

AMTECH SYSTEMS INC

Form 424B5

August 17, 2017

[Table of Contents](#)

**Filed Pursuant to Rule 424(b)(5)
Registration No. 333-215604**

The information in this preliminary prospectus supplement is not complete and may be changed. A registration statement relating to these securities has been declared effective by the Securities and Exchange Commission. This prospectus supplement and the accompanying prospectus are not an offer to sell securities, and they are not soliciting an offer to buy these securities in any jurisdiction where this offer or sale is not permitted.

SUBJECT TO COMPLETION, DATED AUGUST 17, 2017

PROSPECTUS SUPPLEMENT

(to Prospectus dated February 6, 2017)

Shares

Common Stock

This is a firm commitment offering of _____ shares of our common stock. Our common stock is listed on the NASDAQ Global Select Market under the symbol **ASYS**. On August 16, 2017, the last reported sale price of our common stock on the NASDAQ Global Select Market was \$10.65 per share.

Investing in our common stock involves significant risks. See [Risk Factors](#) beginning on page S-7 of this prospectus supplement, page 4 of the accompanying prospectus, and in the document incorporated by reference into this prospectus supplement for a discussion of the factors you should carefully consider before deciding to purchase our common stock.

| | Per Share | Total |
|----------------------------------|----------------------|--------------|
| Public offering price | \$ | \$ |
| Underwriting discount(1) | \$ | \$ |
| Proceeds, before expenses, to us | \$ | \$ |

- (1) The underwriter will receive compensation in addition to the underwriting discount listed above. See Underwriting beginning on page S-17 of this prospectus supplement for a description of the compensation payable to the underwriter.

We have granted the underwriter a 30-day option to purchase up to additional shares of our common stock on the same terms and conditions described herein, solely to cover over-allotments, if any.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or passed upon the adequacy or accuracy of this prospectus. Any representation to the contrary is a criminal offense.

The underwriter expects to deliver the shares of common stock offered hereby to purchasers on or about , 2017.

Roth Capital Partners

The date of this prospectus supplement is August , 2017

Table of Contents

TABLE OF CONTENTS

| | |
|--|-----------------|
| Prospectus Supplement | Page No. |
| <u>ABOUT THIS PROSPECTUS SUPPLEMENT</u> | S-ii |
| <u>CAUTIONARY STATEMENT REGARDING FORWARD-LOOKING STATEMENTS</u> | S-iii |
| <u>PROSPECTUS SUPPLEMENT SUMMARY</u> | S-1 |
| <u>THE OFFERING</u> | S-5 |
| <u>SUMMARY CONSOLIDATED FINANCIAL DATA</u> | S-6 |
| <u>RISK FACTORS</u> | S-7 |
| <u>USE OF PROCEEDS</u> | S-9 |
| <u>CAPITALIZATION</u> | S-10 |
| <u>DILUTION</u> | S-11 |
| <u>PRICE RANGE OF COMMON STOCK</u> | S-12 |
| <u>DIVIDEND POLICY</u> | S-13 |
| <u>MATERIAL U.S. FEDERAL INCOME TAX AND ESTATE TAX CONSEQUENCES FOR NON-U.S. HOLDERS</u> | S-14 |
| <u>UNDERWRITING</u> | S-17 |
| <u>NOTICE TO INVESTORS</u> | S-20 |
| <u>LEGAL MATTERS</u> | S-22 |
| <u>EXPERTS</u> | S-22 |
| <u>WHERE YOU CAN FIND MORE INFORMATION</u> | S-22 |
| <u>INFORMATION INCORPORATED BY REFERENCE</u> | S-22 |
| Prospectus | Page No. |
| <u>ABOUT THIS PROSPECTUS</u> | 1 |
| <u>PROSPECTUS SUMMARY</u> | 2 |
| <u>RISK FACTORS</u> | 4 |
| <u>WHERE YOU CAN FIND MORE INFORMATION</u> | 5 |
| <u>FORWARD-LOOKING STATEMENTS</u> | 5 |
| <u>INCORPORATION OF CERTAIN INFORMATION BY REFERENCE</u> | 6 |
| <u>PROSPECTUS SUPPLEMENTS</u> | 7 |
| <u>USE OF PROCEEDS</u> | 7 |
| <u>SECURITIES WE MAY OFFER</u> | 7 |
| <u>DESCRIPTION OF COMMON AND PREFERRED STOCK</u> | 8 |
| <u>DESCRIPTION OF DEBT SECURITIES</u> | 14 |
| <u>DESCRIPTION OF WARRANTS</u> | 25 |
| <u>DESCRIPTION OF UNITS</u> | 28 |

| | |
|--------------------------------------|----|
| <u>LEGAL OWNERSHIP OF SECURITIES</u> | 30 |
| <u>BOOK-ENTRY HOLDERS</u> | 30 |
| <u>PLAN OF DISTRIBUTION</u> | 34 |
| <u>LEGAL MATTERS</u> | 37 |
| <u>EXPERTS</u> | 37 |

S-i

Table of Contents

We have not authorized anyone to provide any information other than that contained or incorporated by reference in this prospectus supplement, the accompanying prospectus and in any free writing prospectus we may provide to you in connection with this offering. We take no responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. We are not, and the underwriter is not, making an offer to sell these securities in any jurisdiction where the offer or sale is not permitted. You should assume that the information appearing in this prospectus supplement, the accompanying prospectus, the documents incorporated by reference in this prospectus supplement and the accompanying prospectus, and in any free writing prospectus we may provide to you in connection with this offering, is accurate only as of the respective dates of those documents. Our business, financial condition, results of operations and prospects may have changed since those dates. You should read this prospectus supplement, the accompanying prospectus, the documents incorporated by reference in this prospectus supplement and the accompanying prospectus, and any free writing prospectus we may provide to you in connection with this offering, in their entirety before making an investment decision. You should also read and consider the information in the documents to which we have referred you in the sections of this prospectus supplement entitled **Where You Can Find More Information** and **Information Incorporated by Reference**.

ABOUT THIS PROSPECTUS SUPPLEMENT

This document is in two parts. The first part is this prospectus supplement, which describes the terms of this offering of common stock and also adds to and updates information contained in the accompanying prospectus and the documents incorporated by reference into this prospectus supplement and the accompanying prospectus. The second part, the accompanying prospectus dated February 6, 2017, including the documents incorporated by reference therein, provides more general information. Generally, when we refer to this prospectus, we are referring to both parts of this document combined. To the extent there is a conflict between the information contained in this prospectus supplement, on the one hand, and the information contained in the accompanying prospectus or in any document incorporated by reference that was filed with the Securities and Exchange Commission, or SEC, before the date of this prospectus supplement, on the other hand, you should rely on the information in this prospectus supplement. If any statement in one of these documents is inconsistent with a statement in another document having a later date for example, a document incorporated by reference in the accompanying prospectus the statement in the document having the later date modifies or supersedes the earlier statement.

We are offering to sell, and seeking offers to buy, our securities only in jurisdictions where offers and sales are permitted. The distribution of this prospectus supplement and the offering of the securities in certain jurisdictions may be restricted by law. Persons outside the United States who come into possession of this prospectus supplement must inform themselves about, and observe any restrictions relating to, the offering of the securities and the distribution of this prospectus supplement outside the United States. This prospectus supplement does not constitute, and may not be used in connection with, an offer to sell, or a solicitation of an offer to buy, any securities offered by this prospectus supplement by any person in any jurisdiction in which it is unlawful for such person to make such an offer or solicitation.

Unless otherwise indicated, information contained in this prospectus concerning our industry and the markets in which we operate, including our general expectations and market position, market opportunity and market share, is based on information from our own management estimates and research, as well as from industry and general publications and research, surveys and studies conducted by third parties. Management estimates are derived from publicly available information, our knowledge of our industry and assumptions based on such information and knowledge, which we believe to be reasonable. Our management estimates have not been verified by any independent source, and we have not independently verified any third-party information. In addition, assumptions and estimates of our and our

industry's future performance are necessarily subject to a high degree of uncertainty and risk due to a variety of factors, including those described in Risk Factors. These

S-ii

Table of Contents

and other factors could cause our future performance to differ materially from our assumptions and estimates. See Cautionary Statement Regarding Forward-Looking Statements.

This prospectus contains summaries of certain provisions contained in some of the documents described herein, but reference is made to the actual documents for complete information. All of the summaries are qualified in their entirety by the actual documents. Copies of some of the documents referred to herein have been filed, will be filed or will be incorporated by reference as exhibits to the registration statement of which this prospectus supplement is a part, and you may obtain copies of those documents as described below under **Where You Can Find More Information**.

CAUTIONARY STATEMENT REGARDING FORWARD-LOOKING STATEMENTS

Statements in this prospectus, or incorporated by reference herein, include forward-looking statements. These forward-looking statements are based on our management's current expectations and beliefs and involve numerous risks and uncertainties that could cause actual results to differ materially from expectations. You should not rely upon these forward-looking statements as predictions of future events because we cannot assure you that the events or circumstances reflected in these statements will be achieved or will occur. You can identify forward-looking statements by the use of forward-looking terminology, including the words *believes*, *expects*, *may*, *will*, *should*, *intends*, *plans*, *estimates* or *anticipates* or the negative of these words and phrases or other variations of these words and phrases or comparable terminology. These forward-looking statements relate to, among other things, our expectations regarding our:

sales, results of operations and anticipated cash flows;

capital expenditures;

depreciation and amortization expenses;

research and development expenses;

selling, general and administrative expenses;

development and timing of the introduction of new products and technologies; and

ability to maintain and develop relationships with our existing and potential future customers and our ability to maintain the level of investment in research and development and capacity that is required to remain competitive.

Many factors could cause our actual results to differ materially from those projected in these forward-looking statements, including, but not limited to: whether we will be able to complete acquisitions and integrate such businesses successfully and achieve anticipated synergies; variability of our revenues and financial performance; risks

associated with product development and technological changes; the acceptance of our products in the marketplace by existing and potential future customers; disruption of operations or increases in expenses caused by civil or political unrest or other catastrophic events; general economic conditions and conditions in the solar and semiconductor industries in particular; the continued employment of our key personnel and risks associated with competition.

