our current level in future periods. Our cash needs include cash required to fund our operations. If the assumptions underlying our business plan regarding future revenues and expenses change, or if unexpected opportunities or needs arise, we may seek to raise additional cash by selling equity or convertible debt securities. If we raise additional funds through the issuance of equity or convertible debt securities, the percentage ownership of our stockholders could be significantly diluted, and these newly issued securities may have rights, preferences or privileges senior to those of existing stockholders.

CRITICAL ACCOUNTING POLICIES AND ESTIMATES

The preparation of financial statements in accordance with the accounting principles generally accepted in the U.S. requires us to make estimates, assumptions and judgments that affect the amounts reported in our financial statements and the accompanying notes. We base our estimates on historical experience and various other assumptions that we believe to be reasonable. Although these estimates are based on our present best knowledge of the future impact on the Company of current events and actions, actual results may differ from these estimates, assumptions and judgments.

We consider to be critical those accounting policies that require our most subjective or complex judgments, which often result from a need to make estimates about the effect of matters that are inherently uncertain, and that are among the most important of our accounting policies in the portrayal of our financial condition and results of operations. We believe the following to be our critical accounting policies, including the more significant estimates and assumptions used in preparation of our financial statements.

Foreign currency translation and transactions.

Rubicon Technology Worldwide LLC and Rubicon Technology Hong Kong Limited assets and liabilities are translated into U.S. dollars at exchange rates existing at the respective balance sheet dates and capital accounts at historical exchange rates. The results of operations are translated into U.S. dollars at the average exchange rates during the respective period. Translation adjustments resulting from fluctuations in exchange rates for Rubicon Technology Worldwide LLC and Rubicon Technology Hong Kong Limited are recorded as a separate component of accumulated other comprehensive income (loss) within stockholders' equity.

We have determined that the functional currency of Rubicon Sapphire Technology (Malaysia) SDN BHD is the U.S. dollar. Rubicon Sapphire Technology (Malaysia) SDN BHD's assets and liabilities are translated into U.S. dollars using the remeasurement method. Non-monetary assets are translated at historical exchange rates and monetary assets are translated at exchange rates existing at the respective balance sheet dates. Translation adjustments for Rubicon Sapphire Technology (Malaysia) SDN BHD are included in determining net income (loss) for the period. The results of operations are translated into U.S. dollars at the average exchange rates during the respective period. We record these gains and losses in other income (expense).

Foreign currency transaction gains and losses are generated from the effects of exchange rate changes on transactions denominated in a currency other than our functional currency, which is the U.S. dollar. Gains and losses on foreign currency transactions are generally required to be recognized in the determination of net income (loss) for the period.

We record these gains and losses in other income (expense).

Revenue recognition.

We recognize revenue in accordance with ASC Topic 606, *Revenue From Contracts with Customers* (“Topic 606”) which was adopted on January 1, 2018, using the full retrospective transition method. Adoption of Topic 606 had no impact on periods reported. Under Topic 606, we recognize revenue when performance obligations under a purchase order or signed quotation are satisfied. Our business practice commits us to manufacture and deliver product upon acceptance of a customer’s purchase order or signed quotation (“agreement”). The agreement with the customer includes specifications of the product to be delivered, price, expected ship date and payment terms. Our agreements generally do not contain variable, financing, rights of return or non-cash components. There are no up-front costs to develop the production process. The performance obligation is satisfied at the point in time (single performance obligation) when the product is manufactured to the customer’s specification, as performance does not create an asset with an alternative use to us. Accordingly, revenue is recognized when product is shipped, and control of the product, title and risk of loss transfer to a customer. We grant credit terms considering normal collection risk. If there is doubt about collection, full prepayment for the order is required. Any payments received prior to shipment are recorded as deferred revenue and included in Advance Payments in the Consolidated Balance Sheets.

We recognize R&D revenue in the period during which the related costs are incurred over the contractually defined period. In July 2012, we signed a contract with the Air Force Research Laboratory to produce large-area sapphire windows on a cost plus fixed fee basis. The deliverables under the contract included development of machinery and technology to be able to produce large area sapphire windows, prove the concept of growing large windows with that equipment and delivery of large-area sapphire windows. We record R&D revenue on a gross basis as costs are incurred, plus a portion of the fixed fee over a period of time as the obligations (machinery, proof of concept and finished windows) are completed following the input method of measuring progress which recognizes revenue as resources are consumed, labor hours expended and costs are incurred. As of December 31, 2018, this contract has been completed and the full amount of revenue of \$4.7 million allowable per the contract has been recognized.

We do not provide maintenance or other services and we do not have sales that involve multiple elements or deliverables.

All of our revenue is denominated in U.S. dollars.

Inventory valuation

We value our inventory at the lower of cost or net realizable value. Net realizable value is determined based on an estimated selling price in the ordinary course of business less reasonably predictable costs of completion and disposal. Raw materials cost is determined using the first-in, first-out method, and work-in-process and finished goods costs are determined on a standard cost basis which includes materials, labor and overhead. We establish inventory reserves when conditions exist that suggest inventory may be in excess of anticipated demand or is obsolete based on customer required specifications. We evaluate the ability to realize the value of our inventory based on a combination of factors, including forecasted sales, estimated current and future market value and changes in customers' product specifications. For the years ended December 31, 2018 and 2017, we determined we had finished goods inventory that was excess or obsolete and recorded an adjustment which reduced inventory and increased costs of goods sold by \$284,000 and \$1.4 million, respectively. Based on these sales prices, we recorded for the years ended December 31, 2018 and 2017, a lower of cost or net realizable value adjustment which reduced inventory and increased cost of goods sold by \$6,000 and \$97,000, respectively.

In connection with our exit from the LED market, we determined we had excess raw material inventory and recorded a write-down of \$2.4 million for the year ended December 31, 2017. We also recorded a write-down of excess two-inch diameter core inventory of \$310,000 and consumable assets write-down expense of \$256,000. For the year ended December 31, 2018, we recorded additional write-down of the consumable assets of \$63,000. We did not record any additional write-downs of our raw materials and two-inch diameter core inventories for the year ended December 31, 2018.

In addition, for the year ended December 31, 2017, we determined we had excess inventory of lower-quality sapphire crystals and recorded an adjustment which reduced inventory and increased cost of goods sold by \$451,000. We did not record any additional adjustments of sapphire crystals in the year ended December 31, 2018, as we sold some of our lower-quality crystals at a price exceeding the book value of these crystals.

Our method of estimating excess and obsolete inventory has remained consistent for all periods presented. If our recognition of excess or obsolete inventory is, or if our estimates of our inventory's potential utility become, less favorable than currently expected, additional inventory reserves may be required.

We determine our normal operating capacity and record as an expense costs attributable to lower utilization of equipment and staff. For the year ended December 31, 2017, we determined that we were not operating at capacity and recorded costs associated with lower utilization of equipment and staff of \$2.1 million. For the year ended December 31, 2018, we significantly reduced our costs attributable to lower utilization of equipment and staff due to consolidation of our operations in our Bensenville, Illinois, facility, and recorded \$723,000 of such costs.

Investments

We invest our available cash primarily in U.S. Treasury securities, investment grade commercial paper, FDIC guaranteed certificates of deposit, common stock and corporate notes. Investments classified as available-for-sale debt securities are carried at fair value with unrealized gains and losses recorded in accumulated other comprehensive income (loss). Investments in equity securities are reported at fair value, with both realized and unrealized gains and losses recorded in other income (expense), in the Consolidated Statements of Operations. Investments in which we have the ability and intent, if necessary, to liquidate in order to support our current operations are classified as short-term.

We review our available-for-sale debt securities investments at the end of each quarter for other-than-temporary declines in fair value based on the specific identification method. We consider various factors in determining whether an impairment is other-than-temporary, including the severity and duration of the impairment, changes in underlying credit ratings, forecasted recovery, our ability and intent to hold the investment for a period of time sufficient to allow for any anticipated recovery in market value and the probability that the scheduled cash payments will continue to be made. When we conclude that an other-than-temporary impairment has resulted, the difference between the fair value and carrying value is written off and recorded as a charge on the Consolidated Statement of Operations. As of December 31, 2018 and 2017, no impairment was recorded.

Allowance for doubtful accounts

We estimate the allowance for doubtful accounts based on an assessment of the collectability of specific customer accounts. The determination of risk for collection is assessed on a customer-by-customer basis considering our historical experience and expected future orders with the customer, changes in payment patterns and recent information we have about the current status of our accounts receivable balances. If we determine that a specific customer is a risk for collection, we provide a specific allowance for credit losses to reduce the net recognized receivable to the amount we reasonably believe will be collected. If a receivable is deemed uncollectible, and the account balance differs from the allowance provided, the specific amount is written off to bad debt expense. We believe that based on the customers to whom we sell and the nature of our agreements with them, our estimates are reasonable. Our method of estimating collectability has remained consistent for all periods presented and with past collections experience.

Assets held for sale and long-lived assets

When circumstances, such as adverse market conditions, indicate that the carrying value of a long-lived asset may be impaired, we perform an analysis to review the recoverability of the asset's carrying value using estimates of the undiscounted cash flows (excluding interest charges) from the expected future operations of the asset. These estimates consider factors such as expected future operating income, operating trends and prospects, as well as the effects of demand, competition and other factors. If the analysis indicates that the carrying value is not recoverable from future cash flows, an impairment loss is recognized to the extent that the carrying value exceeds the estimated fair value. The estimated fair value of assets is determined using appraisal techniques which assume the highest and best use of the asset by market participants, considering the use of the asset that is physically possible, legally permissible, and financially feasible at the measurement date. Any impairment losses are recorded as operating expenses, which reduce net income.

In connection with the decision in 2016 to limit our focus to the optical and industrial sapphire markets and exit the LED market, we developed a plan to close our Malaysia facility, scale down and consolidate remaining operations in the U.S. and sell additional assets that would not be needed. We evaluated our U.S. and Malaysia asset portfolios to identify assets needed for our current business strategy and excess assets that were no longer needed. We determined we had excess machinery, equipment and facilities. Excess U.S. and Malaysia assets were evaluated based on assuming an orderly liquidation plan, which considers economic obsolescence and sales of comparable equipment, as it is our intention to sell these assets. Additionally, we evaluated our U.S. assets continuing to be used in operations using a cost and market approach to determine the current fair value.

As a result, for the year ended December 31, 2017, we recorded an impairment charge of \$1.0 million on lower than expected sales prices for certain machinery and equipment held for sale, and identification of assets that will not be needed to support our current operations. Additionally, for the year ended December 31, 2017, we recorded an impairment charge of \$4.0 million on our U.S. and Malaysia land and building assets on lower than expected sale price. For the year ended December 31, 2018, we reviewed the current fair value of our assets and concluded no adjustments were needed. We will continue to assess our long-lived assets to ensure the carrying amount of these assets is still appropriate given any changes in the asset usage, marketplace and other factors used in determining the current fair value.

In September 2018, we completed the sale of our 134,400 square-foot manufacturing and office facility located in Batavia, Illinois, with the net book value of \$5.9 million. The sale price for the property was \$6.7 million, we realized net proceeds of approximately \$6.4 million after the payment of real estate taxes, brokerage and legal fees, transfer taxes and other expenses, and recorded a gain on sale of this asset of \$504,000.

In the year ended December 31, 2018, we completed individual sales and held auctions for equipment and consumable assets located at each of our U.S. properties, resulting in the sale of certain of our excess U.S. equipment and consumable assets, which had a total net book value of \$1.6 million. In the beginning of 2018, we intended to sell a certain number of our crystal growth furnaces. Due to our changed needs and business plan, we reduced the number of furnaces we wanted to sell. The difference in the number of furnaces we originally intended to sell and the number we actually disposed of, had a net book value of \$236,000. The additional furnaces that we decided to retain were reclassified from current assets held for sale to fixed assets held and used at December 31, 2018. Additionally, in the year ended December 31, 2018, we completed sales of Malaysia equipment with a total net book value of \$131,000. Based on these sales, a gain on disposal of equipment and consumable assets of \$2.9 million was recorded for the year ended December 31, 2018. Unsold excess Malaysia equipment continued to be classified as current assets held for sale at December 31, 2018.

We are pursuing the sale of our parcel of land in Batavia, Illinois, and the sale or lease of our 65,000 square-foot manufacturing facility located in Penang, Malaysia. Although we cannot assure the timing of these sales, these properties were classified as current assets held for sale at December 31, 2018 and 2017, as it is our intention to complete these sales within the next twelve-month period.

In September 2018, we completed the purchase of our property located in Bensenville, Illinois. The purchase price for the property was approximately \$2.3 million. Previously, we leased the Bensenville property and it was the headquarters of our operations and one of our growth facilities. We used our cash on hand to purchase the property.

Stock-based compensation

We grant stock-based compensation in the form of stock options, restricted stock units (“RSUs”) and restricted stock. We expense stock options based upon the fair value on the date of grant. We use the Black-Scholes option pricing model to determine the fair value of stock options. The determination of the fair value of stock-based payment awards on the date of grant using an option-pricing model is affected by assumptions regarding a number of complex and subjective variables. These variables include our expected stock volatility over the term of the awards, actual and projected employee stock option exercise behaviors, risk-free interest rates, forfeitures and expected dividends.

The expected term represents the weighted-average period that our stock options are expected to be outstanding and is based upon five years of historical data. We estimate the volatility of our common stock based on a five-year historical stock price. We base the risk-free interest rate that we use in the option pricing model on U.S. Treasury zero-coupon issues with remaining terms similar to the expected term on the options. We do not anticipate paying any cash dividends in the foreseeable future and, therefore, use an expected dividend yield of zero in the option pricing model. We are required to estimate forfeitures at the time of grant and revise those estimates in subsequent periods if actual forfeitures differ from those estimates. The current forfeiture rate of 24.43% was based on our past history of forfeitures.

All stock options are granted at an exercise price per share equal to the closing market price of our common stock on the last market trading day prior to the date of grant. Therefore, there is no intrinsic value because the exercise price per share of each option was equal to the fair value of the common stock on the date of grant.

We used a Monte Carlo simulation model valuation technique to determine the fair value of RSUs granted in 2017 and 2018 to a key executive pursuant to an employment agreement, because the awards vest based upon achievement of market price targets of our common stock. The Monte Carlo simulation model utilizes multiple input variables that determine the probability of satisfying the market condition stipulated in the award and calculates the fair value of each RSU. The daily expected stock price volatility is based on a four-year historical volatility of our common stock. The daily expected dividend yield is based on annual expected dividend payments. The average daily risk-free interest rate is based on the three-year treasury yield as of the grant date. Each of the tranches is calculated to have its own fair value and requisite service period. The fair value of each tranche is amortized over the requisite or derived service period, which is up to four years.

We allocate stock-based compensation costs using a straight-line method which amortizes the fair value of each option on a straight-line basis over the service period.

All option grants are granted at an exercise price per share equal to the closing market price of our common stock on the day before the date of grant. Therefore, there is no intrinsic value because the exercise price per share of each option was equal to the fair value of the common stock on the date of grant. Based on the fair value of the common stock at December 31, 2018, there was \$44,500 of intrinsic value arising from 34,000 stock options exercisable or outstanding.

For more information on stock-based compensation, see Note 7 – Stock Incentive Plans to our Consolidated Financial Statements included in this Annual Report on Form 10-K.

Income tax valuation allowance

Evaluating the need for and amount of a valuation allowance for deferred tax assets often requires significant judgment and extensive analysis of all the positive and negative evidence available to determine whether all or some portion of the deferred tax assets will not be realized. A valuation allowance must be established for deferred tax assets when it is more likely than not (a probability level of more than 50%) that they will not be realized. In general, “realization” refers to the incremental benefit achieved through the reduction in future taxes payable or an increase in future taxes refundable from the deferred tax assets, assuming that the underlying deductible differences and carryforwards are the last items to enter into the determination of future taxable income. In determining our valuation allowance, we consider the source of taxable income including taxable income in prior carryback years, future reversals of existing temporary differences, the required use of tax planning strategies, and future taxable income exclusive of reversing temporary differences and carryforwards. We are in a cumulative loss position for the past three years which is considered significant negative evidence that is difficult to overcome on a “more likely than not” standard through objectively verifiable data. Under the accounting standards, verifiable evidence will have greater weight than subjective evidence such as our projections for future growth. Based on an evaluation in accordance with the accounting standards, as of December 31, 2018, a valuation allowance has been recorded against the net U.S. and Malaysia deferred tax assets in order to measure only the portion of the deferred tax assets that are more likely than not to be realized based on the weight of all the available evidence. Any U.S. and Malaysia tax benefit or tax expense recorded on the Consolidated Statement of Operations will be offset with a corresponding adjustment from the use of the NOL carryforward asset which currently has a full valuation allowance. In the event that we change our determination as to the amount of deferred tax assets that can be realized, we will adjust our valuation allowance with a corresponding impact to the provision for income taxes in the period in which such determination is made.

Accounting for uncertainty in income taxes

We recognize the tax benefit from an uncertain tax position only if it is more likely than not the tax position will be sustained on examination by the taxing authorities, based on the technical merits of the position. The tax benefits recognized in the financial statements from such positions are then measured based on the largest benefit that has a greater than 50% likelihood of being realized upon settlement. At December 31, 2018 and 2017, we had \$1.1 million of unrecognized tax benefits taken or expected to be taken in a tax return that have been recorded on our financial statements as an offset to the valuation allowance related to tax positions taken in 2012. We recognize interest and/or penalties related to income tax matters in income tax expense. There were no interest or penalties related to income taxes that have been accrued or recognized as of and for the years ended December 31, 2018 and 2017.

We are subject to taxation in the U.S., Malaysia and in a U.S. state jurisdiction. Due to the existence of NOL carryforwards, tax years ended December 31, 2001 through 2006, 2008, 2009 and 2011 through 2017 are open to examination by tax authorities for Federal purposes. Due to NOL carryforwards at the State level, tax years ended 2006 and 2008 through 2017 are open to examination by state tax authorities. Tax years 2013 through 2017 are open to examination by the Malaysia Inland Revenue Board.

RECENT ACCOUNTING PRONOUNCEMENTS

See Note 1 to the Consolidated Financial Statements for a discussion of new accounting standards.

OFF-BALANCE SHEET ARRANGEMENTS

None.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Disclosure under this item is not required as the registrant is a smaller reporting company.

ITEM 8. CONSOLIDATED FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

Our Consolidated Financial Statements, together with the related notes and the report of independent registered public accounting firm, are set forth on the pages indicated in Item 15 of this Annual Report on Form 10-K and are incorporated by reference herein.

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

None.

ITEM 9A. CONTROLS AND PROCEDURES

Management's Evaluation of Disclosure Controls and Procedures.

An evaluation was performed under the supervision and with the participation of our management, including our chief executive officer and chief financial officer (together, our "certifying officers"), of the effectiveness of the design and operation of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended (the "Exchange Act")) as of the end of the year covered by this report. Disclosure controls and procedures are controls and other procedures designed to ensure that information required to be disclosed by us in our periodic reports filed with the SEC is recorded, processed, summarized and reported within the time periods specified by the SEC's rules and forms, and that the information is accumulated and communicated to our management, including the chief executive officer and chief financial officer, as appropriate to allow timely decisions regarding required disclosure. Based on their evaluation, our certifying officers concluded that these disclosure controls and procedures were effective as of December 31, 2018.

Management's Report on Internal Control over Financial Reporting

The financial statements were prepared by management, which is responsible for their integrity and objectivity and for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Exchange Act Rules 13a-15(f) and 15d-15(f).

The Company's internal control over financial reporting is designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. The Company's internal control over financial reporting includes those policies and procedures that:

- i. pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and disposition of the assets of the Company;
- ii. provide reasonable assurance that transactions are recorded as necessary to permit preparation of Consolidated Financial Statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the Company are being made only in accordance with authorizations of management and directors of the Company; and
- iii. provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the Company's assets that could have a material effect on the Consolidated Financial Statements.

There are inherent limitations in the effectiveness of any internal control, including the possibility of human error and the circumvention or overriding of controls. Accordingly, even effective internal controls can provide only reasonable assurance with respect to the financial statement preparation. Further, because of changes in conditions, the effectiveness of internal controls may vary over time.

Management assessed the design and effectiveness of the Company's internal control over financial reporting as of December 31, 2018. In making this assessment, management used the criteria set forth in 2013 *Internal Control—Integrated Framework* by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

Based on management's assessment using those criteria, as of December 31, 2018, management concluded that the Company's internal control over financial reporting was effective.

This annual report does not include an attestation report of our independent registered public accounting firm regarding internal control over financial reporting. The Company's internal controls over financial reporting were not subject to attestation by our independent registered public accounting firm pursuant to rules of the SEC.

Changes in Internal Control over Financial Reporting

There have been no changes in our internal control over financial reporting that occurred during the quarter ended December 31, 2018, that our certifying officers concluded materially affected, or are reasonably likely to materially affect, our internal controls over financial reporting.

ITEM 9B. OTHER INFORMATION

None.

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PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

The Information required by Items 401, 405, 407(d)(4) and 407(d)(5) of Regulation S-K will be included under the captions “Proposal 1: Election of Directors,” “Executive Compensation – Executive Officers,” “Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters – Section 16(a) Beneficial Ownership Reporting Compliance” and “Corporate Governance – Committees of the Board of Directors and Meetings – Audit Committee” in our proxy statement for our 2019 Annual Meeting of Stockholders and is incorporated by reference herein. If such proxy statement is not filed with the SEC within 120 days after the end of the fiscal year covered by this Form 10-K, an amendment to this Form 10-K shall be filed not later than the end of such 120-day period.

We have adopted a Code of Ethics that applies to all of our employees, officers and directors. A copy of the Code of Ethics is available on our website at www.rubicontechnology.com, and any waiver from the Code of Ethics will be timely disclosed on the Company’s website as will any amendments to the Code of Ethics.

ITEM 11. EXECUTIVE COMPENSATION

The information required by Item 402 of Regulation S-K will be included under the captions “Executive Compensation” and “Director Compensation” in our proxy statement for our 2019 Annual Meeting of Stockholders and is incorporated by reference herein. If such proxy statement is not filed with the SEC within 120 days after the end of the fiscal year covered by this Form 10-K, an amendment to this Form 10-K shall be filed not later than the end of such 120-day period.

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

Securities Authorized for Issuance under Equity Compensation Plans

The following table represents securities authorized for issuance under, the Rubicon Technology Inc. 2007 Stock Incentive Plan, as amended and restated, and the Rubicon Technology Inc. 2016 Stock Incentive Plan as of December 31, 2018.

Equity Compensation Plan Information

Plan category	Number of securities to be issued upon exercise of outstanding options, warrants and rights	Weighted-average exercise price of outstanding options, warrants and rights	Number of securities remaining available for future issuances under the equity compensation plans (excluding securities reflected in column (a))
	(a)	(b)	(c)
Equity compensation plans approved by security holders(1)	119,258	\$ 12.10	295,067

(1) The Rubicon Technology Inc. 2007 Stock Incentive Plan was approved by stockholders before our initial public offering. The Rubicon Technology Inc. 2016 Stock Incentive Plan was approved by stockholders in June 2016.

The information required by Item 403 of Regulation S-K will be included under the caption “Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters” in our proxy statement for our 2019 Annual Meeting of Stockholders and is incorporated by reference herein. If such proxy statement is not filed with the SEC within 120 days after the end of the fiscal year covered by this Form 10-K, an amendment to this Form 10-K shall be filed not later than the end of such 120-day period.

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

The information required by Item 404 of Regulation S-K will be included under the caption “Certain Relationships and Related Party Transactions” in our proxy statement for our 2019 Annual Meeting of Stockholders and is incorporated by reference herein. The information required by Item 407(a) of Regulation S-K will be included under the caption “Corporate Governance - Director Independence” in our proxy statement for our 2019 Annual Meeting of Stockholders and is incorporated by reference herein. If such proxy statement is not filed with the SEC within 120 days after the end of the fiscal year covered by this Form 10-K, an amendment to this Form 10-K shall be filed not later than the end of such 120-day period.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The information required by this Item will be included under the caption “Ratification of Selection of Independent Registered Public Accounting Firm” in our proxy statement for our 2019 Annual Meeting of Stockholders and is incorporated by reference herein. If such proxy statement is not filed with the SEC within 120 days after the end of the fiscal year covered by this Form 10-K, an amendment to this Form 10-K shall be filed not later than the end of such 120-day period.

PART IV

ITEM 15. EXHIBITS AND CONSOLIDATED FINANCIAL STATEMENT SCHEDULES

(a) Financial statements. The following Consolidated Financial Statements are filed as part of this Annual Report on Form 10-K.

	Page
<u>Report of Independent Registered Public Accounting Firm</u>	F-2
<u>Consolidated Balance Sheets as of December 31, 2018 and 2017</u>	F-3
<u>Consolidated Statements of Operations for each of the two years in the period ended December 31, 2018</u>	F-4
<u>Consolidated Statements of Comprehensive Income (Loss) for each of the two years in the period ended December 31, 2018</u>	F-5
<u>Consolidated Statements of Stockholders' Equity for each of the two years in the period ended December 31, 2018</u>	F-6
<u>Consolidated Statements of Cash Flows for each of the two years in the period ended December 31, 2018</u>	F-7
<u>Notes to Consolidated Financial Statements</u>	F-8

(b) Exhibits. The exhibits filed or incorporated by reference as a part of this report are listed in the Index to Exhibits which appears following the signature page to this Annual Report on Form 10-K and are incorporated by reference.

(c) Financial statement schedules not listed above have been omitted because they are inapplicable, are not required under applicable provisions of Regulation S-X, or the information that would otherwise be included in such schedules is contained in the registrant's financial statements or accompanying notes.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized on March 22, 2019.

Rubicon Technology, Inc.

By/s/ Timothy E. Brog
Timothy E. Brog

President and Chief Executive Officer

KNOWN BY ALL MEN BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Timothy E. Brog and Inga A. Slavutsky, jointly and severally, his or her attorney-in-fact, with the power of substitution, for him or her in any and all capacities, to sign any amendments to this Annual Report on Form 10-K and to file the same, with exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, hereby ratifying and confirming all that each of said attorneys-in-fact, or his or her substitute or substitutes, may do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities indicated on March 22, 2019.

Signature	Title
/s/ Timothy E. Brog Timothy E. Brog	Director, President and Chief Executive Officer (Principal Executive Officer)
/s/ Inga A. Slavutsky Inga A. Slavutsky	Chief Financial Officer (Principal Financial and Accounting Officer)
/s/ Michael E. Mikolajczyk Michael E. Mikolajczyk	Chairman of the Board of Directors
/s/ Susan Westphal Susan Westphal	Director
/s/ Jefferson Gramm Jefferson Gramm	Director

EXHIBIT INDEX

The Exhibits listed below are filed or incorporated by reference as part of this Annual Report on Form 10-K.