Although we believe that the expectations reflected in such forward-looking statements are reasonable, such expectations could prove to have been incorrect. Important factors that could cause actual results to differ materially from our expectations (cautionary statements) are disclosed under Item 1A. Risk Factors in our Annual Report on Form 10-K, as amended, for the fiscal year ended September 30, 2016, our Quarterly Report on Form 10-Q for the fiscal quarter ended June 30, 2017, and elsewhere in this prospectus supplement, including, without limitation, in conjunction with the forward-looking statements included in this prospectus and any documents that we file in the future with the SEC that are incorporated by reference in this prospectus. All subsequent written and oral forward-looking statements attributable to us, or persons acting on our behalf, are

S-iii

Table of Contents

expressly qualified in their entirety by the cautionary statements. These forward-looking statements should not be relied upon as representing our views as of any subsequent date, and we undertake no obligation to update forward-looking statements to reflect events or circumstances after the date they were made.

S-iv

Table of Contents

PROSPECTUS SUPPLEMENT SUMMARY

*This summary highlights certain information about us, this offering and selected information contained elsewhere in or incorporated by reference into this prospectus supplement. This summary is not complete and does not contain all of the information that you should consider before deciding whether to invest in our common stock. For a more complete understanding of our company and this offering, we encourage you to read and consider carefully the more detailed information in this prospectus supplement and the accompanying prospectus, including the financial statements and other information incorporated by reference in this prospectus supplement and the accompanying prospectus, and the information included in any free writing prospectus we may provide to you in connection with this offering, and including the information referred to under the heading **Risk Factors** in this prospectus supplement. For a more complete understanding of our shares of common stock, please refer to the section of the accompanying prospectus entitled **Description of Capital Stock** and our Articles of Incorporation, as amended, and our Amended and Restated Bylaws, as amended, copies of which have been filed with the SEC and are available upon request. See **Where You Can Find More Information**.*

*In this prospectus supplement and the accompanying prospectus, the terms **we**, **our**, **us**, **Amtech** and the **Company** refer to Amtech Systems, Inc. and its subsidiaries on a consolidated basis, unless otherwise specified.*

Our Company

We are a leading, global manufacturer of capital equipment, including thermal processing, silicon wafer handling automation, and related consumables used in fabricating solar cells, LED and semiconductor devices. Semiconductors, or semiconductor chips, are fabricated on silicon wafer substrates, sliced from ingots, and are part of the circuitry, or electronic components, of many products including solar cells, computers, telecommunications devices, automotive products, consumer goods, and industrial automation and control systems. The Company's wafer handling, thermal processing and consumable products currently address the diffusion, oxidation, and deposition steps, including atomic layer deposition used in the fabrication of solar cells, LEDs, semiconductors, microelectromechanical systems (MEMS) and the polishing of newly sliced silicon wafers.

Our major emphasis in the solar industry is the development of thermal processes, and deposition for solar cell manufacturing, which we believe, collectively, are key to driving higher cell efficiencies. The markets we serve are experiencing rapid technological advances and are, historically, cyclical. Therefore, future profitability and growth depend on our ability to develop or acquire and market profitable new technology products, and on our ability to adapt to cyclical trends.

We believe our product portfolio, developed through a track record of technological innovation as well as the successful integration of key acquisitions, reduces the cost of solar cell manufacturing by increasing solar cell efficiency, increasing throughput and increasing yields. We have been providing manufacturing solutions to the semiconductor industry for over 30 years and have leveraged our semiconductor technology and industry presence to capitalize on growth opportunities in the solar industry. Our customers use our equipment to manufacture solar cells, semiconductors, silicon wafers and MEMS, which are used in end markets such as solar power, telecommunications, consumer electronics, computers, automotive and mobile hand-held devices. Through the acquisition of BTU International, Inc. (BTU) in fiscal 2015, we expanded our thermal processing capability with the supply of solder reflow systems used for surface mount and semiconductor packaging applications in the electronics assembly market, and custom equipment for multiple industrial markets. Also in fiscal 2015, we expanded our participation in the solar market through the acquisition of a controlling interest in SoLayTec B.V. (SoLayTec), which provides Atomic Layer Deposition (ALD) systems used in high efficiency solar cells. We acquired the remaining interest in SoLayTec in July 2017. To complement our research

S-1

Table of Contents

and development efforts, we also sell our equipment to, and coordinate certain development efforts with, research institutes, universities and customers.

Our systems and equipment are sold into two primary end-markets:

Solar. We provide process equipment and related cell manufacturing equipment to many of the world's leading solar cell manufacturers.

Within process equipment, our primary focus is on our existing solar diffusion furnace and the development of next-generation diffusion furnaces, including our proprietary N-type, PECVD systems. Our N-type technology has been developed through a three-party research collaboration agreement with the Energy Research Centre of the Netherlands, or ECN, a leading solar research center in Europe and Yingli Green Energy Holding Company Limited, or Yingli, one of the world's leading vertically integrated photovoltaic (PV) product manufacturers. In 2012, we launched our PECVD system. Through our acquisition of SoLayTec, we produce, develop, and deliver and service worldwide machines for ultrafast ALD Equipment used in high efficiency solar cells.

We also offer furnace automation and wafer handling systems used within the diffusion processing step of solar cell manufacturing. Our automation equipment includes mass wafer transfer systems, sorters, long-boat transfer systems, load station elevators, buffers and conveyers, which we sell both in connection with our diffusion furnaces and on a standalone basis.

Most solar cell manufacturers sell their products to manufacturers of solar modules or solar panels. Others are vertically integrated and use their cells in the production of solar modules and panels. Solar cells are the critical component of solar modules and solar panels, which are sold to the end user and used in residential homes, industrial applications, remote pumping, lighting and heating uses and central power stations.

Although the solar market has experienced tremendous growth over the past five years, it is characterized by short-term periods of rapid capacity expansion followed by periods of rapid contraction in our customers' capital spending. When actual and expected end-user demand outstrips available capacity, this triggers the beginning of the next period of expansion.

Semiconductors. We provide diffusion equipment as well as handling, storage and automation equipment and related services to leading semiconductor manufacturers. Our products include horizontal and vertical diffusion furnaces used to produce semiconductors, silicon wafers and MEMS, as well as lapping equipment, polishing templates and wafer insert carriers, loaders and sorters.

Although the semiconductor market has experienced significant growth over the past fifteen years, it remains cyclical by nature. The market is characterized by short-term periods of under or over utilization of capacity for most semiconductors, including microprocessors, memory, power management chips and other logic devices. When capacity utilization decreases due to the addition of excess capacity, semiconductor manufacturers typically slow their purchasing of capital equipment. Conversely, when capacity utilization increases, so does capital spending.

Most semiconductor chips are built on a silicon wafer, and include multiple layers of circuitry that connect a variety of circuit components, such as transistors, capacitors and other components. To build a chip, the transistors, capacitors and other components are first created on the surface of the wafer by performing a series of processes to deposit and remove selected film layers, including insulators. Similar processes are then used to build the layers of wiring

structures on the wafer. These are all referred to as front-end processes.

As demand for increasingly sophisticated electronic devices continues; new technologies such as wireless networks, next generation cellular phones and tablets will help to drive future growth.

S-2

Table of Contents

Electronic equipment continues to become more complex, yet end users are still demanding smaller, lighter and less expensive devices. This, in turn, requires increased performance and reduced cost, size, weight and power requirements of electronic assemblies, printed circuit boards and semiconductors. In response to these developments, manufacturers are increasingly employing more sophisticated production and assembly techniques requiring more advanced manufacturing equipment, such as that supplied by BTU.

In the printed circuit board assembly process, semiconductor discrete-devices and various other components are attached to printed circuit boards. The attachment process, which creates a permanent physical and electrical bond, is called solder reflow or surface mount reflow. Manufacturers rely on high throughput and highly reliable equipment to get the maximum efficiency in their production process. Die level semiconductor packaging processes include precision thermal processing steps. Advancements in the semiconductor industry toward higher chip speeds, smaller form factors and reduced costs are driving the transition to wafer level packaging from the traditional wire bonding technique.

Recent Initiatives and Developments

SoLayTec Acquisition

On July 31, 2017, Tempress entered into an Exit Agreement (the *Agreement*) with the two minority owners of SoLayTec (*Minority Owners*) to acquire their shares of SoLayTec, resulting in Tempress becoming the sole owner of SoLayTec. The terms of the Agreement, which is effective as of July 1, 2017, state that the Minority Owners will sell all of their SoLayTec shares to Tempress for a nominal fee and waive all right to future repayment of principal and interest on loans payable to the Minority Owners. As a result of the effectiveness of the Agreement, SoLayTec will have no further liability under the loans. The principal balance of these loans at June 30, 2017 was approximately \$2.3 million, which management expects to record as a capital contribution, with no impact on the Company's consolidated statement of operations. The Company has no further obligation under these loans.

Turnkey Orders

On January 24, 2017, the Company announced that Tempress received a large turnkey order from a new solar cell manufacturer in China and, on April 25, 2017, the Company announced that Tempress received a large follow-on order for the second phase of this project from the same manufacturer. This project is designed to manufacture high efficiency n-type bi-facial solar cells and modules at an attractive cost per watt. A turnkey project is a complete solar cell manufacturing line, including equipment manufactured by third parties, and the design, delivery, installation, start-up and qualification of the entire line. As of June 30, 2017, this customer individually accounted for 53% of our backlog. While this order first began shipping in the third quarter of 2017, we expect to recognize significant revenues from this project in the future.

Financial Performance

Net revenue for the quarter ended June 30, 2017 was \$47.8 million, up 43% or \$14.4 million from \$33.3 million for the quarter ended June 30, 2016. Net revenue from the solar market for the quarter ended June 30, 2017 was \$29.0 million, up 53% or \$10.0 million from \$19.0 million for the quarter ended June 30, 2016. Net revenue from the semiconductor market for the quarter ended June 30, 2017 was \$16.0 million, up 31% or \$3.8 million from \$12.2 million for the quarter ended June 30, 2016.

Net revenue for the nine months ended June 30, 2017 was \$109.8 million, up 41% or \$31.9 million from \$77.9 million for the nine months ended June 30, 2016. Net revenue from the solar market for the nine months

S-3

Table of Contents

ended June 30, 2017 was \$57.0 million, up 49% or \$18.6 million from \$38.3 million for the nine months ended June 30, 2016. Net revenue from the semiconductor market for the nine months ended June 30, 2017 was \$45.1 million, up 35% or \$11.7 million from \$33.4 million for the nine months ended June 30, 2016.

The orders included in our backlog are generally credit approved customer purchase orders believed to be firm and are generally expected to ship within the next twelve months. Our order backlog as of June 30, 2017 and 2016 was \$125.7 million and \$63.8 million, respectively, an increase of \$61.9 million or 97%. Our backlog as of June 30, 2017 includes approximately \$98.2 million of orders and deferred revenue from our solar industry customers, compared to \$45.3 million at June 30, 2016. New orders booked in the quarter ended June 30, 2017 were \$79.9 million (\$54.2 million solar) compared to \$30.0 million (\$13.2 million solar) of customer orders in the quarter ended June 30, 2016. The backlog of business units included in the Solar segment include some sales of equipment and parts to the semiconductor, silicon wafer and MEMS industries, comprising less than 25% of the Solar segment backlog.