Exhibit No.	Description	Incorporation by Reference
3.1	<u>Eighth Amended and Restated Certificate of Incorporation of Rubicon Technology, Inc.</u>	Filed as Exhibit 3.1 to the registrant's Registration Statement on Form S-1/A, filed on November 1, 2007 (File No. 333-145880)
3.2	<u>Amendment No. 1 to Eighth Amended and Restated Certificate of Incorporation of Rubicon Technology, Inc.</u>	Filed as Appendix A to the registrant's Definitive Proxy Statement on Schedule 14A, filed on April 29, 2011 (File No. 1-33834)
3.3	<u>Amendment No. 2 to Eighth Amended and Restated Certificate of Incorporation of Rubicon Technology, Inc.</u>	Filed as Exhibit 3.1 to the registrant's Current Report on Form 8-K, filed on May 4, 2017 (File No. 1-33834)
3.4	<u>Second Amended and Restated Bylaws of Rubicon Technology, Inc.</u>	Filed as Exhibit 3.3 to the registrant's Quarterly Report on Form 10-Q, filed on May 10, 2016 (File No. 1-33834)
3.5	<u>Certificate of Designations of Series A Junior Participating Preferred Stock of Rubicon Technology, Inc. filed with the Secretary of State of Delaware on December 18, 2017.</u>	Filed as Exhibit 3.1 to the registrant's Current Report on Form 8-K, filed on December 18, 2017 (File No. 1-33834)
3.6	<u>Amendment No. 3 to Eighth Amended and Restated Certificate of Incorporation of Rubicon Technology, Inc.</u>	Filed as Exhibit 3.1 to the registrant's Current Report on Form 8-K, filed on May 15, 2018 (File No. 1-33834)
4.1	<u>Specimen Common Stock Certificate</u>	Filed as Exhibit 4.1 to the registrant's Registration Statement on Form S-1/A, filed on November 13, 2007 (File No. 333-145880)
4.2	<u>Rights Agreement dated as of December 18, 2017, between Rubicon Technology, Inc. and American Stock Transfer & Trust Company, LLC, which includes the Form of Certificate of Designations of Series A Junior Participating Preferred Stock as Exhibit A, the Form of Right Certificate as Exhibit B and the</u>	Filed as Exhibit 4.1 to the registrant's Current Report on Form 8-K, filed on December 18, 2017 (File No. 1-33834)

Summary of Rights to Purchase Preferred Shares as Exhibit C.

- 10.1* Rubicon Technology, Inc. 2001 Equity Plan, dated as of August 2, 2001 Filed as Exhibit 10.1 to the registrant's Registration Statement on Form S-1, filed on September 5, 2007 (File No. 333-145880)
- 10.1(a)* Amendment No. 1 to the Rubicon Technology, Inc. 2001 Equity Plan, dated as of November 6, 2001 Filed as Exhibit 10.1(a) to the registrant's Registration Statement on Form S-1, filed on September 5, 2007 (File No. 333-145880)
- 10.1(b)* Amendment No. 2 to the Rubicon Technology, Inc. 2001 Equity Plan, dated as of May 21, 2002 Filed as Exhibit 10.1(b) to the registrant's Registration Statement on Form S-1, filed on September 5, 2007 (File No. 333-145880)
- 10.1(c)* Amendment No. 3 to the Rubicon Technology, Inc. 2001 Equity Plan, dated as of May 28, 2004 Filed as Exhibit 10.1(c) to the registrant's Registration Statement on Form S-1, filed on September 5, 2007 (File No. 333-145880)
- 10.1(d)* Amendment No. 4 to the Rubicon Technology, Inc. 2001 Equity Plan, dated as of December 6, 2004 Filed as Exhibit 10.1(d) to the registrant's Registration Statement on Form S-1, filed on September 5, 2007 (File No. 333-145880)
- 10.1(e)* Amendment No. 5 to the Rubicon Technology, Inc. 2001 Equity Plan, dated as of June 28, 2005 Filed as Exhibit 10.1(e) to the registrant's Registration Statement on Form S-1, filed on September 5, 2007 (File No. 333-145880)
- 10.1(f)* Amendment No. 6 to the Rubicon Technology, Inc. 2001 Equity Plan, dated as of November 30, 2005 Filed as Exhibit 10.1(f) to the registrant's Registration Statement on Form S-1, filed on September 5, 2007 (File No. 333-145880)
- 10.1(g)* Amendment No. 7 to the Rubicon Technology, Inc. 2001 Equity Plan, dated as of July 26, 2006 Filed as Exhibit 10.1(g) to the registrant's Registration Statement on Form S-1, filed on September 5, 2007 (File No. 333-145880)
- 10.1(h)* Rubicon Technology, Inc. 2001 Equity Plan Form of Notice of Stock Option Grant and Stock Option Agreement Filed as Exhibit 10.1(h) to the registrant's Registration Statement on Form S-1, filed on September 5, 2007 (File No. 333-145880)
- 10.2* Rubicon Technology, Inc. 2007 Stock Incentive Plan, as amended and restated, effective March 23, 2011 Filed as Exhibit 10.2 to the registrant's Annual Report on Form 10-K, filed on March 13, 2014 (File No. 1-33834)

Exhibit No.	Description	Incorporation by Reference
10.3*	<u>Rubicon Technology, Inc. 2016 Stock Incentive Plan</u>	Filed as Appendix A to the registrant's Definitive Proxy Statement on Schedule 14A, filed on May 18, 2016 (File No. 1-33834)
10.3(a)*	<u>Form of Notice of Stock Option Grant and Stock Option Agreement pursuant to Rubicon Technology, Inc. 2016 Stock Incentive Plan</u>	Filed as Exhibit 10.2 to the registrant's Quarterly Report on Form 10-Q, filed on August 9, 2016 (File No. 1-33834)
10.3(b)*	<u>Form of Non-Employee Director Restricted Stock Agreement pursuant to Rubicon Technology, Inc. 2016 Stock Incentive Plan</u>	Filed as Exhibit 10.3 to the registrant's Quarterly Report on Form 10-Q, filed on August 9, 2016 (File No. 1-33834)
10.3(c)*	<u>Form of Restricted Stock Unit Agreement pursuant to Rubicon Technology, Inc. 2016 Stock Incentive Plan (with time-based vesting)</u>	Filed as Exhibit 10.4 to the registrant's Quarterly Report on Form 10-Q, filed on August 9, 2016 (File No. 1-33834)
10.4*	<u>Form of Indemnification Agreement for Directors and Officers</u>	Filed as Exhibit 10.11 to the registrant's Registration Statement on Form S-1, filed on September 5, 2007 (File No. 333-145880)
10.5*	<u>Form of Indemnification Agreement for Directors and Executive Officers</u>	Filed as Exhibit 10.1 to the registrant's Quarterly Report on Form 10-Q, filed on May 8, 2015 (File No. 1-33834)
10.6*	<u>Executive Employment Agreement by and between Rubicon Technology, Inc. and William F. Weissman, dated as of February 18, 2015</u>	Filed as Exhibit 10.1 to the registrant's Current Report on Form 8-K, filed on February 19, 2015 (File No. 1-33834)
10.6(a)*	<u>First Amendment to Executive Employment Agreement by and between Rubicon Technology, Inc. and William F. Weissman, dated as of December 1, 2015</u>	Filed as Exhibit 10.1 to the registrant's Current Report on Form 8-K, filed on December 4, 2015 (File No. 1-33834)
10.6(b)*	<u>Separation Agreement between Rubicon Technology, Inc. and William F. Weissman, dated as of March 16, 2017</u>	Filed as Exhibit 10.1 to the registrant's Quarterly Report On Form 10-Q filed on May 12, 2017 (File No. 1-33834)
10.7*	<u>Executive Employment Agreement by and between Rubicon Technology, Inc. and Mardel A. Graffy, dated as of February 18, 2015</u>	Filed as Exhibit 10.2 to the registrant's Current Report on Form 8-K, filed on February 19, 2015 (File No. 1-33834)
10.8*	<u>Letter of Appointment by and between Rubicon Sapphire Technology (Malaysia) Sdn. Bhd and Hany Tamim, dated as of October 31, 2015</u>	Filed as Exhibit 10.1 to the registrant's Current Report on Form 8-K/A, filed on November 5, 2015 (File No. 1-33834)

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- 10.9* Executive Employment Agreement by and between Rubicon Technology, Inc. and Timothy E. Brog, dated as of March 1, 2017 Filed as Exhibit 10.1 to the registrant's Current Report on Form 8-K, filed on March 16, 2017 (File No. 1-33834)
- 10.10* Amended and Restated Executive Employment Agreement by and between Rubicon Technology, Inc. and Timothy E. Brog, dated as of May 12, 2017 Filed as Exhibit 10.2 to the registrant's Quarterly Report on Form 10-Q, filed on May 12, 2017 (File No. 1-33834)
- 10.11 Stockholder's Agreement dated as of November 16, 2017, by and among Rubicon Technology, Inc. and Bandera Partners LLC, Bandera Master Fund L.P., Gregory Bylinsky and Jefferson Gramm Filed as Exhibit 10.1 to the registrant's Current Report on Form 8-K, filed on November 16, 2017 (File No. 1-33834)

Exhibit No.	Description	Incorporation by Reference
10.12	<u>Commercial Lease by and between Rubicon Technology, Inc. and Bartmanns, Perales & Dolter, LLC, dated as of December 23, 2004</u>	Filed as Exhibit 10.12(a) to the registrant's Registration Statement on Form S-1, filed on September 5, 2007 (File No. 333-145880)
10.12(a)	<u>Amendment to Commercial Lease by and between Rubicon Technology, Inc. and Bartmanns, Perales & Dolter, LLC, dated as of May 6, 2005</u>	Filed as Exhibit 10.12 to the registrant's Registration Statement on Form S-1, filed on September 5, 2007 (File No. 333-145880)
10.12(b)	<u>Second Amendment to Commercial Lease by and between Rubicon Technology, Inc. and Bartmanns, Perales & Dolter, LLC, dated as of December 23, 2014</u>	Filed as Exhibit 10.11 to the registrant's Annual Report on Form 10-K, filed on March 13, 2015 (File No. 1-33834)
10.13	<u>Industrial Building Lease by and between Rubicon Technology, Inc. and Phillip J. Latoria, Jr., dated as of July 18, 2007</u>	Filed as Exhibit 10.14 to the registrant's Registration Statement on Form S-1, filed on September 5, 2007 (File No. 333-145880)
10.13(a)	<u>Second Amendment to Industrial Building Lease by and between Rubicon Technology, Inc. and Phillip J. Latoria, Jr., dated as of July 17, 2014</u>	Filed as Exhibit 10.13 to the registrant's Annual Report on Form 10-K, filed on March 13, 2015 (File No. 1-33834)
10.14	<u>Pay-Off Letter effective as of September 9, 2016</u>	Filed as Exhibit 10.1 to the registrant's Current Report on Form 8-K, filed on September 15, 2016 (File No. 1-33834)
21.1**	<u>Subsidiaries of the Company</u>	
23.1**	<u>Consent of Independent Registered Public Accounting Firm</u>	
24.1**	<u>Power of Attorney (incorporated by reference to the signature page of this Annual Report on Form 10-K)</u>	
31.1**	<u>Certification of Chief Executive Officer pursuant to Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002</u>	
31.2**	<u>Certification of Chief Financial Officer pursuant to Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002</u>	
32.1**	<u>Certifications of Chief Executive Officer and Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002</u>	

101.INS** XBRL Instance Document

101.SCH** XBRL Taxonomy Extension Schema Document

101.CAL** XBRL Taxonomy Extension Calculation Linkbase Document

101.LAB** XBRL Taxonomy Extension Label Linkbase Document

101.PRE** XBRL Taxonomy Extension Presentation Document

101.DEF** XBRL Taxonomy Extension Definition Linkbase Document

* Management contract or compensatory plan or arrangement of the Company.

** Submitted electronically with this Annual Report on Form 10-K.

Rubicon Technology, Inc.

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and Board of Directors of
Rubicon Technology, Inc. and Subsidiaries

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Rubicon Technology, Inc. and Subsidiaries (the “Company”) as of December 31, 2018 and 2017, the related consolidated statements of operations, comprehensive income (loss), stockholders’ equity and cash flows for each of the two years in the period ended December 31, 2018, and the related notes (collectively referred to as the “financial statements”). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the two years in the period ended December 31, 2018, 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 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 financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included

examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Marcum LLP

Marcum llp

We have served as the Company's auditor since 2017.

Chicago, Illinois

March 22, 2019

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Rubicon Technology, Inc.**Consolidated Balance Sheets**

	As of December 31,	
	2018	2017
	(in thousands, other than share data)	
Assets		
Cash and cash equivalents	\$11,241	\$11,544
Restricted cash	169	181
Short-term investments	14,356	6,451
Accounts receivable, net	733	718
Inventories	2,130	3,030
Other inventory supplies	183	837
Prepaid expenses and other current assets	109	270
Assets held for sale	4,145	11,202
Total current assets	33,066	34,233
Property and equipment, net	2,728	815
Total assets	\$35,794	\$35,048
Liabilities and stockholders' equity		
Accounts payable	\$400	\$582
Accrued payroll	28	101
Accrued and other current liabilities	345	430
Corporate income and franchise taxes	286	294
Accrued real estate taxes	96	249
Advance payments	39	59
Total current liabilities	1,194	1,715
Commitments and contingencies		
Stockholders' equity		
Preferred stock, \$0.001 par value, 1,000,000 undesignated shares authorized, no shares issued or outstanding	—	—
Common stock, \$0.001 par value 8,200,000 shares authorized; 2,919,542 and 2,910,334 shares issued; 2,733,601 and 2,732,850 shares outstanding	29	29
Additional paid-in capital	375,979	375,611
Treasury stock, at cost, 185,941 and 177,484 shares	(12,213)	(12,148)
Accumulated other comprehensive loss	(2)	(3)
Accumulated deficit	(329,193)	(330,156)
Total stockholders' equity	34,600	33,333
Total liabilities and stockholders' equity	\$35,794	\$35,048

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

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Rubicon Technology, Inc.**Consolidated Statements of Operations**

	Year ended December 31,	
	2018	2017
	(in thousands, other than share data)	
Revenue	\$3,878	\$5,044
Cost of goods sold	3,862	10,552
Gross profit (loss)	16	(5,508)
Operating expenses:		
General and administrative	2,250	4,510
Sales and marketing	376	775
Research and development	122	962
Long-lived asset impairment charge	—	5,051
(Gain) loss on sale or disposal of assets	(3,367)	1,118
Income (loss) from operations	635	(17,924)
Other income:		
Interest income	361	116
Realized gain (loss) on foreign currency translation	(9)	45
Total other income	352	161
Income (loss) before income taxes	987	(17,763)
Income tax expense	(24)	(88)
Net income (loss)	\$963	\$(17,851)
Net income (loss) per common share		
Basic	\$0.35	\$(6.60)
Diluted	\$0.35	\$(6.60)
Weighted average common shares outstanding used in computing net income (loss) per common share		
Basic	2,729,548	2,702,926
Diluted	2,734,721	2,702,926

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

Rubicon Technology, Inc.