Corporate Information

We were incorporated in Arizona in October 1981, under the name Quartz Engineering & Materials, Inc. We changed to our present name in 1987. We conduct operations through six wholly owned subsidiaries: Tempres Systems, Inc., or Tempres, a Texas corporation with all of its operations in Vaassen, The Netherlands, acquired in 1994 and subsequently reincorporated in The Netherlands; P.R. Hoffman Machine Products, Inc., or P.R. Hoffman, an Arizona corporation based in Carlisle, Pennsylvania, acquired in July 1997; Bruce Technologies, Inc., or Bruce Technologies, a Massachusetts corporation based in North Billerica, Massachusetts, acquired in July 2004; R2D Automation SAS, or R2D, a French corporation located near Montpellier, France, acquired in October 2007; BTU International, Inc., a Delaware corporation based in North Billerica, Massachusetts, acquired in January 2015; and SoLayTec, a private company based in Eindhoven, the Netherlands, of which we acquired 100% ownership in July 2017. We also own a 15% interest in Kingstone Hong Kong, which effectively represents an 8% beneficial ownership interest in the Shanghai operating entity, Shanghai Kingstone.

Table of Contents

THE OFFERING

| | |
|---|--|
| Common stock offered by us | shares |
| Common stock to be outstanding after this offering(1) | shares |
| Over-allotment option | We have granted the underwriter a 30-day option to purchase up to additional shares of our common stock on the same terms and conditions described herein, solely to cover over-allotments, if any. |
| Use of proceeds | We intend to use the net proceeds from this offering for general corporate purposes, which may include working capital, capital expenditures and potential acquisitions. |
| Risk factors | Investing in our securities involves risks. See Risk Factors and other information included in, or incorporated by reference into, this prospectus supplement and the accompanying prospectus, including our Annual Report on Form 10-K, as amended, for the year ended September 30, 2016 and our Quarterly Report on Form 10-Q for the fiscal quarter ended June 30, 2017, for a discussion of factors you should carefully consider before deciding to invest in our shares of common stock. |
| NASDAQ Global Select Market Symbol | ASYS. |

(1) The number of shares of common stock to be outstanding after this offering is based on 13,328,656 shares outstanding as of June 30, 2017, and excludes as of that date, the following:

1,729,786 shares of common stock issuable upon the exercise of all equity awards outstanding with a weighted average exercise price of \$7.82 per share; and

792,972 shares of our common stock available as of that date for future grant or issuance pursuant to our stock plans.

Except as otherwise indicated, all information in the prospectus supplement assumes no exercise by the underwriter of its over-allotment option.

S-5

Table of Contents**SUMMARY CONSOLIDATED FINANCIAL DATA**

The information set forth below should be read in conjunction with Management's Discussion and Analysis of Financial Condition and Results of Operations, and our consolidated financial statements and related notes included in our Annual Report on Form 10-K, as amended, for the fiscal year ended September 30, 2016, which is incorporated herein by reference, and in our Quarterly Report on Form 10-Q for the fiscal quarter ended June 30, 2017, which is incorporated herein by reference.

The consolidated statements of operations data for the fiscal years ended September 30, 2014, September 30, 2015 and September 30, 2016 and balance sheet data as of September 30, 2015 and 2016 have been derived from the audited consolidated financial statements and related notes that are incorporated by reference in this prospectus supplement. The consolidated statements of operations data for the nine months ended June 30, 2016 and 2017 and the balance sheet data as of June 30, 2017 have been derived from the unaudited consolidated financial statements and related notes that are incorporated by reference in this prospectus supplement. The consolidated financial statements as of and for the nine months ended June 30, 2016 and 2017 are unaudited but include in management's opinion all adjustments, consisting only of normal, recurring adjustments, that are necessary for a fair presentation of the information presented. The results of operations for the nine months ended June 30, 2017 are not necessarily indicative of results that can be expected for the fiscal year ended September 30, 2017 or any subsequent period.

| | Years Ended September 30, | | | Nine months ended | |
|--|--|------------|------------|-------------------|------------|
| | 2014 | 2015 | 2016 | 2016 | 2017 |
| | (In thousands, except per share amounts) | | | | |
| Statement of Operations: | | | | | |
| Net revenue | \$ 56,501 | \$ 104,883 | \$ 120,308 | \$ 77,899 | \$ 109,839 |
| Cost of sales | 44,875 | 77,875 | 86,245 | 56,312 | 77,499 |
| Gross profit | 11,626 | 27,008 | 34,063 | 21,587 | 32,340 |
| Selling, general and administrative | 18,424 | 33,028 | 33,967 | 23,709 | 25,366 |
| Impairment and restructuring charges | | 583 | | | |
| Research and development | 6,291 | 6,918 | 8,004 | 6,015 | 4,586 |
| Operating income (loss) | (13,089) | (13,521) | (7,908) | (8,137) | 2,388 |
| Interest and other income (expense), net | 40 | 8,714 | 2,458 | 2,369 | (351) |
| Income (loss) before income taxes | (13,049) | (4,807) | (5,450) | (5,768) | 2,037 |
| Income tax provision (benefit) | 1,240 | 1,910 | 3,100 | 2,040 | 1,270 |
| Net income (loss) | \$ (14,289) | \$ (6,717) | \$ (8,550) | \$ (7,808) | \$ 767 |
| Earnings (loss) per share: | | | | | |
| Basic earnings (loss) per share | \$ (1.34) | \$ (0.65) | \$ (0.53) | \$ (0.51) | \$ 0.14 |
| Diluted earnings (loss) per share | \$ (1.34) | \$ (0.65) | \$ (0.53) | \$ (0.51) | \$ 0.14 |
| Order backlog | \$ 28,522 | \$ 34,589 | \$ 48,610 | \$ 63,773 | \$ 125,744 |

September 30, **June 30,**
2015 **2016** **2017**
(In thousands)

Balance Sheet Data:

| | | | |
|-------------------------------|------------|------------|------------|
| Cash and cash equivalents | \$ 25,852 | \$ 27,655 | \$ 39,160 |
| Total assets | \$ 125,456 | \$ 118,430 | \$ 148,439 |
| Total current liabilities | \$ 39,371 | \$ 38,064 | \$ 64,092 |
| Long-term obligations | \$ 13,438 | \$ 15,027 | \$ 16,252 |
| Total stockholders' equity(1) | \$ 72,834 | \$ 67,057 | \$ 70,782 |

(1) Excludes noncontrolling interest.

S-6

Table of Contents

RISK FACTORS

Investing in our common stock involves risk. Before you make a decision to invest in our common stock, you should consider carefully the risks described below, together with other information in this prospectus supplement, the accompanying prospectus and the information incorporated by reference herein and therein. If any of the following events actually occur, our business, operating results, prospects or financial condition could be materially and adversely affected. This could cause the trading price of our common stock to decline and you may lose all or part of your investment. The risks described below are not the only ones that we face. Additional risks not presently known to us or that we currently deem immaterial may also significantly impair our business operations and could result in a complete loss of your investment.

In addition to the risk factors set forth below, please see Item 1A. Risk Factors beginning on page 13 of our Annual Report on Form 10-K, as amended, for the year ended September 30, 2016, which is incorporated herein by reference, and Item 1A. Risk Factors beginning on page 24 of our Quarterly Report on Form 10-Q for the quarter ended June 30, 2017, which is incorporated herein by reference.

Risks Related to this Offering

You will experience immediate and substantial dilution in the net tangible book value per share of the common stock you purchase.

Since the public offering price per share of our common stock is substantially higher than the net tangible book value per share of our common stock, you will suffer substantial dilution in the net tangible book value of the common stock you purchase in this offering. Our net tangible book value as of June 30, 2017 was approximately \$53.2 million, or approximately \$3.99 per share. After giving effect to the sale of shares of our common stock in this offering at the public offering price of \$ per share and after deducting the underwriting discount and estimated offering expenses payable by us, if you purchase shares of our common stock in this offering, you will suffer immediate and substantial dilution of \$ per share in the net tangible book value of the common stock you acquire. See the section titled Dilution below for a more detailed discussion of the dilution you would incur if you purchase shares of our common stock in this offering.

In addition, we have a significant number of stock options outstanding. To the extent that outstanding stock options have been or may be exercised or other shares issued, you may experience further dilution.

Our management will have broad discretion in the use of the net proceeds we receive in this offering and might not apply the proceeds in ways that increase the value of your investment.

Our management will have broad discretion over the use of our net proceeds from this offering, and you will be relying on the judgment of our management regarding the application of these proceeds. Our management might not apply our net proceeds in ways that ultimately increase the value of your investment and we might not be able to yield a significant return, if any, on any investment of these net proceeds. Our failure to apply these funds effectively could have a material adverse effect on our business, delay the development of our products and cause the price of our common stock to decline.

There may be future sales or other dilution of our equity, which may adversely affect the market price of our common stock.

Except as described under Underwriting, we are not restricted from issuing additional shares of our common stock, including any securities that are convertible into or exchangeable for, or that represent the right to receive, our common stock. The market price of our common stock could decline as a result of sales of shares of our common stock or sales of such other securities made after this offering or the perception that such sales could occur.

S-7

Table of Contents

The market price of our common stock may be adversely affected by market conditions affecting the stock markets in general, including price and trading fluctuations on the NASDAQ Global Select Market.

Market conditions may result in volatility in the level of, and fluctuations in, the market prices of stocks generally and, in turn, our common stock and sales of substantial amounts of our common stock in the market, in each case being unrelated or disproportionate to changes in our operating performance. The overall weakness in the economy has recently contributed to the extreme volatility of the markets which may have an affect on the market price of our common stock.

Sales of a significant number of shares of our common stock in the public markets, or the perception of such sales, could depress the market price of our common stock.

Sales of a substantial number of shares of our common stock in the public markets and the availability of those shares for sale could adversely affect the market price of our common stock. In addition, future issuances of equity securities, including pursuant to outstanding options, could dilute the interests of our existing shareholders, including you, and could cause the market price of our common stock to decline. We may issue such additional equity or convertible securities to raise additional capital. The issuance of any additional shares of common or preferred stock or convertible securities could be substantially dilutive to shareholders of our common stock. Moreover, to the extent that we issue restricted stock units, phantom shares, stock appreciation rights, options or warrants to purchase our common stock in the future and those stock appreciation rights, options or warrants are exercised or as the restricted stock units vest, our shareholders may experience further dilution. Holders of our shares of common stock have no preemptive rights that entitle holders to purchase their pro rata share of any offering of shares of common stock and, therefore, such sales or offerings could result in increased dilution to our shareholders. We cannot predict the effect that future sales of our common stock would have on the market price of our common stock.