Consolidated Statements of Comprehensive Income (Loss)

	Year ended December 31, 2018 2017 (in thousands)	
Net income (loss)	\$963	\$(17,851)
Other comprehensive income:		
Unrealized gain on investments, net of taxes	1	10
Unrealized gain on currency translation	—	17
Other comprehensive income	1	27
Comprehensive income (loss)	\$964	\$(17,824)

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

Rubicon Technology, Inc.**Consolidated Statements of Stockholders' Equity**

	Common stock		Treasury stock		Additional paid-in capital	Stockholders' equity		
	Shares	Amount	Shares	Amount		Accum other comp inc.	Accum deficit	Total stockholders' equity
	(in thousands other than share data)							
Balance at January 1, 2017	2,860,367	\$ 29	(177,484)	\$(12,148)	\$ 374,903	\$(30)	\$(312,305)	\$ 50,449
Exercise of stock options, net of shares withheld for employee taxes	168	—	—	—	(1)	—	—	(1)
Stock-based compensation	—	—	—	—	277	—	—	277
Restricted stock issued	16,496	—	—	—	160	—	—	160
Common stock issued, net of shares withheld for employee taxes	33,318	—	—	—	272	—	—	272
Reverse stock split fractional shares	(15)	—	—	—	—	—	—	—
Foreign currency translation adjustments	—	—	—	—	—	10	—	10
Unrealized gain on investments, net of tax	—	—	—	—	—	17	—	17
Net loss	—	—	—	—	—	—	(17,851)	(17,851)
Balance at December 31, 2017	2,910,334	\$ 29	(177,484)	\$(12,148)	\$ 375,611	\$(3)	\$(330,156)	\$ 33,333
Exercise of stock options, net of shares withheld for employee taxes	125	—	—	—	1	—	—	1
Stock-based compensation	—	—	—	—	47	—	—	47
Restricted stock issued	6,592	—	—	—	69	—	—	69
Common stock issued, net of shares withheld for employee taxes	2,491	—	—	—	251	—	—	251
Purchase of treasury stock, at cost	—	—	(8,457)	(65)	—	—	—	(65)
Unrealized gain on investments, net of tax	—	—	—	—	—	1	—	1
Net income	—	—	—	—	—	—	963	963

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Balance at December 31, 2018	2,919,542	\$ 29	(185,941)	\$(12,213)	\$375,979	\$(2)	\$(329,193)	\$ 34,600
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The accompanying notes are an integral part of these consolidated financial statements.

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Rubicon Technology, Inc.**Consolidated Statements of Cash Flows**

	Year ended December 31, 2018 2017 (in thousands)	
Cash flows from operating activities		
Net income (loss)	\$963	\$(17,851)
Adjustments to reconcile net income (loss) to net cash used in operating activities		
Depreciation and amortization	355	1,173
Net (gain) loss on sale or disposal of assets	(3,367)	1,118
Stock-based compensation	381	897
Long-lived asset impairment charge	—	5,051
Changes in operating assets and liabilities:		
Accounts receivable	(15)	1,867
Inventories	900	4,970
Other inventory supplies	76	605
Prepaid expenses and other assets	161	978
Accounts payable	(182)	(369)
Accrued payroll	(73)	(85)
Corporate income and franchise taxes	(8)	(273)
Accrued real estate taxes	(153)	8
Advance payments	(20)	36
Accrued and other current liabilities	(84)	(159)
Net cash used in operating activities	(1,066)	(2,034)
Cash flows from investing activities		
Purchases of assets	(2,280)	—
Proceeds from sale or disposal of assets	11,016	2,561
Purchase of investments	(8,106)	(6,498)
Proceeds from sale of investments	201	57
Net cash (used in) provided by investing activities	831	(3,880)
Cash flows from financing activities		
Taxes paid related to net share settlement of equity awards	(14)	(189)
Purchases of treasury stock	(65)	—
Net cash used in financing activities	(79)	(189)
Net effect of currency translation	(1)	(7)
Net decrease in cash, cash equivalents and restricted cash	(315)	(6,110)
Cash, cash equivalents and restricted cash, beginning of year	11,725	17,835
Cash, cash equivalents and restricted cash, end of year	\$11,410	\$11,725
Supplemental disclosure of cash flow information		

Cash paid for interest	\$—	\$—
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The accompanying notes are an integral part of these consolidated financial statements.

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Rubicon Technology, Inc.

Notes to Consolidated Financial Statements

1. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Description of business

Rubicon Technology, Inc., a Delaware corporation (the “Company”), is a vertically integrated, advanced materials provider specializing in monocrystalline sapphire for applications in optical and industrial systems. The Company sells its products on a global basis to customers in North America, Europe and Asia. The Company maintains its operating facility in the Chicago metropolitan area.

Principles of consolidation

The Consolidated Financial Statements include the accounts of the Company and its wholly owned subsidiaries, Rubicon Technology Worldwide LLC, Rubicon Technology BP LLC, Rubicon Sapphire Technology (Malaysia) SDN BHD and Rubicon Technology Hong Kong Limited. All intercompany transactions and balances have been eliminated in consolidation.

A summary of the Company’s significant accounting policies applied in the preparation of the accompanying Consolidated Financial Statements follows.

Cash and cash equivalents

The Company considers all unrestricted highly liquid investments immediately available to be cash equivalents. Cash equivalents primarily consist of time deposits with banks, unsettled trades and brokerage money market accounts.

Restricted cash

A summary of the Company's restricted cash at December 31, 2018 and 2017, is as follows:

	As of December 31,	
	2018	2017
	(in thousands)	
Certificates of deposit	\$ —	\$ 5
Flexible spending funds	—	3
Fixed deposit pledge	169	173
	\$ 169	\$ 181

Foreign currency translation and transactions

Rubicon Technology Worldwide LLC, and Rubicon Technology Hong Kong Limited assets and liabilities are translated into U.S. dollars at exchange rates existing at the respective balance sheet dates and capital accounts at historical exchange rates. The results of operations are translated into U.S. dollars at the average exchange rates during the respective period. Translation adjustments resulting from fluctuations in exchange rates for Rubicon Technology Worldwide LLC and Rubicon Technology Hong Kong Limited are recorded as a separate component of accumulated other comprehensive income (loss) within stockholders' equity.

The Company has determined that the functional currency of Rubicon Sapphire Technology (Malaysia) SDN BHD is the U.S. dollar. Rubicon Sapphire Technology (Malaysia) SDN BHD's assets and liabilities are translated into U.S. dollars using the remeasurement method. Non-monetary assets are translated at historical exchange rates and monetary assets are translated at exchange rates existing at the respective balance sheet dates. Translation adjustments for Rubicon Sapphire Technology (Malaysia) SDN BHD are included in determining net income (loss) for the period. The results of operations are translated into U.S. dollars at the average exchange rates during the respective period. The Company records these gains and losses in other income (expense).

Rubicon Technology, Inc.

Notes to Consolidated Financial Statements—(Continued)

Foreign currency transaction gains and losses are generated from the effects of exchange rate changes on transactions denominated in a currency other than the functional currency of the Company, which is the U.S. dollar. Gains and losses on foreign currency transactions are generally required to be recognized in the determination of net income (loss) for the period. The Company records these gains and losses in other income (expense).

Investments

We invest our available cash primarily in U.S. Treasury securities, investment grade commercial paper, FDIC guaranteed certificates of deposit, common stock and corporate notes. Investments classified as available-for-sale debt securities are carried at fair value with unrealized gains and losses recorded in accumulated other comprehensive income (loss). Investments in equity securities are reported at fair value, with both realized and unrealized gains and losses recorded in other income (expense), in the consolidated statements of operations. Investments in which the Company has the ability and intent, if necessary, to liquidate are classified as short-term.

The Company reviews its available-for-sale debt securities investments at the end of each quarter for other-than-temporary declines in fair value based on the specific identification method. The Company considers various factors in determining whether an impairment is other-than-temporary, including the severity and duration of the impairment, changes in underlying credit ratings, forecasted recovery, its ability and intent to hold the investment for a period of time sufficient to allow for any anticipated recovery in market value and the probability that the scheduled cash payments will continue to be made. When the Company concludes that an other-than-temporary impairment has resulted, the difference between the fair value and carrying value is written off and recorded as a charge on the consolidated statements of operations. As of December 31, 2018 and 2017, no impairment was recorded.

Purchases of Equity Securities by the Issuer and Affiliated Purchasers

The Company records treasury stock purchases under the cost method whereby the entire cost of the acquired stock is recorded as treasury stock. In November 2018, the Company's Board of Directors authorized a program to repurchase up to \$3 million of the Company's common stock. The Company's share repurchase program does not obligate it to

acquire any specific number of shares. Under the program, shares may be repurchased in privately negotiated and/or open market transactions. The timing, price and volume of repurchases will be based upon market conditions, relevant securities laws and other factors. The stock repurchase plan expires on November 19, 2021, and may be terminated at any time.

Share repurchase activity during the year ended December 31, 2018, was as follows:

Periods	Total number of shares purchased	Average price paid per share	Total number of shares purchased as part of publicly announced program	Approximate dollar value of shares that may yet be purchased under the program (in thousands)
December 1, 2018, to December 31, 2018	8,457	\$ 7.69	8,457	2,935
Total	8,457			\$ 2,935

Accounts receivable

The majority of the Company's accounts receivable are due from defense subcontractors, industrial manufacturers, fabricators and resellers. Credit is extended based on an evaluation of the customer's financial condition. Accounts receivable are due based on contract terms and at stated amounts due from customers, net of an allowance for doubtful accounts. Losses from credit sales are provided for in the financial statements.

Accounts outstanding longer than the contractual payment terms are considered past due. The Company determines its allowance by considering a number of factors, including the length of time a customer's account is past due, the customer's current ability to pay and the condition of the general economy and industry as a whole. The Company writes off accounts receivable when they are deemed uncollectible and such write-offs, net of payments received, are recorded as a reduction to the allowance.

Rubicon Technology, Inc.**Notes to Consolidated Financial Statements—(Continued)**

The following table shows the activity of the allowance for doubtful accounts:

	Year ended December 31,	
	2018	2017
	(in thousands)	
Beginning balance	\$ 7	\$ 31
Charges to costs and expenses	—	(20)
Account write-offs, less recoveries	—	(4)
Ending balance	\$ 7	\$ 7

Inventories

Inventories are valued at the lower of cost or net realizable value. Net realizable value is determined based on an estimated selling price in the ordinary course of business less reasonably predictable costs of completion and disposal. Raw materials cost is determined using the first-in, first-out method, and work-in-process and finished goods costs are determined on a standard cost basis, which includes materials, labor and overhead. The Company reduces the carrying value of its inventories for differences between the cost and the estimated net realizable value, taking into account usage, expected demand, technological obsolescence and other relevant information.

The Company establishes inventory reserves when conditions exist that suggest inventory may be in excess of anticipated demand or is obsolete based on customer specifications. The Company evaluates the ability to realize the value of its inventory based on a combination of factors, including forecasted sales, estimated current and future market value and changes in customers' product specifications. For the years ended December 31, 2018 and 2017, the Company determined it had excess or obsolete inventory and recorded an adjustment which reduced inventory and increased costs of goods sold by \$284,000 and \$1.4 million, respectively. The Company's method of estimating excess and obsolete inventory has remained consistent for all periods presented. Based on these sales prices, the Company recorded for the years ended December 31, 2018 and 2017, a lower of cost or net realizable value adjustment which reduced inventory and increased cost of goods sold by \$6,000 and \$97,000, respectively.

In 2017, due to low prices and a worldwide over supply of material, the Company's two-inch diameter core material was considered to be in excess and had been written down to raw material value. An excess and obsolete adjustment was recorded which reduced the value of two-inch diameter core inventory and increased cost of goods sold by \$310,000 for the year ended December 31, 2017. In 2018, the Company used some of its two-inch diameter core material in production of optical and industrial sapphire wafers and did not record any additional adjustments for the year ended December 31, 2018.

The Company evaluates the amount of raw material needed for future production based on expected crystal growth production needed to meet anticipated sales. With the decision to exit the LED market in the fourth quarter of 2016, the Company evaluated its future production needs and determined it had excess raw materials inventory. Accordingly, raw materials inventory in excess of the amount needed for future production has been written down and for the year ended December 31, 2017, an excess and obsolete adjustment was recorded which reduced inventory and increased cost of goods sold by \$2.4 million. The Company did not record any additional write-downs of its raw materials inventory for the year ended December 31, 2018.

In addition, for the year ended December 31, 2017, the Company determined it had excess inventory of lower quality sapphire crystals and recorded an adjustment which reduced inventory and increased cost of goods sold by \$451,000. The Company did not record any adjustments for the year ended December 31, 2018, as it sold some of its lower-quality crystals at a price exceeding the book value of these crystals.

For the years ended December 31, 2018 and 2017, amounts charged to cost of goods sold for all inventory write-downs were \$290,000 and \$4.7 million, respectively.

Rubicon Technology, Inc.**Notes to Consolidated Financial Statements—(Continued)**

Inventories are composed of the following:

	As of	
	December 31,	
	2018	2017
	(in thousands)	
Raw materials	\$468	\$476
Work-in-process	1,322	2,334
Finished goods	340	220
	\$2,130	\$3,030

Other inventory supplies

The Company's other inventory supplies include stock of consumable assets and spare parts used in the manufacturing process. With the decision to focus on optical and industrial products, the Company determined it had consumable assets that were obsolete and recorded for the year ended December 31, 2017, a consumable asset write-down of \$256,000.

For the year ended December 31, 2018, the Company recorded additional write-down of the obsolete consumable assets of \$63,000.

Property and equipment

Property and equipment consisted of the following:

	As of	
	December 31,	
	2018	2017
	(in thousands)	
Machinery, equipment and tooling	\$3,293	\$6,105
Buildings	1,686	—
Information systems	819	819
Land and land improvements	594	—
Furniture and fixtures	8	8
Leasehold improvements	—	4,624
Total cost	6,400	11,556
Accumulated depreciation and amortization	(3,672)	(10,741)
Property and equipment, net	\$2,728	\$815

Property and equipment are carried at cost and depreciated over their estimated useful lives using the straight-line method. The cost of maintenance and repairs is charged to expense as incurred. Significant renewals and improvements are capitalized. Depreciation expense associated with property and equipment was \$355,000 and \$1.2 million for the years ended December 31, 2018 and 2017, respectively.