We have not paid cash dividends to our shareholders and currently have no plans to pay future cash dividends.

We plan to retain earnings to finance future growth and have no current plans to pay cash dividends to shareholders. Because we have not paid cash dividends, holders of our securities will experience a gain on their investment in our securities only in the case of an appreciation of value of our securities. You should neither expect to receive dividend income from investing in our common stock nor an appreciation in value.

Table of Contents

USE OF PROCEEDS

We estimate the net proceeds from the sale of common stock by us in this offering will be approximately \$ million (or approximately \$ million if the underwriter's over-allotment option is exercised in full). We intend to use the net proceeds from this offering for general corporate purposes, which may include working capital, capital expenditures and potential acquisitions. We have not yet determined the amount of net proceeds to be used specifically for any particular purposes or the timing of these expenditures. Accordingly, our management will have significant discretion and flexibility in applying the net proceeds from this offering.

S-9

Table of Contents**CAPITALIZATION**

The following table sets forth our cash and cash equivalents and capitalization as of June 30, 2017:

On an actual basis; and

On an as adjusted to give effect to the sale of _____ shares of common stock in this offering at the public offering price of \$ _____ per share, after deducting the underwriting discount and estimated offering expenses payable by us.

The following table should be read in conjunction with Summary Consolidated Financial Information included elsewhere in this prospectus supplement and our consolidated financial statements and related notes which are incorporated by reference into this prospectus supplement.

| | As of June 30, 2017 | |
|---|----------------------------|--------------------|
| | Actual | As Adjusted |
| | (unaudited) | (unaudited) |
| | (In thousands) | |
| Cash and cash equivalents | \$ 39,160 | \$ |
| Long-term debt | 10,549 | |
| Stockholders' Equity | | |
| Preferred stock: 100,000,000 shares authorized; none issued | | |
| Common stock, \$0.01 par value: 100,000,000 shares authorized; 13,328,656 shares (actual) and _____ shares (as adjusted) issued and outstanding | 133 | |
| Additional paid-in capital | 113,501 | |
| Accumulated other comprehensive loss | (8,834) | |
| Retained deficit | (34,018) | |
| Total Amtech Systems, Inc. stockholders' equity | \$ 70,782 | |
| Noncontrolling interest | (2,687) | |
| Total Equity | \$ 68,095 | |
| Capitalization | \$ 148,439 | |

Table of Contents**DILUTION**

If you purchase shares of our common stock in this offering, you will experience dilution to the extent of the difference between the price per share you pay in this offering and the net tangible book value per share of our common stock immediately after this offering. Our net tangible book value as of June 30, 2017 was approximately \$53.2 million, or approximately \$3.99 per share. Net tangible book value per share represents total tangible assets less total liabilities, divided by the number of shares of common stock outstanding. After giving effect to the sale by us of _____ shares of our common stock in this offering at a public offering price of \$ _____ per share and after deducting the underwriting discount and estimated offering expenses payable by us, our as adjusted net tangible book value as of June 30, 2017 would have been approximately \$ _____ million, or approximately \$ _____ per share. This represents an immediate increase in net tangible book value of approximately \$ _____ per share to existing shareholders and an immediate dilution in net tangible book value of approximately \$ _____ per share to investors purchasing shares of common stock in this offering. The following table illustrates this per share dilution:

| | |
|---|----|
| Public offering price per share | \$ |
| Net tangible book value per share as of June 30, 2017 | \$ |
| Increase per share attributable to new investors in this offering | \$ |

As adjusted net tangible book value per share as of June 30, 2017 after giving effect to this offering

\$

Dilution per share to new investors in this offering

\$

The number of shares of common stock outstanding in the table and calculations above is based on 13,328,656 shares outstanding as of June 30, 2017 and excludes, as of that date, the following:

1,729,786 shares of common stock issuable upon the exercise of all equity awards outstanding with a weighted average exercise price of \$7.82 per share; and

792,972 shares of our common stock available as of that date for future grant or issuance pursuant to our stock plans.

If the underwriter exercises its over-allotment option in full, the adjusted net tangible book value after this offering would increase to approximately \$ _____ per share, and there would be an immediate dilution of approximately \$ _____ per share to new investors.

To the extent that outstanding options or warrants with an exercise price per share that is less than the as adjusted net tangible book value per share are exercised, new investors will experience further dilution.

In addition, we may choose to raise additional capital due to market conditions or strategic considerations even if we believe we have sufficient funds for our current or future operating plans. To the extent that we raise additional capital through the sale of equity or convertible debt securities, the issuance of these securities could result in further dilution to our stockholders.

S-11

Table of Contents**PRICE RANGE OF COMMON STOCK**

Our shares of common stock are listed on the NASDAQ Global Select Market under the symbol ASYS. The following table sets forth, for the fiscal periods indicated, the reported high and low sale price at which the shares of our common stock traded as reported by the NASDAQ Global Select Market.

| | High | Low |
|--|-------------|------------|
| Year ended September 30, 2015 | | |
| First Quarter | \$ 11.15 | \$ 7.52 |
| Second Quarter | 12.59 | 7.96 |
| Third Quarter | 12.93 | 9.84 |
| Fourth Quarter | 11.11 | 4.27 |
| Year ended September 30, 2016 | | |
| First Quarter | \$ 8.40 | \$ 4.12 |
| Second Quarter | 7.83 | 4.41 |
| Third Quarter | 7.14 | 5.53 |
| Fourth Quarter | 6.52 | 4.75 |
| Year ended September 30, 2017 | | |
| First Quarter | \$ 5.71 | \$ 4.00 |
| Second Quarter | 6.69 | 3.99 |
| Third Quarter | 9.19 | 5.17 |
| Fourth Quarter (through August 16, 2017) | 11.82 | 8.13 |

On August 16, 2017, the last reported sale price of our common stock on the NASDAQ Global Select Market was \$10.65 per share. As of August 16, 2017, there were approximately 477 holders of our common stock.

Table of Contents

DIVIDEND POLICY

We have never paid dividends on our common stock. Our present policy is to apply cash to investment in product development, acquisition or expansion; consequently, we do not expect to pay dividends on common stock in the foreseeable future.

S-13

Table of Contents

MATERIAL U.S. FEDERAL INCOME TAX AND ESTATE TAX CONSEQUENCES FOR NON-U.S. HOLDERS

The following is a summary of certain material United States federal income and estate tax consequences of the purchase, ownership and disposition of our common stock as of the date hereof. This summary is limited to non-U.S. holders that purchase our common stock issued pursuant to this offering and deals only with such common stock that is held as a capital asset by such a non-U.S. holder.

A non-U.S. holder means a person (other than a partnership) that is not, for United States federal income tax purposes any of the following:

an individual citizen or resident of the United States;

a corporation (or any other entity treated as a corporation for United States federal income tax purposes) created or organized in or under the laws of the United States, any state thereof or the District of Columbia;

an estate whose income is subject to United States federal income taxation regardless of its source; or

a trust if it (1) is subject to the primary supervision of a court within the United States and one or more United States persons have the authority to control all substantial decisions of the trust or (2) has a valid election in effect under applicable United States Treasury regulations to be treated as a United States person.

This summary is based upon provisions of the Internal Revenue Code of 1986, as amended, or the Code, and regulations, rulings and judicial decisions as of the date hereof. Those authorities may be changed, perhaps retroactively, so as to result in United States federal income and estate tax consequences different from those summarized below. This summary does not address all aspects of United States federal income and estate taxes and does not deal with foreign, state, local or other tax considerations that may be relevant to non-U.S. holders in light of their personal circumstances. In addition, it does not represent a detailed description of the United States federal income tax consequences applicable to you if you are subject to special treatment under the United States federal income tax laws (including, without limitation, if you are a United States expatriate, controlled foreign corporation, passive foreign investment company or a partnership or other pass-through entity for United States federal income tax purposes). A change in law could alter significantly the tax considerations that we describe in this summary.

If a partnership (including an entity or arrangement treated as a partnership for United States federal income tax purposes) holds our common stock, the tax treatment of a partner will generally depend upon the status of the partner and the activities of the partnership. If you are a partner of a partnership holding our common stock, you should consult your tax advisors.

If you are considering the purchase of our common stock, you should consult your tax advisors concerning the particular United States federal income and estate tax consequences to you of the ownership of the common stock, as well as the consequences to you arising under the laws of any other taxing jurisdiction.

Dividends

Distributions on our common stock will constitute dividends for United States federal income tax purposes to the extent paid from our current or accumulated earnings and profits, as determined under United States federal income tax principles. To the extent those distributions exceed both our current and our accumulated earnings and profits, they will constitute a return of capital and will first reduce your adjusted basis in our common stock, but not below zero, and then will be treated as gain from the sale of the stock as discussed below under Gain on Disposition of Common Stock.

S-14

Table of Contents

Dividends paid to a non-U.S. holder of our common stock generally will be subject to withholding of United States federal income tax at a 30% rate or such lower rate as may be specified by an applicable income tax treaty. However, dividends that are effectively connected with the conduct of a trade or business by the non-U.S. holder within the United States (and, if required by an applicable income tax treaty, are attributable to a United States permanent establishment of the non-U.S. holder), are not subject to the withholding tax, provided certain certification and disclosure requirements are satisfied, including completing and providing us with Internal Revenue Service Form W-8ECI. Instead, such dividends are subject to United States federal income tax on a net income basis in the same manner as if the non-U.S. holder were a United States person as defined under the Code. Any such effectively connected dividends received by a foreign corporation may be subject to an additional branch profits tax at a 30% rate or such lower rate as may be specified by an applicable income tax treaty.

A non-U.S. holder of our common stock who wishes to claim the benefit of an applicable treaty rate and avoid backup withholding, as discussed below, for dividends will be required (a) to complete Internal Revenue Service Form W-8BEN (or other applicable form) and certify under penalty of perjury that such holder is not a United States person as defined under the Code and is eligible for treaty benefits or (b) if our common stock is held through certain foreign intermediaries, to satisfy the relevant certification requirements of applicable United States Treasury regulations. Special certification and other requirements apply to certain non-U.S. holders that are pass-through entities rather than corporations or individuals.

A non-U.S. holder of our common stock eligible for a reduced rate of United States withholding tax pursuant to an income tax treaty may obtain a refund of any excess amounts withheld by filing an appropriate claim for refund with the Internal Revenue Service.