The estimated useful lives are as follows:

Asset description	Life
Buildings	39 years
Machinery, equipment and tooling	3-10 years
Leasehold improvements	Lesser of life of lease or economic life
Furniture and fixtures	7 years
Information systems	3 years

Rubicon Technology, Inc.**Notes to Consolidated Financial Statements—(Continued)****Warranty cost**

The Company's sales terms include a warranty that its products will meet certain specifications. The Company records a current liability for the expected cost of warranty-related claims at the time of sale. The warranty reserve is included in accrued and other current liabilities on the Consolidated Balance Sheets.

The following table presents changes in the Company's product warranty liability:

	Year ended December 31,	
	2018	2017
	(in thousands)	
Balance, beginning of period	\$ 15	\$ 27
Charged to cost of sales	23	20
Actual product warranty expenditures	(30)	(32)
Balance, end of period	\$ 8	\$ 15

Fair value of financial instruments

The Company's financial instruments consist primarily of cash and cash equivalents, short-term investments, accounts receivable, and accounts payable. The carrying values of these assets and liabilities approximate their fair values due to the short-term nature of these instruments at December 31, 2018 and 2017.

Concentration of credit risks and other risks and uncertainties

Financial instruments that could potentially subject the Company to concentrations of credit risk consist principally of cash and cash equivalents, restricted cash, short-term investments and accounts receivable. At December 31, 2018 and

2017, the Company had \$1.5 million and \$1.2 million, respectively, on deposit at foreign financial institutions. For each of the years ended December 31, 2018 and 2017, the Company had \$6.8 million on deposit at financial institutions in excess of amounts insured by the (FDIC) and other foreign governmental insurance agencies. The Company performs a periodic evaluation of these institutions for relative credit standing. The Company has not experienced any losses in such accounts and management believes it is not exposed to any significant risk of loss on these balances.

The Company uses third parties for certain finishing functions for its products, including the slicing and polishing of its sapphire crystal inventory. These types of services are only available from a limited number of third parties. The Company's ability to successfully outsource these finishing functions will substantially depend on its ability to develop, maintain and expand its strategic relationship with these third parties. As a result, the Company may be unable to meet the demand for its products, which could have a material adverse impact on the Company.

Concentration of credit risk related to revenue and accounts receivable is discussed in Note 4.

Rubicon Technology, Inc.

Notes to Consolidated Financial Statements—(Continued)

Revenue recognition

Revenues recognized include product sales and billings for costs and fees for government contracts.

Product Sales

The Company recognizes revenue in accordance with ASC Topic 606, *Revenue From Contracts with Customers* (“Topic 606”) which was adopted on January 1, 2018, using the full retrospective transition method. Adoption of Topic 606 had no impact on periods reported. Under Topic 606, the Company recognizes revenue when performance obligations under a purchase order or signed quotation are satisfied. The Company’s business practice commits the Company to manufacture and deliver product upon acceptance of a customer’s purchase order or signed quotation (“agreement”). The agreement with the customer includes specifications of the product to be delivered, price, expected ship date and payment terms. The Company’s agreements generally do not contain variable, financing, rights of return or non-cash components. There are no up-front costs to develop the production process. The performance obligation is satisfied at the point in time (single performance obligation) when the product is manufactured to the customer’s specification, as performance does not create an asset with an alternative use to the Company. Accordingly, the Company recognizes revenue when the product is shipped, and control of the product, title and risk of loss have been transferred to the customer. The Company grants credit terms considering normal collection risk. If there is doubt about collection, full prepayment for the order is required. Any payments received prior to shipment are recorded as deferred revenue and included in Advance Payments in the Consolidated Balance Sheets.

Government Contracts

The Company recognizes R&D revenue in the period during which the related costs are incurred over the contractually defined period. In July 2012, the Company signed a contract with the Air Force Research Laboratory (the LANCE government contract) to produce large-area sapphire windows on a cost plus fixed fee basis for a total contract amount of \$4.7 million. The deliverables under the contract included development of machinery and technology to be able to produce large area sapphire windows, prove the concept of growing large windows with that equipment and delivery of large area sapphire windows. The Company records research and development revenue on

a gross basis as costs are incurred, plus a portion of the fixed fee over a period of time as the obligations (machinery, proof of concept and finished windows) are completed following the input method of measuring progress which recognizes revenue as resources are consumed, labor hours expended and costs are incurred. For the years ended December 31, 2018 and 2017, \$56,000 and \$394,000, respectively, of revenue was recorded. The performance obligations under this contract have been completed in the year ended December 31, 2018.

The Company does not provide maintenance or other services and it does not have sales that involve bill & hold arrangements, multiple elements or deliverables. However, the Company does provide product warranty for up to 90 days, for which the Company has accrued a warranty reserve of \$8,000 and \$15,000 for the years ended December 31, 2018 and 2017, respectively.

Shipping and handling costs

The Company records costs incurred in connection with shipping and handling of products as cost of goods sold. Amounts billed to customers in connection with these costs are included in revenue and are not material for any of the periods presented in the accompanying financial statements.

Sales tax

The Company collects and remits sales taxes on products sold to customers and reports such amounts under the net method in its Consolidated Statements of Operations and records a liability until remitted to the respective tax authority.

Rubicon Technology, Inc.

Notes to Consolidated Financial Statements—(Continued)

Stock-based compensation

The Company requires all share-based payments to employees, including grants of employee stock options, to be measured at fair value and expensed in the Consolidated Statements of Operations over the service period (generally the vesting period) of the grant. Expense is recognized in the Consolidated Statements of Operations for these share-based payments. The Company uses Black Scholes option pricing model in order to determine the fair value of stock option grants.

Research and development

R&D costs are expensed as incurred. R&D expense was \$122,000 and \$962,000 for the years ended December 31, 2018 and 2017, respectively.

Accounting for uncertainty in income taxes

The Company recognizes the tax benefit from an uncertain tax position only if it is more likely than not the tax position will be sustained on examination by the taxing authorities, based on the technical merits of the position. The tax benefits recognized in the financial statements from such positions are then measured based on the largest benefit that has a greater than 50% likelihood of being realized upon settlement. The Company recognizes interest and/or penalties related to income tax matters in income tax expense. There were no interest or penalties related to income taxes that have been accrued or recognized as of and for the years ended December 31, 2018 and 2017.

The Company is subject to taxation in the U.S., Malaysia and in a U.S. state jurisdiction. Due to the existence of NOL carryforwards, tax years ended December 31, 2001 through 2006, 2008, 2009 and 2011 through 2017 are open to examination by tax authorities for Federal purposes. Due to NOL carryforwards at the State level, tax years ended 2006 and 2008 through 2017 are open to examination by state tax authorities. Tax years 2013 through 2017 are open to examination by the Malaysia Inland Revenue Board.

Income taxes

Deferred tax assets and liabilities are provided for temporary differences between financial reporting and income tax bases of assets and liabilities, and are measured using the enacted tax rates and laws expected to be in effect when the differences will reverse. Deferred income taxes also arise from the future benefits of NOL carryforwards. Valuation allowances are established when necessary to reduce deferred tax assets to the amounts expected to be realized. Full valuation allowances on net deferred tax assets are maintained until an appropriate level of profitability that generates taxable income is deemed sustainable or until a tax strategy is developed that would enable the Company to conclude that it is more likely than not that a portion of the deferred tax assets will be realizable. Based on an evaluation in accordance with the accounting standards, as of December 31, 2018 and 2017, a valuation allowance has been recorded against the net U.S. and Malaysia deferred tax assets in order to measure only the portion of the deferred tax assets that are more likely than not to be realized based on the weight of all the available evidence.

Use of estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America (“U.S. GAAP”) requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements, and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

Rubicon Technology, Inc.**Notes to Consolidated Financial Statements—(Continued)****Other comprehensive loss**

Comprehensive loss is defined as the change in equity of a business enterprise from transactions and other events from non-owner sources. Comprehensive loss includes net loss and other non-owner changes in equity that bypass the statement of operations and are reported in a separate component of equity. A summary of the components of comprehensive loss for the years ended December 31, 2018 and 2017, follows:

	Year ended December 31,	
	2018	2017
	(in thousands)	
Unrealized loss on investments, net of tax	\$ (1)	\$ (2)
Unrealized loss on currency translation	(1)	(1)
Ending balance	\$ (2)	\$ (3)

Net income (loss) per common share

Basic net income (loss) per common share is computed by dividing net income (loss) by the weighted-average number of common shares outstanding during the period. Diluted net income (loss) per common share is computed by dividing net income (loss) by the weighted-average number of diluted common shares outstanding during the period. Diluted shares outstanding are calculated by adding to the weighted-average shares (a) any outstanding stock options based on the treasury stock method and (b) restricted stock units (“RSU”).

Diluted net income per share was the same as basic net income per share for the year ended December 31, 2018, because the effects of potentially dilutive securities did not have a material impact on the calculation of diluted net income per share. The Company had outstanding options exercisable into 34,000 shares of the Company’s common stock that would have had an anti-dilutive effect at December 31, 2018.

Diluted net loss per common share was the same as basic net loss per common share for the year ended December 31, 2017, because the effects of potentially dilutive securities were anti-dilutive.

New accounting pronouncements adopted

In January 2016, the FASB issued ASU No. 2016-01 (“ASU 2016-01”), Financial Instruments – Overall (Subtopic 825-10): Recognition and Measurement of Financial Assets and Financial Liabilities. Further clarifications were made in February 2018 with the issuance of ASU No. 2018-03 (“ASU 2018-03”). The amended guidance requires certain equity investments that are not consolidated and not accounted for under the equity method to be measured at fair value with changes recognized in net income rather than as a component of accumulated other comprehensive income (loss). It further states that an entity may choose to measure equity investments that do not have readily determinable fair values using a quantitative approach, or measurement alternative, which is equal to its cost minus impairment, if any, plus or minus changes resulting from observable price changes in orderly transactions for the identical or a similar investment of the same issuer. The adoption of ASU 2016-01 and ASU 2018-03 did not have a material impact on the Company’s financial statements.

In April 2016, the FASB issued ASU No. 2016-10 (“ASU 2016-10”), Revenue from Contracts with Customers (Topic 606): Identifying Performance Obligations and Licensing. This update clarifies how an entity identifies performance obligations related to customer contracts as well as helps to improve the operability and understanding of the licensing implementation guidance. The amendments in this update affect the guidance in ASU No. 2014-09, (“ASU 2014-09”), Revenue from Contracts with Customers (Topic 606), which supersedes most of the current revenue recognition requirements. The underlying principle is that an entity will recognize revenue to depict the transfer of goods or services to customers at an amount that the entity expects to be entitled to in exchange for those goods or services. The guidance provides a five-step analysis of transactions to determine when and how revenue is recognized. Other major provisions include capitalization of certain contract costs, consideration of time value of money in the transaction price, and allowing estimates of variable consideration to be recognized before contingencies are resolved in certain circumstances. The guidance also requires enhanced disclosures regarding the nature, amount, timing and uncertainty of revenue and cash flows arising from an entity’s contracts with customers. The guidance is effective for the interim and annual periods beginning on or after December 15, 2017. The guidance permits the use of either a retrospective or cumulative effect transition method. In May 2016, the FASB issued ASU No. 2016-12, (“ASU 2016-12”), Revenue from Contracts with Customers (Topic 606): Narrow-Scope Improvements and Practical Expedients. This update clarifies the objectives of collectability, sales and other taxes, noncash consideration, contract modifications at transition, completed contracts at transition and technical correction. The amendments in this update affect the guidance in ASU 2014-09. In September 2017, the FASB issued additional amendments providing clarification and implementation guidance. The Company’s revenue is primarily generated from the sale of finished products to customers. Sales predominantly contain a single delivery element and revenue is recognized at a single point in time when ownership, risks and rewards transfer. These are largely unaffected by the new standard, as they closely align with the new standards principles relating to the measurement of revenue and timing of recognition. The Company adopted Topic 606 effective January 1, 2018, using the full retrospective transition method. As the underlying principles of the new standard, relating to the measurement of revenue and the timing of recognition, are closely aligned with the Company’s current business model and practices, the adoption of ASU 2014-09 did not have a material impact on the consolidated financial statements.

Rubicon Technology, Inc.

Notes to Consolidated Financial Statements—(Continued)

In August 2016, the FASB issued ASU No. 2016-15 (“ASU 2016-15”), Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments which adds or clarifies guidance on the classification of certain cash receipts and payments in the statement of cash flows. The standard addresses eight specific cash flow issues with the objective of reducing diversity in practice. ASU 2016-15 is effective for the interim and annual periods beginning after December 15, 2017, with early adoption permitted. The Company’s adoption of ASU 2016-15 did not have a material impact on its consolidated financial statements.

In November 2016, the FASB issued ASU No. 2016-18 (“ASU 2016-18”), Statement of Cash Flows (Topic 230): Restricted Cash. The standard requires that amounts generally described as restricted cash and restricted cash equivalents to be included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amount shown on the statement of cash flows. In addition, the standard requires disclosure of the nature of restrictions on cash balances and how the statement of cash flows reconciles to the balance sheet in any situation in which the balance sheet includes more than one line item of cash, cash equivalents and restricted cash. ASU 2016-18 is effective for the interim and annual periods beginning after December 15, 2017, with early adoption permitted. The Company’s adoption of ASU 2016-18 did not have a material impact on its consolidated financial statements. As of December 31, 2018, cash and cash equivalents of \$11,241,000 and restricted cash of \$169,000 on the consolidated balance sheet are presented on the consolidated statement of cash flows as \$11,410,000 as the end-of-year balance of cash, cash equivalents and restricted cash. As of December 31, 2017, cash and cash equivalents of \$11,544,000 and restricted cash of \$181,000 on the consolidated balance sheet are presented on the consolidated statement of cash flows as \$11,725,000 as the end-of-year balance of cash, cash equivalents and restricted cash.