Gain on Disposition of Common Stock

Any gain realized on the sale or other taxable disposition of our common stock generally will not be subject to United States federal income tax unless:

the gain is effectively connected with a trade or business of the non-U.S. holder in the United States (and, if required by an applicable income tax treaty, is attributable to a United States permanent establishment of the non-U.S. holder);

the non-U.S. holder is an individual who is present in the United States for 183 days or more in the taxable year of that disposition and certain other conditions are met; or

we are or have been a United States real property holding corporation, orUSRPH, for United States federal income tax purposes at any time within the shorter of the five-year period preceding such disposition and the period during which the non-U.S. holder held our common stock.

An individual non-U.S. holder described in the first bullet point above will be subject to tax on the net gain derived from the disposition under regular graduated United States federal income tax rates. An individual non-U.S. holder described in the second bullet point above will be subject to a flat 30% tax on the gain derived from the disposition, which may be offset by United States source capital losses, even though the individual is not considered a resident of the United States. If a non-U.S. holder that is a foreign corporation falls under the first bullet point above, it will be subject to tax on its net gain in the same manner as if it were a United States person as defined under the Code and, in

addition, may be subject to the branch profits tax equal to 30% of its effectively connected earnings and profits or at such lower rate as may be specified by an applicable income tax treaty.

We believe we are not and do not anticipate becoming a USRPHC. However, because the determination of whether we are a USRPHC depends on the fair market value of our United States real property relative to the fair market value of our other business assets, there can be no assurance that we will not become a USRPHC in the

S-15

Table of Contents

future. Even if we become a USRPHC, however, as long as our common stock is regularly traded on an established securities market, such common stock will be treated as United States real property interests only if you actually or constructively hold more than 5% of such regularly traded common stock.

Federal Estate Tax

Common stock held by an individual non-U.S. holder at the time of death will be included in such holder's gross estate for United States federal estate tax purposes, unless an applicable estate tax treaty provides otherwise.

Information Reporting and Backup Withholding

We must report annually to the Internal Revenue Service and to each non-U.S. holder the amount of dividends paid to such holder and the tax withheld with respect to such dividends, regardless of whether withholding was required. Copies of the information returns reporting such dividends and withholding may also be made available to the tax authorities in the country in which the non-U.S. holder resides under the provisions of an applicable income tax or exchange of information treaty.

A non-U.S. holder will be subject to backup withholding (currently at a rate of 28%) for dividends paid to such holder unless such holder certifies under penalty of perjury that it is a non-U.S. holder (and the payor does not have actual knowledge or reason to know that such holder is a United States person as defined under the Code), or such holder otherwise establishes an exemption.

Information reporting and, depending on the circumstances, backup withholding will apply to the proceeds of a sale of our common stock within the United States or conducted through certain United States-related financial intermediaries, unless the beneficial owner certifies under penalty of perjury that it is a non-U.S. holder (and the payor does not have actual knowledge or reason to know that the beneficial owner is a United States person as defined under the Code), or such owner otherwise establishes an exemption.

Any amounts withheld under the backup withholding rules may be allowed as a refund or a credit against a non-U.S. holder's United States federal income tax liability provided the required information is furnished to the Internal Revenue Service in a timely manner.

Foreign Account Tax Compliance

Recently enacted legislation generally imposes a withholding tax of 30% on dividends and the gross proceeds of a disposition of common stock paid to a foreign financial institution, unless such institution enters into an agreement with the United States government to collect and provide to the United States tax authorities substantial information regarding certain United States account holders of such institution (which would include certain account holders that are foreign entities with United States owners). The legislation also generally imposes a withholding tax of 30% on dividend income and the gross proceeds of a disposition of common stock paid to a non-financial foreign entity unless such entity provides the withholding agent with certain certification or information relating to United States ownership of the entity. Under certain circumstances, such foreign persons might be eligible for refunds or credits of such taxes. These rules generally would apply to payments made after December 31, 2018. Non-U.S. holders are encouraged to consult with their tax advisors regarding the possible implications of this legislation with respect to an investment in the common stock.

Table of Contents**UNDERWRITING**

We have entered into an underwriting agreement with Roth Capital Partners, LLC with respect to the shares of common stock subject to this offering. Subject to certain conditions, we have agreed to sell to the underwriter, and the underwriter has agreed to purchase, the number of shares of common stock provided below opposite its name.

| Underwriter | Number of Shares |
|----------------------------|-------------------------|
| Roth Capital Partners, LLC | |
| Total | |

The underwriter is offering the shares of common stock subject to its acceptance of the shares of common stock from us and subject to prior sale. The underwriting agreement provides that the obligation of the underwriter to pay for and accept delivery of the shares of common stock offered by this prospectus supplement and the accompanying prospectus is subject to the approval of certain legal matters by its counsel and to certain other conditions. The underwriter is obligated to take and pay for all of the shares of common stock if any such shares are taken. However, the underwriter is not required to take or pay for the shares of common stock covered by the underwriter's over-allotment option described below.

Over-Allotment Option

We have granted the underwriter an option, exercisable for 30 days from the date of this prospectus supplement, to purchase up to an aggregate of additional shares of common stock to cover over-allotments, if any, at the public offering price set forth on the cover page of this prospectus supplement, less the underwriting discount. The underwriter may exercise this option solely for the purpose of covering over-allotments, if any, made in connection with the offering of the shares of common stock offered by this prospectus supplement and the accompanying prospectus. If the underwriter exercises this option, the underwriter will be obligated, subject to certain conditions, to purchase the additional shares for which the option has been exercised.

Discount, Commissions and Expenses

The underwriter has advised us that they propose to offer the shares of common stock to the public at the public offering price set forth on the cover page of this prospectus supplement and to certain dealers at that price less a concession not in excess of \$ per share. The underwriter may allow, and certain dealers may reallow, a discount from the concession not in excess of \$ per share to certain brokers and dealers. After this offering, the public offering price, concession and reallowance to dealers may be changed by the underwriter. No such change will change the amount of proceeds to be received by us as set forth on the cover page of this prospectus supplement. The shares of common stock are offered by the underwriter as stated herein, subject to receipt and acceptance by it and subject to its right to reject any order in whole or in part. The underwriter has informed us that it does not intend to confirm sales to any accounts over which it exercises discretionary authority.

The following table shows the underwriting discount payable to the underwriter by us in connection with this offering. Such amounts are shown assuming both no exercise and full exercise of the underwriter's over-allotment option to purchase additional shares.

Per share

| | | Total Without Exercise of Over- Allotment Option | Total With Exercise of Over- Allotment Option |
|-----------------------|----|---|--|
| Public offering price | \$ | \$ | \$ |
| Underwriting discount | \$ | \$ | \$ |

We have agreed to reimburse the underwriter for certain out-of-pocket expenses, including the fees and disbursements of its counsel, up to an aggregate of \$75,000. We estimate that the total expenses payable by us in

S-17

Table of Contents

connection with this offering, other than the underwriting discount referred to above, will be approximately \$.

Indemnification

We have agreed to indemnify the underwriter against certain liabilities, including liabilities under the Securities Act of 1933, as amended, or the Securities Act, and liabilities arising from breaches of representations and warranties contained in the underwriting agreement, or to contribute to payments that the underwriter may be required to make in respect of those liabilities.

Lock-up Agreements

We and our officers and directors have agreed, subject to limited exceptions, for a period of 90 days after the date of the underwriting agreement, not to offer, sell, contract to sell, pledge, grant any option to purchase, make any short sale or otherwise dispose of, directly or indirectly any shares of common stock or any securities convertible into or exchangeable for our common stock either owned as of the date of the underwriting agreement or thereafter acquired without the prior written consent of the underwriter. The underwriter may, in its sole discretion and at any time or from time to time before the termination of the lock-up period, without notice, release all or any portion of the securities subject to lock-up agreements.

Price Stabilization, Short Positions and Penalty Bids

In connection with the offering the underwriter may engage in stabilizing transactions, over-allotment transactions, syndicate covering transactions and penalty bids in accordance with Regulation M under the Securities Exchange Act of 1934, as amended (the Exchange Act):

Stabilizing transactions permit bids to purchase the underlying security so long as the stabilizing bids do not exceed a specified maximum.

Over-allotment involves sales by the underwriter of shares in excess of the number of shares the underwriter is obligated to purchase, which creates a syndicate short position. The short position may be either a covered short position or a naked short position. In a covered short position, the number of shares over-allotted by the underwriter is not greater than the number of shares that it may purchase in the over-allotment option. In a naked short position, the number of shares involved is greater than the number of shares in the over-allotment option. The underwriter may close out any covered short position by either exercising its over-allotment option and/or purchasing shares in the open market.

Syndicate covering transactions involve purchases of shares of the common stock in the open market after the distribution has been completed in order to cover syndicate short positions. In determining the source of shares to close out the short position, the underwriter will consider, among other things, the price of shares available for purchase in the open market as compared to the price at which it may purchase shares through the over-allotment option. If the underwriter sells more shares than could be covered by the over-allotment option, a naked short position, the position can only be closed out by buying shares in the open market. A naked short position is more likely to be created if the underwriter is concerned that there could be downward pressure on the price of the shares in the open market after pricing that could adversely affect

investors who purchase in the offering.

Penalty bids permit the underwriter to reclaim a selling concession from a syndicate member when the common stock originally sold by the syndicate member is purchased in a stabilizing or syndicate covering transaction to cover syndicate short positions.

These stabilizing transactions, syndicate covering transactions and penalty bids may have the effect of raising or maintaining the market price of our common stock or preventing or retarding a decline in the market price of the common stock. As a result, the price of our common stock may be higher than the price that might

S-18

Table of Contents

otherwise exist in the open market. Neither we nor the underwriter makes any representation or prediction as to the direction or magnitude of any effect that the transactions described above may have on the price of the common stock. In addition, neither we nor the underwriter make any representations that the underwriter will engage in these stabilizing transactions or that any transaction, once commenced, will not be discontinued without notice.

Passive Market Making

In connection with this offering, the underwriter and any selling group members may engage in passive market making transactions in our common stock on The NASDAQ Stock Market in accordance with Rule 103 of Regulation M under the Exchange Act, during a period before the commencement of offers or sales of common stock and extending through the completion of the distribution. A passive market maker must display its bid at a price not in excess of the highest independent bid of that security. However, if all independent bids are lowered below the passive market maker's bid, that bid must then be lowered when specified purchase limits are exceeded.

Listing and Transfer Agent

Our common stock is listed on the NASDAQ Global Select Market and trades under the symbol ASYS. The transfer agent of our common stock is Computershare Trust Company, N.A.

Electronic Distribution

This prospectus supplement and the accompanying prospectus in electronic format may be made available on websites or through other online services maintained by the underwriter, or by its affiliates. Other than this prospectus supplement and the accompanying prospectus in electronic format, the information on the underwriter's website and any information contained in any other website maintained by the underwriter is not part of this prospectus supplement, the accompanying prospectus or the registration statement of which this prospectus supplement and the accompanying prospectus forms a part, has not been approved and/or endorsed by us or the underwriter in its capacity as underwriter, and should not be relied upon by investors.

Other

From time to time, the underwriter and/or its affiliates have provided, and may in the future provide, various investment banking and other financial services for us for which services they have received and, may in the future receive, customary fees. In the course of their businesses, the underwriter and its affiliates may actively trade our securities or loans for their own account or for the accounts of customers, and, accordingly, the underwriter and its affiliates may at any time hold long or short positions in such securities or loans. Except for services provided in connection with this offering, the underwriter has not provided any investment banking or other financial services to us during the 180-day period preceding the date of this prospectus supplement and we do not expect to retain the underwriter to perform any investment banking or other financial services for at least 90 days after the date of this prospectus supplement.

Table of Contents

NOTICE TO INVESTORS

Notice to Investors in the United Kingdom

In relation to each Member State of the European Economic Area which has implemented the Prospectus Directive, each a Relevant Member State, an offer to the public of any securities which are the subject of the offering contemplated by this prospectus may not be made in that Relevant Member State except that an offer to the public in that Relevant Member State of any such securities may be made at any time under the following exemptions under the Prospectus Directive, if they have been implemented in that Relevant Member State:

to legal entities which are authorized or regulated to operate in the financial markets or, if not so authorized or regulated, whose corporate purpose is solely to invest in securities;

to any legal entity which has two or more of (1) an average of at least 250 employees during the last financial year; (2) a total balance sheet of more than 43,000,000 and (3) an annual net turnover of more than 50,000,000, as shown in its last annual or consolidated accounts;

by the underwriter to fewer than 100 natural or legal persons (other than qualified investors as defined in the Prospectus Directive); or

in any other circumstances falling within Article 3(2) of the Prospectus Directive, provided that no such offer of these securities shall result in a requirement for the publication by the issuer or the underwriter of a prospectus pursuant to Article 3 of the Prospectus Directive.

For the purposes of this provision, the expression an offer to the public in relation to any of the securities in any Relevant Member State means the communication in any form and by any means of sufficient information on the terms of the offer and any such securities to be offered so as to enable an investor to decide to purchase any such securities, as the same may be varied in that Member State by any measure implementing the Prospectus Directive in that Member State and the expression Prospectus Directive means Directive 2003/71/EC and includes any relevant implementing measure in each Relevant Member State.

The underwriter has represented, warranted and agreed that:

it has only communicated or caused to be communicated and will only communicate or cause to be communicated any invitation or inducement to engage in investment activity (within the meaning of section 21 of the Financial Services and Markets Act 2000 (the FSMA)) received by it in connection with the issue or sale of any of the securities in circumstances in which section 21(1) of the FSMA does not apply to the issuer; and

it has complied with and will comply with all applicable provisions of the FSMA with respect to anything done by it in relation to the securities in, from or otherwise involving the United Kingdom.

European Economic Area

In particular, this document does not constitute an approved prospectus in accordance with European Commission's Regulation on Prospectuses no. 809/2004 and no such prospectus is to be prepared and approved in connection with this offering. Accordingly, in relation to each Member State of the European Economic Area which has implemented the Prospectus Directive (being the Directive of the European Parliament and of the Council 2003/71/EC and including any relevant implementing measure in each Relevant Member State) (each, a Relevant Member State), with effect from and including the date on which the Prospectus Directive is implemented in that Relevant Member State (the Relevant Implementation Date) an offer of securities to the public may not be made in that Relevant Member State prior to the publication of a prospectus in relation to such securities which has been approved by the competent authority in that Relevant Member State or, where appropriate, approved in another Relevant Member State and notified to the competent authority in that Relevant Member State, all in accordance with the Prospectus Directive, except that it may, with effect from and including

S-20

Table of Contents

the Relevant Implementation Date, make an offer of securities to the public in that Relevant Member State at any time:

to legal entities which are authorized or regulated to operate in the financial markets or, if not so authorized or regulated, whose corporate purpose is solely to invest in securities;

to any legal entity which has two or more of (1) an average of at least 250 employees during the last financial year; (2) a total balance sheet of more than 43,000,000; and (3) an annual net turnover of more than 50,000,000, as shown in the last annual or consolidated accounts; or

in any other circumstances which do not require the publication by the Issuer of a prospectus pursuant to Article 3 of the Prospectus Directive.

For the purposes of this provision, the expression an offer of securities to the public in relation to any of the securities in any Relevant Member State means the communication in any form and by any means of sufficient information on the terms of the offer and the securities to be offered so as to enable an investor to decide to purchase or subscribe for the securities, as the same may be varied in that Member State by any measure implementing the Prospectus Directive in that Member State. For these purposes the shares offered hereby are securities.

Table of Contents

LEGAL MATTERS

The validity of the common stock offered by this prospectus supplement and the accompanying prospectus will be passed upon for us by Squire Patton Boggs (US) LLP, Phoenix, Arizona. Lowenstein Sandler LLP, New York, New York, is acting as counsel for the underwriter in connection with this offering.

EXPERTS

The consolidated financial statements of Amtech Systems, Inc. and subsidiaries for the three fiscal years ended September 30, 2014, September 30, 2015 and September 30, 2016 have been incorporated by reference herein and in the registration statement in reliance upon the reports of Mayer Hoffman McCann P.C., an independent registered public accounting firm, and such consolidated financial statements have been so incorporated by reference herein in reliance upon the report of such firm given upon their authority as experts in accounting and auditing.

WHERE YOU CAN FIND MORE INFORMATION

This prospectus supplement and the accompanying prospectus are part of the registration statement on Form S-3 we filed with the SEC under the Securities Act and do not contain all the information set forth in the registration statement. Whenever a reference is made in this prospectus supplement or the accompanying prospectus to any of our contracts, agreements or other documents, the reference may not be complete and you should refer to the exhibits that are a part of the registration statement or the exhibits to the reports or other documents incorporated by reference in this prospectus supplement and the accompanying prospectus for a copy of such contract, agreement or other document. Because we are subject to the information and reporting requirements of the Exchange Act we file annual, quarterly and current reports, proxy statements and other information with the SEC. Our SEC filings are available to the public 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 operation of the Public Reference Room.

INFORMATION INCORPORATED BY REFERENCE

We are incorporating by reference certain documents we file with the SEC, which means that we can disclose important information to you by referring you to those documents. The information in the documents incorporated by reference is considered to be part of this prospectus supplement. Statements contained in documents that we file with the SEC and that are incorporated by reference in this prospectus supplement will automatically update and supersede information contained in this prospectus supplement, including information in previously filed documents or reports that have been incorporated by reference in this prospectus supplement, to the extent the new information differs from or is inconsistent with the old information.

We have filed the following documents with the SEC and they are incorporated herein by reference as of their respective dates of filing:

Our Annual Report on Form 10-K for the fiscal year ended September 30, 2016, as filed with the SEC on November 30, 2016, and as amended on Form 10-K/A, as filed with the SEC on December 2, 2016.

Our Quarterly Report on Form 10-Q for the quarterly period ended December 31, 2016, as filed with the SEC on February 9, 2017, the Form 10-Q for the quarterly period ended March 31, 2017, as filed with the SEC on May 10, 2017, and the Form 10-Q for the quarterly period ended June 30, 2017, as filed with the SEC on August 9, 2017.

S-22

Table of Contents

Our definitive Proxy Statement filed in connection with the Annual Meeting of Stockholders held on March 16, 2017, as filed with the SEC on January 27, 2017.

Our Current Reports on Form 8-K, as filed with the SEC on November 16, 2016 and March 20, 2017.

The description of our preferred stock purchase rights contained in our Current Reports on Form 8-K, as filed with the SEC on December 15, 2008 and October 10, 2015.

The description of our common stock contained in the Registration Statement on Form 8-A filed December 15, 1994 with the SEC, including any amendments or reports filed for the purpose of updating such description.

We also incorporate by reference all documents that we file with the SEC pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act on or after the effective date of the registration statement to which this prospectus supplement forms a part and prior to the sale of all shares of common stock to which this prospectus supplement relates or the termination of the registration statement to which this prospectus supplement forms a part. Nothing in this prospectus supplement shall be deemed to incorporate information furnished but not filed with the SEC.

Any statement contained in a document incorporated by reference into this prospectus supplement shall be deemed to be modified or superseded for purposes of this prospectus supplement to the extent that a statement contained in this prospectus supplement or in any subsequently filed document which is also incorporated in this prospectus supplement modifies or replaces such statement. Any statements so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this prospectus supplement.

You may request a copy of these documents, which will be provided to you at no cost, by writing or telephoning us at:

Amtech Systems, Inc.

131 South Clark Drive

Tempe, Arizona 85281

(480) 967-5146

S-23

Table of Contents

PROSPECTUS

Amtech Systems, Inc.

\$50,000,000

Common Stock

Preferred Stock

Debt Securities

Warrants

Units

We may, from time to time, offer and sell any combination of securities described in this prospectus, either separately or in one or more series or offerings and on terms that we will determine at the time of the offering, and we may continue to sell our securities in other lawful ways. The aggregate initial offering price of all securities sold pursuant to this prospectus will not exceed \$50,000,000, or such lesser amount as we may be permitted at the time of a particular offering to sell under General instruction I.B.6 of Form S-3.

We will provide specific terms of any securities that we actually offer for sale in supplements to this prospectus. Any prospectus supplement may also add, update or change information contained in this prospectus. The names of any underwriters, dealers or agents involved in the sale of our securities and their compensation will be described in the applicable prospectus supplement. The net proceeds we expect to receive from such sales will be set forth in such prospectus supplement.

This prospectus may not be used to sell securities unless accompanied by a prospectus supplement. You should carefully read this prospectus and the applicable prospectus supplement as well as the documents incorporated or deemed to be incorporated by reference in this prospectus before you purchase any of the securities offered hereby. This prospectus also covers common stock or preferred stock issuable upon exercise, conversion or exchange of warrants, rights and/or debt securities.