In February 2018, the FASB issued ASU No. 2018-02 (“ASU 2018-02”), Income Statement-Reporting Comprehensive Income (Topic 220): Reclassification of Certain Tax Effects from Accumulated Comprehensive Income. The new guidance allows companies to reclassify stranded tax effects resulting from the Tax Act, from accumulated other comprehensive income to retained earnings. The guidance also requires certain new disclosures regardless of the election. The Company’s adoption of ASU 2018-02 did not have a material impact on its consolidated financial statements.

Recent accounting pronouncements

In February 2016, the FASB issued ASU No. 2016-02 (“ASU 2016-02”), *Leases (Topic 842)* which modifies the lease recognition requirements and requires entities to recognize the assets and liabilities arising from leases on the balance sheet. ASU 2016-02 requires entities to use a modified retrospective approach for leases for the periods longer than twelve months that exist or are entered into after the beginning of the earliest comparative period in the financial statements. ASU 2016-02 is effective for annual reporting periods beginning after December 15, 2018. Early adoption is permitted. The Company will adopt ASU 2016-02 in the first quarter of the fiscal year ending December 31, 2019. The adoption of ASU 2016-02 will not have a material impact on the Company’s consolidated financial statements, as the Company does not have any lease agreements for the periods longer than twelve months.

In June 2018, the FASB issued ASU No. 2018-07 (“ASU 2018-07”), *Compensation - Stock Compensation (Topic 718): Improvements to Nonemployee Share-Based Payment Accounting*. These amendments expand the scope of Topic 718, *Compensation – Stock Compensation*, which currently only includes share-based payments to employees, to include share-based payments issued to non-employees for goods or services. Consequently, the accounting for share-based payments to non-employees and employees will be substantially aligned. ASU 2018-07 supersedes Subtopic 505-50, *Equity – Equity-Based Payments to Non-Employees*. The guidance is effective for public companies for the interim and annual periods beginning after December 15, 2018. Early adoption is permitted, but no earlier than a company’s adoption date of Topic 606, *Revenue from Contracts with Customers*. At this time, the Company does not recognize the existence of any non-employee relationships involving share-based payments. The Company does not expect the adoption of ASU 2018-07 effective January 1, 2019, to have any material impact on the consolidated financial statements, as the Company has not entered into any transactions involving share-based payments with non-employees.

In August 2018, the FASB issued ASU No. 2018-13 (“ASU 2018-13”), *Fair Value Measurement (Topic 820): Disclosure Framework—Changes to the Disclosure Requirements for Fair Value Measurement*. ASU 2018-13 revises the disclosure requirements for fair value measurements by removing, modifying or adding certain disclosures. This standard is effective for fiscal years beginning after December 15, 2019. Early adoption is permitted. The Company is currently in the process of evaluating the effects of this pronouncement on its financial statements.

Rubicon Technology, Inc.**Notes to Consolidated Financial Statements—(Continued)****2. SEGMENT INFORMATION**

The Company has determined that it operates in only one segment as it only reports profit and loss information on an aggregate basis to its chief operating decision maker.

Revenue is attributed by geographic region based on ship-to location of the Company's customers. The following table summarizes revenue by geographic region:

	Year ended December 31, 2018 2017 (in thousands)	
North America	\$3,389	\$4,057
Asia	478	942
Europe	11	45
Total revenue	\$3,878	\$5,044

The following table summarizes sales by product type:

	Year ended December 31, 2018 2017 (in thousands)	
Optical	\$3,781	\$4,615
Wafer	—	9
Core	41	26
Research & development	56	394

Total revenue \$3,878 \$5,044

The following table summarizes assets by geographic region:

	As of December 31, 2018 2017 (in thousands)	
United States	\$30,680	\$30,037
Malaysia	5,110	5,007
Other	4	4
Total assets	\$35,794	\$35,048

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Rubicon Technology, Inc.**Notes to Consolidated Financial Statements—(Continued)****3. INVESTMENTS**

The Company invests its available cash primarily in U.S. Treasury securities, investment-grade commercial paper, FDIC guaranteed certificates of deposit, common stock and corporate notes. The Company's investments are classified as available-for-sale debt securities and are carried at fair value with unrealized gains and losses recorded in accumulated other comprehensive income.

The following table presents the amortized cost, and gross unrealized gains and losses on all securities at December 31, 2018:

	Amortized cost	Gross unrealized gains	Gross unrealized losses	Fair value
	(in thousands)			
Short-term investments:				
U.S. Treasury securities	\$ 14,357		— \$ (1)	\$ 14,356
Total short-term investments	\$ 14,357	\$	— \$ (1)	\$ 14,356

The following table presents the amortized cost, and gross unrealized gains and losses on all securities at December 31, 2017:

	Amortized cost	Gross unrealized gains	Gross unrealized losses	Fair value
	(in thousands)			
Short-term investments:				
Commercial paper	\$ 4,994	\$	— \$ (1)	\$ 4,993
Corporate notes/bonds	1,458		—	1,458
Total short-term investments	\$ 6,452	\$	— \$ (1)	\$ 6,451

Rubicon Technology, Inc.

Notes to Consolidated Financial Statements—(Continued)

The Company values its investments at fair value, defined as the price that would be received to sell an asset or paid to transfer a liability (an exit price) in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date. Valuation techniques used to measure fair value must maximize the use of observable inputs and minimize the use of unobservable inputs. The standard describes a fair value hierarchy based on three levels of inputs, of which the first two are considered observable and the last unobservable, that may be used to measure fair value which are the following:

Level 1—Quoted prices in active markets for identical assets or liabilities.

Level 2—Inputs other than Level 1 that are observable, either directly or indirectly, such as quoted prices for similar assets or liabilities; quoted prices in markets that are not active; or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities.

Level 3—Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities.

The Company's fixed income available-for-sale securities consist of U.S. Treasury securities, high-quality investment grade commercial paper, FDIC guaranteed certificates of deposit, common stock and corporate notes. The Company values these securities based on pricing from pricing vendors, who may use quoted prices in active markets for identical assets (Level 1 inputs) or inputs other than quoted prices that are observable either directly or indirectly (Level 2 inputs) in determining fair value. The valuation techniques used to measure the fair value of the Company's financial instruments having Level 2 inputs were derived from non-binding market consensus prices that are corroborated by observable market data, quoted market prices for similar instruments, or pricing models, such as discounted cash flow techniques.

The following table summarizes the Company's financial assets measured at fair value on a recurring basis as of December 31, 2018:

Level 1	Level 2	Level 3	Total
(in thousands)			

Cash equivalents:

Money market funds	\$2,821	\$—	\$	—	\$2,821
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Investments:

Available-for-sales securities—current:

U.S. Treasury securities	—	14,356	—	14,356
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Total	\$2,821	\$14,356	\$	—	\$17,177
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Rubicon Technology, Inc.**Notes to Consolidated Financial Statements—(Continued)**

The following table summarizes the Company's financial assets measured at fair value on a recurring basis as of December 31, 2017:

	Level 1	Level 2	Level 3	Total
	(in thousands)			
Cash equivalents:				
Money market funds	\$4,575	\$—	\$ —	\$4,575
Investments:				
Available-for-sales securities—current:				
Commercial paper	—	4,993	—	4,993
Corporate notes/bonds	—	1,458	—	1,458
Total	\$4,575	\$6,451	\$ —	\$11,026

There are no terms or conditions restricting the Company from redeeming any of its investments.

In addition to the debt securities noted above, the Company had approximately \$8.4 million and \$6.9 million of time deposits included in cash and cash equivalents as of December 31, 2018 and 2017, respectively.

4. SIGNIFICANT CUSTOMERS

For the year ended December 31, 2018, the Company had three customers that accounted for approximately 18%, 16% and 10% of its revenue. For the year ended December 31, 2017, the Company had two customers that accounted for approximately 18% and 13% of its revenue.

Customers individually representing more than 10% of trade receivables accounted for approximately 79% and 69% of accounts receivable as of December 31, 2018 and 2017, respectively.

5. ASSETS HELD FOR SALE AND LONG-LIVED ASSETS

When circumstances, such as adverse market conditions, indicate that the carrying value of a long-lived asset may be impaired, the Company performs an analysis to review the recoverability of the asset's carrying value using estimates of the undiscounted cash flows (excluding interest charges) from the expected future operations of the asset. These estimates consider factors such as expected future operating income, operating trends and prospects, as well as the effects of demand, competition and other factors. If the analysis indicates that the carrying value is not recoverable from future cash flows, an impairment loss is recognized to the extent that the carrying value exceeds the estimated fair value. The estimated fair value of assets is determined using appraisal techniques which assume the highest and best use of the asset by market participants, considering the use of the asset that is physically possible, legally permissible, and financially feasible at the measurement date. Any impairment losses are recorded as operating expenses, which reduce net income.

In connection with the Company's decision in 2016 to limit its focus to the optical and industrial sapphire markets and exit the LED market, the Company developed a plan to close its Malaysia facility, scale down and consolidate remaining operations in the U.S. and sell additional assets that would not be needed. The Company evaluated its U.S. and Malaysia asset portfolios to identify assets needed for its current business strategy and excess assets that were no longer needed. The Company determined it had excess machinery, equipment and facilities. Excess U.S. and Malaysia assets were evaluated based on assuming an orderly liquidation plan, which considers economic obsolescence and sales of comparable equipment, as it is the Company's intention to sell these assets. Additionally, the Company evaluated its U.S. assets continuing to be used in operations using a cost and market approach to determine the current fair value.

Rubicon Technology, Inc.

Notes to Consolidated Financial Statements—(Continued)

As a result, for the year ended December 31, 2017, the Company recorded an impairment charge of \$1.0 million on lower than expected sales prices for certain machinery and equipment held for sale, and identification of assets that will not be needed to support its current operations. Additionally, for the year ended December 31, 2017, the Company recorded an impairment charge of \$4.0 million on its U.S. and Malaysia land and building assets for the difference between the net carrying value and estimated fair value. For the year ended December 31, 2018, the Company reviewed the current fair value of its assets and concluded no adjustments were needed. The Company will continue to assess our long-lived assets to ensure the carrying amount of these assets is still appropriate given any changes in the asset usage, marketplace and other factors used in determining the current fair value.

In September 2018, the Company completed the sale of its 134,400 square-foot manufacturing and office facility located in Batavia, Illinois, with the net book value of \$5.9 million. The sale price for the property was \$6.7 million, the Company realized net proceeds of approximately \$6.4 million after the payment of real estate taxes, brokerage and legal fees, transfer taxes and other expenses, and recorded a gain on sale of this asset of \$504,000.

In the year ended December 31, 2018, the Company completed individual sales and held auctions for equipment and consumable assets located at each of its U.S. properties, resulting in the sale of certain of its excess U.S. equipment and excess consumable assets, which had a total net book value of \$1.6 million. In the beginning of 2018, the Company intended to sell a certain number of its crystal growth furnaces. Due to the changed needs and business plan, the Company reduced the number of furnaces it wanted to sell. The difference in the number of furnaces the Company originally intended to sell and the number it actually disposed of, had a net book value of \$236,000. The additional furnaces that the Company decided to retain were reclassified from current assets held for sale to fixed assets held and used at December 31, 2018. Additionally, in the year ended December 31, 2018, the Company completed sales of Malaysia equipment with a total net book value of \$131,000. Based on these sales, a gain on disposal of equipment and consumable assets of \$2.9 million was recorded for the year ended December 31, 2018. Unsold excess Malaysia equipment continued to be classified as current assets held for sale at December 31, 2018.

The Company is pursuing the sale of its parcel of land in Batavia, Illinois, and the sale or lease of its 65,000 square-foot facility located in Penang, Malaysia. Although the Company cannot assure the timing of these sales, these properties were classified as current assets held for sale at December 31, 2018 and 2017, as it is the Company's intention to complete these sales within the next twelve-month period.

In September 2018, the Company completed the purchase of a property located in Bensenville, Illinois. The purchase price for the property was approximately \$2.3 million. Previously, the Company leased the Bensenville property and it was the headquarters of its operations and one of its growth facilities. The Company used its cash on hand to purchase the property.

6. STOCKHOLDERS' EQUITY

Common stock

At the Company's annual meeting of stockholders held on May 3, 2017, the Company's stockholders approved amendments to the Company's Eighth Amended and Restated Certificate of Incorporation (as amended, the "Certificate of Incorporation") to (i) effect a reverse stock split of the Company's common stock; and (ii) decrease the Company's authorized number of shares of common stock to three times the number of shares of the Company's common stock outstanding immediately following the reverse stock split. On May 3, 2017, following the annual meeting, the Company filed with the Secretary of State of the State of Delaware a Certificate of Amendment to (a) implement the reverse stock split at a ratio of 1-for-10; and (b) to reduce the number of authorized shares of common stock from 40,000,000 to 8,200,000, consequently reducing the number of total authorized shares from 45,000,000 to 13,200,000. With the completion of the reverse stock split, the Company's shares began trading above the required \$1.00 per share closing bid price, as required by the Listing Qualifications Department of NASDAQ. The share information has been retroactively reflected for the effects of this reverse stock split for all periods presented.

Preferred stock

At the Company's annual meeting of stockholders held on May 10, 2018, the Company's stockholders approved an amendment to the Certificate of Incorporation to decrease the Company's authorized number of shares of preferred stock from 5,000,000 shares to 1,000,000 shares. The Company filed with the Secretary of State of the State of Delaware a Certificate of Amendment to decrease the authorized number of preferred shares, consequently reducing the number of total authorized shares from 13,200,000 to 9,200,000.

Rubicon Technology, Inc.

Notes to Consolidated Financial Statements—(Continued)

Common shares reserved

As of December 31, 2018, the Company had reserved 119,258 shares of common stock for issuance upon the exercise of outstanding common stock options and vesting of RSUs. Also 295,067 shares of the Company's common stock were reserved for future grants of stock options and RSUs (or other similar equity instruments) under the Rubicon Technology, Inc. 2016 Stock Incentive Plan (the "2016 Plan") as of December 31, 2018.