Our common stock has a par value \$0.01 per share, and we are authorized to issue 100,000,000 shares of our Common Stock. Our common stock is traded on the NASDAQ Stock Market under the symbol **ASYS**. On January 31, 2017, there were 13,179,535 shares of our common stock issued and outstanding in total, our non-affiliates held 10,249,590 of those shares, the closing price of our common stock on NASDAQ was \$5.40 per share, the aggregate market value those total outstanding shares was \$71,169,489, and the aggregate market value of the outstanding shares of our common stock then held by our non-affiliates was \$55,347,786. We have not offered any securities pursuant to General Instruction I.B.6 of Form S-3 during the 12 calendar months prior to and including the date hereof.

Our principal offices are located at 131 South Clark Drive, Tempe, Arizona 85281 and our telephone number is (480) 967-5146.

INVESTING IN OUR SECURITIES INVOLVES RISKS. YOU SHOULD CAREFULLY CONSIDER THE RISKS THAT WE HAVE DESCRIBED IN THIS PROSPECTUS AND IN THE ACCOMPANYING PROSPECTUS SUPPLEMENT BEFORE YOU INVEST. SEE RISK FACTORS ON PAGE 4.

You should rely only on the information contained or expressly incorporated by reference in this prospectus, including each applicable prospectus supplement and incorporated report or other filing by us with the SEC. No one is authorized to provide you with any different or inconsistent information. If they do, you should not rely on it. You cannot assume that any information in this prospectus would be accurate for other than the specified dates and periods, since the corresponding information for later dates and periods may be materially different.

This prospectus is not an offer to sell these securities, and is not soliciting an offer to buy these securities, in any state where the offer or sale of these securities is not permitted.

Neither the Securities and Exchange Commission nor any state securities commission or regulatory body has approved or disapproved of these securities or passed upon the adequacy or accuracy of this prospectus. Any representation to the contrary is a criminal offense.

The date of this prospectus is February 6, 2017.

Table of Contents

TABLE OF CONTENTS

| | Page No. |
|--|-----------------|
| <u>ABOUT THIS PROSPECTUS</u> | 1 |
| <u>PROSPECTUS SUMMARY</u> | 2 |
| <u>RISK FACTORS</u> | 4 |
| <u>WHERE YOU CAN FIND MORE INFORMATION</u> | 5 |
| <u>FORWARD-LOOKING STATEMENTS</u> | 5 |
| <u>INCORPORATION OF CERTAIN INFORMATION BY REFERENCE</u> | 6 |
| <u>PROSPECTUS SUPPLEMENTS</u> | 7 |
| <u>USE OF PROCEEDS</u> | 7 |
| <u>SECURITIES WE MAY OFFER</u> | 7 |
| <u>DESCRIPTION OF COMMON AND PREFERRED STOCK</u> | 8 |
| <u>DESCRIPTION OF DEBT SECURITIES</u> | 14 |
| <u>DESCRIPTION OF WARRANTS</u> | 25 |
| <u>DESCRIPTION OF UNITS</u> | 28 |
| <u>LEGAL OWNERSHIP OF SECURITIES</u> | 30 |
| <u>BOOK-ENTRY HOLDERS</u> | 30 |
| <u>PLAN OF DISTRIBUTION</u> | 34 |
| <u>LEGAL MATTERS</u> | 37 |
| <u>EXPERTS</u> | 37 |

Table of Contents

ABOUT THIS PROSPECTUS

This prospectus is part of a shelf registration statement that we filed with the Securities and Exchange Commission (the SEC). By using a shelf registration statement, we may offer and sell any combination of the securities described in this prospectus, in one or more offerings from time to time over the next three years, up to a total dollar amount of \$50,000,000. This prospectus provides you with general information. Each time we sell securities under this shelf registration statement, we will provide a prospectus supplement that will contain specific information about the terms of that offering. The prospectus supplement also may add, update or change information contained in the prospectus. You should read both this prospectus and the prospectus supplement related to any offering as well as additional information described under the headings **Incorporation By Reference** and **Where You Can Find More Information**.

You should rely only on the information that we have provided or incorporated by reference in this prospectus, any prospectus supplement, any free writing prospectus or other written communication we may authorize to be delivered to you. We have not provided, and have not authorized anyone else to provide, you with different or additional information.

This prospectus, any prospectus supplement, any free writing prospectus and any other written communication do not constitute an offer to sell or the solicitation of an offer to buy any securities other than the registered securities to which they specifically relate, nor does this prospectus, any prospectus supplement, any free writing prospectus or any other written communication constitute an offer to sell or the solicitation of an offer to buy securities in any jurisdiction to any person to whom it is unlawful to make such offer or solicitation in such jurisdiction. You should not assume that the information contained in this prospectus or in the documents incorporated by reference herein, any prospectus supplement, any free writing prospectus or other written communication is accurate as of any date other than the date noted therein or, in the case of documents incorporated by reference, the filing date thereof, regardless of its time of delivery, and you should not consider any information in this prospectus or in the documents incorporated by reference herein, any prospectus supplement, any free writing prospectus or other written communication to be investment, legal or tax advice. We encourage you to consult your own counsel, accountant and other advisors for legal, tax, business, financial and related advice regarding an investment in our securities.

For further information about our business and the securities, you should refer to the registration statement and its exhibits. The exhibits to our registration statement contain the full text of certain contracts and other important documents we have summarized in this prospectus. Since these summaries may not contain all the information that you may find important in deciding whether to purchase the securities we may offer, you should review the full text of these documents.

This prospectus does not contain all the information provided in the registration statement we filed with the SEC. For further information about us or our securities offered hereby, you should refer to that registration statement, which you can obtain from the SEC as described below under the caption **Where You Can Find More Information**.

We may sell securities through underwriters or dealers, through agents, directly to purchasers or through a combination of these methods. We and our agents reserve the sole right to accept or reject, in whole or in part, any proposed purchase of securities. The prospectus supplement, which we will provide to you each time we offer securities, will set forth the names of any underwriters, agents or others involved in the sale of securities and any applicable fee, commission or discount arrangements with them. See the information described below under the caption **Plan of Distribution**.

In this prospectus, the terms we, our, us, Amtech and the Company refer to Amtech Systems, Inc., unless otherwise specified.

Table of Contents

PROSPECTUS SUMMARY

The following summary does not contain all of the information that may be important to purchasers of our securities. Prospective purchasers of securities should carefully review the detailed information and financial statements, including the notes thereto, appearing elsewhere in or incorporated by reference into this prospectus.

Our Company

We are a leading, global manufacturer of capital equipment, including thermal processing, silicon wafer handling automation, and related consumables used in fabricating solar cells, LED and semiconductor devices. Semiconductors, or semiconductor chips, are fabricated on silicon wafer substrates, sliced from ingots, and are part of the circuitry, or electronic components, of many products including solar cells, computers, telecommunications devices, automotive products, consumer goods, and industrial automation and control systems. The Company's wafer handling, thermal processing and consumable products currently address the diffusion, oxidation, and deposition steps, including atomic layer deposition used in the fabrication of solar cells, LEDs, semiconductors, microelectromechanical systems (MEMS) and the polishing of newly sliced silicon wafers.

Our major emphasis in the solar industry is the development of thermal processes, and deposition for solar cell manufacturing, which we believe, collectively, are key to driving higher cell efficiencies. The markets we serve are experiencing rapid technological advances and are, historically, cyclical. Therefore, future profitability and growth depend on our ability to develop or acquire and market profitable new technology products, and on our ability to adapt to cyclical trends.

We believe our product portfolio, developed through a track record of technological innovation as well as the successful integration of key acquisitions, reduces the cost of solar cell manufacturing by increasing solar cell efficiency, increasing throughput and increasing yields. We have been providing manufacturing solutions to the semiconductor industry for over 30 years and have leveraged our semiconductor technology and industry presence to capitalize on growth opportunities in the solar industry. Our customers use our equipment to manufacture solar cells, semiconductors, silicon wafers and MEMS, which are used in end markets such as solar power, telecommunications, consumer electronics, computers, automotive and mobile hand-held devices. Through the acquisition of BTU International, Inc. in fiscal 2015, we expanded our thermal processing capability with the supply of solder reflow systems used for surface mount and semiconductor packaging applications in the electronics assembly market, and custom equipment for multiple industrial markets. Also in fiscal 2015, we expanded our participation in the solar market through the acquisition of a controlling interest in SoLayTec B.V., which provides Atomic Layer Deposition systems used in high efficiency solar cells. To complement our research and development efforts, we also sell our equipment to, and coordinate certain development efforts with, research institutes, universities and customers.

For fiscal 2016, we recognized net revenue of \$120 million, which included \$61 million of solar revenue or approximately 51% of our total revenue.

Our Offices

We maintain our principal executive offices at 131 South Clark Drive, Tempe, Arizona 85281. Our telephone number is (480) 967-5146. Our website is located at www.amtechsystems.com. Other than as described in "Where You Can Find More Information" below, the information on, or that can be accessed through, our web site is not incorporated by reference in this prospectus or any prospectus supplement, and you should not consider it to be a part of this prospectus or any prospectus supplement. Our web site address is included as an inactive textual reference only.

Table of Contents

Maximum value of the Shares to be Offered under this Prospectus

We will be offering and selling our securities pursuant to this prospectus in accordance with General Instruction I.B.6 of Form S-3, which permits us to use Form S-3 to sell securities during any 12 month period having an aggregate market value of no more than one-third of the aggregate market value of the voting and non-voting common equity held by our non-affiliates. On January 31, 2017, our non-affiliates held such equity having an aggregate market value of \$55,347,786 so our maximum offering would be \$18,449,262 if the equity held by our non-affiliates does not increase and our stock price remains the same. However, if there is an increase in either our stock price or the number of shares held by our non-affiliates, or both, the amount of our maximum offering under that rule also would increase. Conversely, decreases in them would cause the amount of our maximum offering and remaining availability under that rule to likewise decrease (which may stop further sales but would not affect previously permitted sales). Sales of our Common Stock or other securities not made under I.B.6 (including private placements and S-1 offerings) do not count against such maximum or remaining availability.

Our Determination of Offering Prices

We from time to time will determine the prices at which our securities will be sold, which may and likely will vary over time and may be negotiated or based directly or indirectly on the market price of our common stock at the time. We will specify the price(s), share amount, expected net proceeds, manner of distribution and other terms of each offering in the applicable prospectus supplement. We will try to maximize the net proceeds we receive in each sale, and we hope to sell our securities for more than our net book value per share (and thus avoid diluting the equity of our existing stockholders), but there can be no assurance that we will be able to do so.