7. STOCKHOLDER RIGHTS AGREEMENT

On December 18, 2017, the Company entered into a Section 382 Rights Agreement with American Stock Transfer & Trust Company, LLC, as Rights Agent (the "Rights Agreement") in an effort to protect stockholder value by attempting to diminish the risk that the Company's ability to use its net NOLs to reduce potential future federal income tax obligations may become substantially limited. The Company's ability to utilize its NOLs may be substantially limited if the Company experiences an "ownership change" within the meaning of Section 382 of the Internal Revenue Code of 1986, as amended (the "IRC"). The Rights Agreement is intended to act as a deterrent to any person acquiring beneficial ownership of 4.9% or more of the Company's outstanding common stock without the approval of the Company's Board of Directors (the "Board").

The Board authorized the issuance of one Right for each outstanding share of common stock, par value \$0.001 per share, of the Company, payable to stockholders of record date of the close of business on January 2, 2018. One Right will also be issued together with each share of the Company's common stock issued after January 2, 2018 but before the Distribution Date (as defined below) and, in certain circumstances, after the Distribution Date. Subject to the terms, provisions and conditions of the Rights Agreement, if the Rights become exercisable, each Right would initially represent the right to purchase from the Company one one-thousandth of a share of Series A Junior Participating Preferred Stock, par value \$0.001 per share, of the Company (the "Series A Preferred Stock") for a purchase price of \$40.00. If issued, each one-thousandth of a share of Series A Preferred Stock would give the stockholder approximately the same dividend, voting and liquidation rights as does one share of common stock. However, prior to exercise, a Right does not give its holder any rights as a stockholder of the Company, including, without limitation, any dividend, voting or liquidation rights.

The Rights will not be exercisable until the earlier of (i) ten business days after a public announcement that a person has become an “Acquiring Person” by acquiring beneficial ownership of 4.9% or more of outstanding common stock (or, in the case of a person that had beneficial ownership of 4.9% or more of the outstanding common stock as of the close of business on December 18, 2017, by obtaining beneficial ownership of any additional shares of common stock representing 0.5% or more of the shares of common stock then outstanding (other than pursuant to a dividend or distribution paid or made by the Company on the outstanding shares of the common stock or pursuant to a split or subdivision of the outstanding shares of common stock) at a time such person still beneficially owns 4.9% or more of the outstanding common stock), and (ii) ten business days (or such later date as may be specified by the Board prior to such time as any person becomes an Acquiring Person) after the commencement of a tender or exchange offer by or on behalf of a person that, if completed, would result in such person becoming an Acquiring Person (the “Distribution Date”).

Until the Distribution Date, common stock certificates or the ownership statements issued with respect to uncertificated shares of common stock will evidence the Rights. Any transfer of shares of common stock prior to the Distribution Date will also constitute a transfer of the associated Rights. After the Distribution Date, separate rights certificates will be issued and the Rights may be transferred other than in connection with the transfer of the underlying shares of common stock unless and until the Board has determined to effect an exchange pursuant to the Rights Agreement (as described below).

In the event that a person becomes an Acquiring Person, each holder of a Right, other than Rights that are or, under certain circumstances, were beneficially owned by the Acquiring Person (which will thereupon become void), will thereafter have the right to receive upon exercise of a Right and payment of the purchase price, a number of shares of the Company’s common stock (or, in certain circumstances, cash, property or other securities of the Company) having a market value equal to two times the purchase price. However, Rights are subject to redemption and exchange at the option of the Company.

In the event that, at any time following a person becoming an Acquiring Person, (i) the Company engages in a merger or other business combination transaction in which the Company is not the surviving corporation; (ii) the Company engages in a merger or other business combination transaction in which the Company is the surviving corporation and the common stock is changed or exchanged; or (iii) 50% or more of the Company’s assets, cash flow or earning power is sold or transferred, each holder of a Right (except Rights which have previously been voided) shall thereafter have the right to receive, upon exercise of the Right, common stock of the acquiring company having a value equal to two times the purchase price.

Rubicon Technology, Inc.

Notes to Consolidated Financial Statements—(Continued)

At any time until the earlier of December 18, 2020, and ten calendar days following the first date of public announcement that a person has become an Acquiring Person or that discloses information which reveals the existence of an Acquiring Person or such earlier date as a majority of the Board becomes aware of the existence of an Acquiring Person, the Board may redeem the Rights in whole, but not in part, at a price of \$0.001 per Right (the “Redemption Price”). The redemption of the Rights may be made effective at such time, on such basis and with such conditions as the Board in its sole discretion may establish. Immediately upon any redemption of the Rights, the right to exercise the Rights will terminate and the only right of the holders of Rights will be to receive the Redemption Price.

At any time after a person becomes an Acquiring Person, the Board may, at its option, exchange the Rights (other than Rights that have become void), in whole or in part, at an exchange ratio of one share of common stock, or a fractional share of Series A Preferred Stock (or of a share of a similar class or series of the Company’s preferred stock having similar rights, preferences and privileges) of equivalent value, per Right (subject to adjustment). Immediately upon an exchange of any Rights, the right to exercise such Rights will terminate and the only right of the holders of Rights will be to receive the number of shares of common stock (or fractional share of Series A Preferred Stock or of a share of a similar class or series of the Company’s preferred stock having similar rights, preferences and privileges) equal to the number of such Rights held by such holder multiplied by the exchange ratio.

Each one one-thousandth of a share of Series A Preferred Stock, if issued: (i) will be nonredeemable and junior to any other series of preferred stock the Company may issue (unless otherwise provided in the terms of such other series), (ii) will entitle holders to preferential cumulative quarterly dividends in an amount per share of Series A Preferred Stock equal to the greater of (a) \$1 or (b) 1,000 times the aggregate the dividends, if any, declared on one share of the Company’s common stock, (iii) will entitle holders upon liquidation (voluntary or otherwise) to receive \$1,000 per share of Series A Preferred Stock plus an amount equal to accrued and unpaid dividends and distributions thereon, whether or not declared, (iv) will have the same voting power as one share of common stock, and (v) will entitle holders to a per share payment equal to the payment made on one share of the Company’s common stock, if shares of the common stock are exchanged via merger, consolidation, or a similar transaction. Because of the nature of the Series A Preferred Stock’s dividend, liquidation and voting rights, the value of a Unit of Series A Preferred Stock purchasable upon exercise of each Right should approximate the value of one share of common stock.

The Rights and the Rights Agreement will expire on the earliest of (i) December 18, 2020, (ii) the time at which the Rights are redeemed pursuant to the Rights Agreement, (iii) the time at which the Rights are exchanged in full

pursuant to the Rights Agreement, (iv) the date that the Board determines that the Rights Agreement is no longer necessary for the preservation of material valuable Tax Benefits, (v) the beginning of a taxable year of the Company to which the Board determines that no NOL tax benefits may be carried forward, and (vi) a determination by the Board, prior to the time any Person becomes an Acquiring Person, that the Rights Agreement and the Rights are no longer in the best interests of the Company and its stockholders.

The Board may adjust the purchase price, the number of shares of Series A Preferred Stock or other securities or assets issuable and the number of outstanding Rights to prevent dilution that may occur as a result of certain events, including among others, a stock dividend, a stock split or a reclassification of the Series A Preferred Stock or common stock. With certain exceptions, no adjustments to the purchase price will be required until cumulative adjustments amount to at least 1% of the purchase price.

For so long as the Rights are redeemable, the Board may supplement or amend any provision of the Rights Agreement in any respect without the approval of the holders of the Rights. From and after the time the Rights are no longer redeemable, the Board may supplement or amend the Rights Agreement only to cure an ambiguity, to alter time period provisions, to correct inconsistent provisions, or to make any additional changes to the Rights Agreement which the Company may deem necessary or desirable, but only to the extent that those changes do not impair or adversely affect any Rights holder (other than an Acquiring Person or any Affiliate or Associate of an Acquiring Person or certain of their transferees) and do not result in the Rights again becoming redeemable or the Rights Agreement again becoming amendable other than in accordance with this sentence.

In connection with the adoption of the Rights Agreement and authorization and declaration of the dividend of the Rights, on December 18, 2017, the Company filed the Certificate of Designation with the Secretary of State of the State of Delaware. The Certificate of Designation became effective on December 18, 2017.

Rubicon Technology, Inc.**Notes to Consolidated Financial Statements—(Continued)****8. STOCK INCENTIVE PLANS**

In August 2007, the Company adopted the Rubicon Technology Inc. 2007 Stock Incentive Plan, which was amended and restated effective in March 2011 (the “2007 Plan”), and which allowed for the grant of incentive stock options, non-statutory stock options, stock appreciation rights, restricted stock, RSUs, performance awards and bonus shares. The maximum number of shares that could be awarded under the 2007 Plan was 440,769 shares. Options granted under the 2007 Plan entitle the holder to purchase shares of the Company’s common stock at the specified option exercise price, which could not be less than the fair market value of the common stock on the grant date. On June 24, 2016, the plan terminated with the adoption of the Rubicon Technology, Inc. 2016 Stock Incentive Plan, (the “2016 Plan”). Any existing awards under the 2007 Plan remain outstanding in accordance with their current terms under the 2007 Plan. In June 2016, the Company’s stockholders approved adoption of the 2016 Plan effective as of March 17, 2016, which allows for the grant of incentive stock options, non-statutory stock options, stock appreciation rights, restricted stock, RSUs, performance awards and bonus shares. The Compensation Committee of the Board administers the 2016 Plan. The committee determines the type of award to be granted, the fair value, the number of shares covered by the award, and the time when the award vests and may be exercised.

Pursuant to the 2016 Plan, 222,980 shares of the Company’s common stock plus any shares subject to outstanding awards under the 2007 Plan that subsequently expire unexercised, are forfeited without the delivery of shares or are settled in cash, will be available for issuance under the 2016 Plan. The 2016 Plan will automatically terminate on March 17, 2026, unless the Company terminates it sooner.

The following table summarizes the activity of the stock incentive and equity plans:

	Shares available for grant	Number of options outstanding	Weighted-average option exercise price	Number of restricted stock shares issued	Number of RSUs outstanding
Outstanding at January 1, 2017	243,218	253,541	37.31	76,483	12,584
Granted	(85,071)	—	—	21,209	63,862
Exercised/issued	—	(938)	6.10	—	(53,625)
Canceled/forfeited	116,347	(127,039)	51.85	—	(437)

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Outstanding at December 31, 2017	274,494	125,564	19.53	97,692	22,384
Granted	(47,953)	10,000	—	1,878	36,075
Exercised/issued	—	(938)	6.10	—	(5,300)
Canceled/forfeited	68,526	(65,543)	31.66	—	(2,983)
Outstanding at December 31, 2018	295,067	69,083	\$ 12.10	99,570	50,176

The following table sets forth option grants made during 2018 with intrinsic value calculated based on grant date fair value.

Date of grant	Number of options granted	Exercise price	Intrinsic value per share
November 2018	10,000	\$ 7.77	—

There is no intrinsic value because the exercise price per share of each option was equal to the fair value of the common stock on the date of grant.

No options were granted during 2017.

Rubicon Technology, Inc.**Notes to Consolidated Financial Statements—(Continued)**

At December 31, 2018, the exercise prices of outstanding options were as follows:

Exercise price	Number of options outstanding	Average remaining contractual life (years)	Number of options exercisable
\$6.10 - \$13.50	64,027	7.21	42,035
\$40.10 - \$44.10	4,255	2.74	4,255
\$77.50 - \$121.10	312	0.87	312
\$194.90 - \$226.90	489	1.19	489
	69,083	6.86	47,091

The weighted average grant date fair value of the options that became vested in the years ended 2018 and 2017 was \$76,000 and \$614,000, respectively.

The following table summarizes the activity of non-vested options:

	Non-vested options	Weighted-average option exercise price
Non-vested at January 1, 2017	148,983	\$ 10.20
Vested	(47,618)	12.89
Cancelled	(54,523)	9.50
Non-vested at December 31, 2017	46,842	8.26
Granted	10,000	7.77
Vested	(8,413)	9.04
Cancelled	(26,437)	8.99
Non-vested at December 31, 2018	21,992	\$ 6.86

The Company's aggregate intrinsic value is calculated as the difference between the exercise price of the underlying stock options and the fair value of the Company's common stock. Based on the fair value of the common stock at December 31, 2018 and 2017, there was no aggregate intrinsic value for options outstanding and exercisable.

The Company used historical stock prices as the basis for its volatility assumptions. The assumed risk-free rates were based on U.S. Treasury rates in effect at the time of grant with a term consistent with the expected option lives. The expected term for the year ended December 31, 2018, is based upon the Company's median average life of its options. The forfeiture rate is based on the past history of forfeited options. The expense is being allocated using the straight-line method. For the years ended December 31, 2018 and 2017, the Company recorded \$47,000 and \$277,000, respectively, of stock option compensation expense. As of December 31, 2018, the Company has \$79,000 of total unrecognized compensation cost related to non-vested options granted under the Company's stock-based plans that it expects to recognize over a weighted-average period of 1.74 years.

Rubicon Technology, Inc.**Notes to Consolidated Financial Statements—(Continued)**

For the year ended December 31, 2018, the assumptions used for the estimated fair value at the date of option grant using the Black-Scholes option-pricing model were as follows:

	2018	
Weighted-average fair value per option	\$6.09	
Expected term	5.1 years	
Risk-free interest rate	2.95	%
Volatility	47	%
Dividend yield	None	
Forfeiture rate	24.43	%

Pursuant to an employment agreement in March 2017, which was subsequently amended on May 12, 2017, the Company granted 30,902 and 59,098 RSUs to a key executive in years ended December 31, 2018 and 2017, respectively.

The following table summarizes the award vesting terms for the RSUs granted in 2018:

Number of RSUs	Target price
902	\$11.00
15,000	\$12.50
15,000	\$14.00

The following table summarizes the award vesting terms for the RSUs granted in 2017:

Number of restricted stock units	Target price
15,000	\$ 6.50
15,000	\$ 8.00
15,000	\$ 9.50

14,098

\$ 11.00

The RSUs vest in the amounts set forth below on the first date the 15-trading day average closing price of the Company's common stock equals or exceeds the corresponding target price for the common stock before May 12, 2021. At the time the negotiation of the terms of the employment agreement began, the closing price of the common stock was \$5.50. On the date of grant, the closing price of the common stock was \$6.30. During the twelve months ended December 31, 2017, the first three tranches of the grant vested. No additional tranches vested during the twelve months ended December 31, 2018.

The Company used Monte Carlo simulation model valuation technique to determine the fair value of RSUs granted because the awards vest based upon achievement of market price targets. The Monte Carlo simulation model utilizes multiple input variables that determine the probability of satisfying the market condition stipulated in the award and calculates the fair value of each RSU. The Company used the following assumptions in determining the fair value of the RSUs:

	Granted	
	January 2018	March 2017
Daily expected stock price volatility	4.2806 %	4.4237 %
Daily expected mean return on equity	(0.2575 %)	(0.2226 %)
Daily expected dividend yield	0.0 %	0.0 %
Average daily risk-free interest rate	0.0078 %	0.0063 %

The daily expected stock price volatility is based on a four-year historical volatility of the Company's common stock. The daily expected dividend yield is based on annual expected dividend payments. The average daily risk-free interest rate is based on the three-year treasury yield as of the grant date. Each of the tranches is calculated to have its own fair value and requisite service period. The fair value of each tranche is amortized over the requisite or derived service period which is up to four years. The RSUs granted in January 2018 and March 2017 had a grant date fair value of \$209,000 and \$323,000, respectively.

Rubicon Technology, Inc.**Notes to Consolidated Financial Statements—(Continued)**

A summary of the Company's RSUs is as follows:

	RSUs outstanding	Weighted-average price at time of grant	Aggregate intrinsic value
Non-vested RSUs as of January 1, 2017	12,584	\$ 16.00	
Granted	63,862	6.46	
Vested	(53,625)	9.41	
Cancelled	(437)	11.30	
Non-vested RSUs as of December 31, 2017	22,384	4.65	
Granted	36,075	7.88	
Vested	(5,300)	8.51	
Cancelled	(2,983)	8.88	
Non-vested RSUs at December 31, 2018	50,176	\$ 6.31	\$ 396,319

The fair value of each RSU is the market price on the date of grant and is being recorded as compensation expense ratably over the vesting terms. For the years ended December 31, 2018 and 2017, the Company recorded \$265,000 and \$460,000 of RSU expense, respectively. The RSUs are forfeited by a participant upon termination for any reason, and there is no proportionate or partial vesting in the periods between the vesting dates. As of December 31, 2018, there was no unrecognized compensation cost related to the non-vested RSUs.

An analysis of restricted stock issued is as follows:

Non-vested restricted stock as of January 1, 2017	16,470
Granted	21,209
Vested	(32,775)
Non-vested restricted stock as of December 31, 2017	4,904
Granted	1,878
Vested	(4,328)
Non-vested restricted stock as of December 31, 2018	2,454

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For the years ended December 31, 2018 and 2017, the Company recorded \$69,000 and \$160,000, respectively, of stock compensation expense related to restricted stock.

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Rubicon Technology, Inc.**Notes to Consolidated Financial Statements—(Continued)****9. INCOME TAXES**

On December 22, 2017, the U.S. enacted the Tax Cuts and Jobs Act (the “Act”) which, among other provisions, reduced the U.S. corporate tax rate from 35% to 21% effective January 1, 2018. The SEC issued guidance, Staff Accounting Bulletin 118, on accounting for the tax effects of the Act. The guidance allowed the Company to record provisional amounts for those impacts, with the requirement that the accounting be completed in a period not to exceed one year from the date of enactment. The Company has completed its accounting for the tax effects of enactment of the Act. The deemed inclusion from the repatriation tax increased from \$3.9 million at the time of provision to \$5.0 million at the time the calculation was finalized for the tax return. The increase of the inclusion related primarily to the refinement of Malaysia earnings and profits. As the Company is in a full valuation allowance position, an equal benefit adjustment was recorded for the impact of the increase of the deemed repatriation tax.

Components of income before income taxes and the income tax provision are as follows:

Income (loss) before income taxes

	Year ended December 31,	
	2018	2017
	(in thousands)	
U.S.	\$ 1,017	\$ (17,104)
Foreign	(30)	(659)
Total	\$ 987	\$ (17,763)

Income taxes

Year ended December 31,

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	2018	2017
	(in thousands)	
Current		
U.S.	\$ —	\$ —
State	—	—
Foreign	24	88
Total current income tax expense	24	88
Deferred		
U.S.	—	—
State	—	—
Foreign	—	—
Total deferred income tax expense (benefit)	—	—
Total income tax expense (benefit)	\$ 24	\$ 88

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Rubicon Technology, Inc.**Notes to Consolidated Financial Statements—(Continued)**

The reconciliation of income tax computed at the federal statutory rate to income before taxes is as follows:

	Year ended December 31,	
	2018	2017
U.S. federal statutory rate	(21)%	(33.6)%
State taxes net of federal benefit	(7.7)	(4.9)
Impact of new federal tax rate	0.0	157.8
Foreign rate differential and transactional tax	0.1	0.3
Tax credits	(14.0)	—
Valuation allowance	42.7	(118.4)
Other	(2.5)	(0.7)
	(2.4)%	0.5 %

Deferred income taxes reflect the net tax effects of the temporary differences between the carrying amount of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes.

Significant components of the Company's net deferred income taxes are as follows at December 31:

	2018	2017
	(in thousands)	
Deferred tax assets:		
Allowance for doubtful accounts	\$2	\$2
Inventory reserves	3,323	3,672
Consumables excess reserve	170	-
Accrued liabilities	55	4
Warrant interest expense	196	196
Stock compensation expense	881	2,022
State net operating loss	14,633	15,954
Net operating loss carryforward	38,525	37,856
Tax credits	740	999
Depreciation	2,993	5,117

Valuation allowance	(61,512)	(65,817)
Total deferred tax assets	6	5
Deferred tax liability:		
Prepaid expenses	(6)	(5)
Net deferred tax liability	\$-	\$-

In March 2018, the FASB issued ASU No. 2018-05 (“ASU 2018-05”), *Income Taxes (Topic 740): Amendments to SEC Paragraphs Pursuant to SEC Staff Accounting Bulletin No. 118*. This standard amends ASC 740, *Income Taxes*, to provide guidance on accounting for tax effects of the Tax Cuts and Jobs Act (the “Tax Act”) pursuant to Staff Accounting Bulletin No. 118, which allows companies to complete the accounting under ASC 740 within one-year measurement period from the Tax Act enactment date. This standard is effective upon issuance. The Company has decided to follow the guidance provided by ASU 2018-05 and will leave the one-year measurement period open to evaluate the impact of the Tax Act.

In February 2018, the FASB issued ASU No. 2018-02 (“ASU 2018-02”), *Income Statement-Reporting Comprehensive Income (Topic 220): Reclassification of Certain Tax Effects from Accumulated Comprehensive Income*. The new guidance allows companies to reclassify stranded tax effects resulting from the Tax Act, from accumulated other comprehensive income to retained earnings. The guidance also requires certain new disclosures regardless of the election. Early adoption is permitted. The Company’s adoption of ASU 2018-02 did not have a material impact on its consolidated financial statements.

The Company adopted the guidance in ASU No. 2015-17, *Income Taxes (Topic 740): Balance Sheet Classification of Deferred Taxes*, which requires that all deferred tax assets and liabilities, along with any related valuation allowance, be classified as noncurrent in the balance sheet. As a result, each jurisdiction has one net noncurrent deferred tax asset or liability. The new guidance does not change the existing requirement that only permits offsetting within a jurisdiction. Companies are still prohibited from offsetting deferred tax liabilities from one jurisdiction against deferred tax assets of another jurisdiction. The change in accounting principle did not have an impact on the Company’s results of operations, cash flows or stockholders’ equity.

Rubicon Technology, Inc.

Notes to Consolidated Financial Statements—(Continued)

In March 2016, the FASB issued ASU No. 2016-09 (“ASU 2016-09”), *Compensation—Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting* which modifies several aspects of the accounting for share-based payment transactions, including income tax consequences, classification of awards as either equity or liabilities, and classification on the statement of cash flows. The Company adopted ASU 2016-09 at January 1, 2017, and the impact of adopting ASU 2016-09 for the twelve months ended December 31, 2017, was that the Company was required to bring the deferred tax assets related to off balance net operating losses onto the balance sheet. This increased the Company’s deferred tax assets by \$10.3 million with a corresponding entry to retained earnings. Since the Company continues to be in a full valuation allowance, there was an entry made to the valuation allowance to offset the increase to the deferred tax assets with a corresponding entry to retained earnings.

In accordance with ASC740 “Accounting for Income Taxes” (“ASC740”), the Company evaluates its deferred income tax assets quarterly to determine if valuation allowances are required or should be adjusted. ASC740 requires that companies assess whether valuation allowances should be established against their deferred tax assets based on consideration of all available evidence, both positive and negative, using a “more likely than not” standard. The Company is in a cumulative loss position for the past three years which is considered significant negative evidence that is difficult to overcome on a “more likely than not” standard through objectively verifiable data. Based on an evaluation in accordance with the accounting standards, as of December 31, 2018 and 2017, a valuation allowance of \$61.5 million and \$65.8 million, respectively, has been recorded against the net U.S. and Malaysia deferred tax assets in order to measure only the portion of the deferred tax assets that are more likely than not to be realized based on the weight of all the available evidence. Until an appropriate level of profitability is attained, the Company expects to maintain a full valuation allowance on its U.S. and Malaysia net deferred tax assets. Any U.S. or Malaysia tax benefits or tax expense recorded on the Company’s Consolidated Statement of Operations will be offset with a corresponding valuation allowance until such time that the Company changes its determination related to the realization of deferred tax assets. In the event that the Company changes its determination as to the amount of deferred tax assets that can be realized, the Company will adjust its valuation allowance with a corresponding impact to the provision for income taxes in the period in which such determination is made.

At December 31, 2018, the Company had separate Federal and Illinois NOL carryforwards of \$181.1 million and \$195.0 million, respectively, which begin to expire in 2021 and 2020, respectively. In addition, at December 31, 2018, the Company had Federal and Illinois research and development credits and Illinois investment tax credits of \$662,000, \$66,000 and \$23,000, respectively, which begin to expire in 2019. Tax credits are accounted for using the flow-through method and therefore are taken in the year earned.

The Company completed an analysis of the utilization of NOLs subject to limits based upon certain ownership changes as of December 31, 2018. The results of this analysis indicated no ownership change limiting the utilization of net operating losses and tax credits.

The Company prescribes a recognition threshold and measurement attribute for the financial statement recognition and measurement of a tax position taken, or expected to be taken, in a tax return. At December 31, 2018 and 2017, the Company had \$1.1 million of unrecognized tax benefits taken or expected to be taken in a tax return that have been recorded on the Company's financial statements as an offset to the valuation allowance related to tax positions taken in 2012. It is not reasonably possible that the amount will change in the next twelve months. There were no material changes to prior year or current year positions taken during the year ended December 31, 2018.

There were no interest or penalties related to income taxes that have been accrued or recognized as of and for the years ended December 31, 2018 and 2017.

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Rubicon Technology, Inc.

Notes to Consolidated Financial Statements—(Continued)

The Company files income tax returns in the United States federal jurisdiction and in a state jurisdiction. During 2009, the Company began foreign operations in Malaysia and is subject to local income taxes in that jurisdiction. The Company's Malaysia tax returns for the periods ended December 31, 2010 through 2012 have been audited by the Malaysia Inland Revenue Board with no changes made to the taxable income for those years. All other tax years in Malaysia are open to examination by tax authorities.

The Company's federal tax returns for the periods ended December 31, 2010, 2008 and 2007 have been audited by the Internal Revenue Service (IRS) with no changes made to the Company's taxable losses for those years. The Company's state tax returns for the periods ended December 31, 2009 through 2012 have been audited by the Illinois Department of Revenue with no changes made to the Company's taxable losses for those years. Due to the existence of NOL carryforwards, tax years ended December 31, 2001 through 2006, 2008, 2009 and 2011 through 2017 are open to examination by tax authorities for Federal purposes. Due to NOL carryforwards at the State level, tax years ended 2006 and 2008 through 2017 are open to examination by state tax authorities.

Due to the closing of the Rubicon Malaysia operations, the Company no longer considers the undistributed earnings of Rubicon Malaysia to be indefinitely reinvested. Upon liquidation of Rubicon Malaysia, it is anticipated any cash left after the liquidation will be brought back to the U.S. via a payment of principal towards the intercompany loan. A withholding tax will be payable to the Malaysian government on the interest portion of the loan. At December 31, 2018 and 2017, the Company accrued the withholding tax on the interest balance of the loan in the amount of \$24,000 and \$129,000, respectively, which represents the incremental tax.

10. COMMITMENTS AND CONTINGENCIES

Operating Leases

The Company leased buildings used for manufacturing and offices. In the third quarter of 2018, the Company vacated its leased Franklin Park, Illinois, facility due to the expiration of its lease. Additionally, in September 2018, the Company completed the purchase of its Bensenville property, which the Company leased previously. The Company does not have any future lease obligations.

Net rent expense under operating leases in 2018 and 2017 amounted to \$418,000 and \$592,500, respectively.

Litigation

From time to time, the Company experiences routine litigation in the ordinary course of business. On October 31, 2018, the Company received a summons from Bartmann, Perales & Dolter, LLC, the former lessor of the Franklin Park, Illinois, property the Company leased previously, alleging that the Company owes \$175,000 in overdue rent payments, property taxes and restoration costs. The Company intends to vigorously defend against these allegations and has asserted a counterclaim pursuant to the terms of the lease agreement for reimbursement of costs and expenses to maintain the condition and repair for said property. The management of the Company does not believe any pending litigation will have a material adverse effect on the financial condition or results of operations or cash flows of the Company.

11. BENEFIT PLAN

The Company sponsors a 401(k) savings plan (the “Plan”). Employees are eligible to participate in the Plan upon reaching 18 years of age. Employees make contributions to the Plan through payroll deferrals. Employer matching contributions are discretionary. There were no employer matching contributions for the years ended December 31, 2018 and 2017.

12. SUBSEQUENT EVENTS

In January 2019, the Company’s Malaysia facility was damaged by intruders. The Company cannot currently estimate the cost to restore the facility to its prior state.