Our Sales and Distributions

We may offer and sell these securities under this prospectus directly to investors (which may include our affiliates) or through underwriters, dealers or agents as we may determine from time to time. If we designate or engage any underwriter, dealer or agent in such offering, we will identify them and their compensation in the applicable prospectus supplement. See PLAN OF DISTRIBUTION on page 32 of this prospectus.

No Selling Stockholders

None of our existing stockholders will be offering any of their respective securities under this prospectus.

Table of Contents

RISK FACTORS

Investing in our securities involves a high degree of risk. You should review carefully the risks and uncertainties described under the heading "Risk Factors" contained in the applicable prospectus supplement and any related free writing prospectus, and in our most recent Annual Report on Form 10-K, as amended, or any updates in our Quarterly Reports on Form 10-Q, together with all of the other information appearing in this prospectus or incorporated by reference into this prospectus and any applicable prospectus supplement, before deciding whether to purchase any of the securities being registered pursuant to the registration statement of which this prospectus is a part. Each of the risk factors could adversely affect our business, operating results and financial condition, as well as adversely affect the value of an investment in our securities, and the occurrence of any of these risks might cause you to lose all or a part of your investment.

Table of Contents

WHERE YOU CAN FIND MORE INFORMATION

We file annual, quarterly and current reports, proxy statements and other information with the SEC under the Exchange Act. You may access our filings through our website at www.amtechsystems.com, free of charge, as soon as reasonably practical after we electronically file them with or furnish them to the SEC. Other information contained in our website is not incorporated by reference in, and should not be considered a part of, this prospectus or any accompanying prospectus supplement. You also may 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 to the public from the SEC's website at www.sec.gov.

This prospectus is part of a registration statement on Form S-3 that we filed with the SEC to register the securities offered hereby under the Securities Act of 1933, as amended (the "Securities Act"). This prospectus does not contain all of the information included in the registration statement, including certain exhibits and schedules. You may obtain the registration statement and exhibits to the registration statement from the SEC at the address listed above or from the SEC's website www.sec.gov.

FORWARD-LOOKING STATEMENTS

This prospectus and each prospectus supplement include and incorporate forward-looking statements within the meaning of Section 27A of the Securities Act and Section 21E of the Exchange Act. All statements, other than statements of historical facts, included or incorporated in this prospectus or any prospectus supplement are hereby identified as forward-looking statements. Examples of forward-looking statements include, but are not limited to, statements regarding our strategy, prospects, plans, objectives, future operations, future revenue and earnings, projected margins and expenses, technological innovations, future products or product development, product development strategies, potential acquisitions or strategic alliances, the success of particular product or marketing programs, the amount of revenue generated as a result of sales to significant customers, financial position, and liquidity and anticipated cash needs and availability are forward-looking statements. The words "anticipates," "believes," "could," "confident," "continue," "estimates," "expects," "forecasts," "hopes," "intends," "likely," "may," "plans," "predicts," "projects," "should," "will," "would" and the negatives or variations of such words and similar expressions are intended to identify forward-looking statements.

You should not place undue reliance on these forward-looking statements. Actual results or events could differ materially from the forward-looking statements we make. Among the factors that could cause actual results to differ materially are the factors discussed under the "Risk Factors" heading in our Annual Report on Form 10-K, as amended, for the fiscal year ended September 30, 2016. We also will include or incorporate by reference in each prospectus supplement important factors that we believe could cause actual results or events to differ materially from the forward-looking statements that we make. Should one or more known or unknown risks or uncertainties materialize, or should underlying assumptions prove inaccurate, actual results could differ materially from past results and those anticipated, estimated, projected or implied by these forward-looking statements. You should consider these factors and the other cautionary statements made in this prospectus, any prospectus supplement or the documents we incorporate by reference in this prospectus as being applicable to all related forward-looking statements wherever they appear in this prospectus, any prospectus supplement or the documents incorporated by reference. While we may elect to update forward-looking statements wherever they appear in this prospectus, any prospectus supplement or the documents incorporated by reference, we do not assume, and specifically disclaim, any obligation to do so, whether as a result of new information, future events or otherwise. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures or investments we may make.

Table of Contents

INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

This prospectus constitutes a part of a registration statement on Form S-3 filed under the Securities Act. As permitted by the SEC's rules, this prospectus and any prospectus supplement, which form a part of the registration statement, do not contain all the information that is included in the registration statement. You will find additional information about us in the registration statement. Any statements made in this prospectus or any prospectus supplement concerning legal documents are not necessarily complete and you should read the documents that are filed as exhibits to the registration statement or otherwise filed with the SEC for a more complete understanding of the document or matter.

The SEC allows us to incorporate by reference the information we file with the SEC, which means that we can disclose important information to you by referring you to those documents. The information that we incorporate by reference is considered to be part of this prospectus. Information that we file with the SEC in the future and incorporate by reference in this prospectus automatically updates and supersedes previously filed information as applicable.

We incorporate by reference into this prospectus the following documents filed by us with the SEC, other than any portion of any such documents that are not deemed filed under the Exchange Act in accordance with the Exchange Act and applicable SEC rules:

Annual Report on Form 10-K for the fiscal year ended September 30, 2016 filed with the SEC on November 30, 2016, and Amendment No. 1 to Annual Report on form 10-K/A filed with the SEC on December 2, 2016;

Current Report on Form 8-K filed with the SEC on November 16, 2016;

The information specifically incorporated by reference into our Annual Report on Form 10-K, as amended, for the fiscal year ended September 30, 2016 and from our definitive proxy statement on Schedule 14A filed with the SEC on January 27, 2017; and

The description of our common stock contained in the Registration Statement on Form 8-A filed with the SEC, including any amendments or reports filed for the purpose of updating such description.

We also incorporate by reference into this prospectus all documents (other than any portions of any such documents that are not deemed filed under the Exchange Act in accordance with the Exchange Act and applicable SEC rules) filed by us under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act after the date of the initial registration statement and before effectiveness of the registration statement, and after the date of this prospectus.

You may request a copy of these filings that are incorporated by reference into this prospectus, which we shall deliver to you, together with all exhibits thereto, at no cost, by writing or telephoning us as follows:

Amtech Systems, Inc.

Attention: Corporate Secretary

Edgar Filing: AMTECH SYSTEMS INC - Form 424B5

131 South Clark Drive

Tempe, Arizona 85281

(480) 967-5146

Any statement contained in a document that is incorporated by reference will be modified or superseded for all purposes to the extent that a statement contained in this prospectus or any accompanying prospectus supplement, or in any other document that is subsequently filed with the SEC and incorporated by reference, modifies or is contrary to that previous statement. Any statement so modified or superseded will not be deemed a part of this prospectus or any accompanying prospectus supplement, except as so modified or superseded. Since information that we later file with the SEC will update and supersede previously incorporated information, you should look at all of the SEC filings that we incorporate by reference to determine if any of the statements in this prospectus or any accompanying prospectus supplement or in any documents previously incorporated by reference have been modified or superseded.

Table of Contents

PROSPECTUS SUPPLEMENTS

This prospectus provides you with a general description of the proposed offering of our securities. Each time that we sell securities under this prospectus, we will provide a prospectus supplement that will contain specific information about the terms of that offering. The prospectus supplement may add to, update or change information contained in this prospectus and should be read as superseding this prospectus. You should read both this prospectus and any prospectus supplement together with additional information described under the headings **Incorporation of Certain Information by Reference** and **Where You Can Find More Information**.

The prospectus supplement will describe the terms of any offering of securities, including the offering price to the public in that offering, the purchase price and net proceeds of that offering, and the other specific terms related to that offering of securities.

USE OF PROCEEDS

Except as may be otherwise set forth in any prospectus supplement accompanying this prospectus, we will use the net proceeds we receive from sales of securities offered hereby for general corporate purposes, which may include the repayment of indebtedness outstanding from time to time and for working capital, capital expenditures, acquisitions and repurchases of our common stock or other securities. Pending these uses, the net proceeds may also be temporarily invested in short-term securities.

SECURITIES WE MAY OFFER

The descriptions of the securities contained in this prospectus, together with the applicable prospectus supplements, summarize the material terms and provisions of the various types of securities that we may offer. We will describe in the applicable prospectus supplement relating to any securities the particular terms of the securities offered by that prospectus supplement. If we indicate in the applicable prospectus supplement, the terms of the securities may differ from the terms we have summarized below. We will also include in the prospectus supplement information, when applicable, about material U.S. federal income tax considerations relating to the securities and the securities exchange, if any, on which the securities will be listed.

We may sell from time to time, in one or more offerings, any one or more of the following:

common stock, including the associated rights;

preferred stock;

debt securities;

warrants to purchase common stock, preferred stock and/or debt securities;

units consisting of common stock, preferred stock, debt securities and/or warrants in any combination; or

any combination of the foregoing securities.

In this prospectus, we refer to the common stock (including the associated rights), preferred stock, debt securities, warrants and units collectively as securities. The total dollar amount of all securities that we may issue under this prospectus will not exceed \$50,000,000.

If we issue debt securities at a discount from their original stated principal amount, then, for purposes of calculating the total dollar amount of all securities issued under this prospectus, we will treat the initial offering price of the debt securities as the total original principal amount of the debt securities.

This prospectus may not be used to consummate a sale of securities unless it is accompanied by a prospectus supplement.

Table of Contents

DESCRIPTION OF COMMON AND PREFERRED STOCK

This section describes the general terms of our common stock and preferred stock. A prospectus supplement may provide information that is different from this prospectus. If the information in a prospectus supplement with respect to our common stock or preferred stock being offered differs from this prospectus, you should rely on the information in the prospectus supplement. A copy of our amended and restated articles of incorporation, as amended (articles of incorporation) has been incorporated by reference from our filings with the SEC as an exhibit to the registration statement.

Common Stock

Our common stock and the rights of the holders of our common stock are subject to the applicable provisions of Arizona law, our articles of incorporation, our bylaws, as amended (bylaws), and the rights of the holders of our preferred stock, if any. Certain provisions of Arizona law and our articles of incorporation and bylaws are described under the heading Certain Provisions of Arizona Law and the Company s Articles of Incorporation and Bylaws below.

As of December 31, 2016, under our articles of incorporation, we had the authority to issue 100,000,000 shares of common stock, par value \$.01 per share, of which 13,179,535 shares of our common stock were outstanding as of that date. As of December 31, 2016, we had outstanding stock options to purchase 1,885,941 shares of our common stock, of which 1,375,174 shares of common stock were issuable upon exercise of vested stock options as of that date.

Voting Rights. Each outstanding share of our common stock is entitled to one vote per share of record on all matters submitted to a vote of shareholders and to vote together as a single class for the election of directors and in respect of other corporate matters. At a meeting of shareholders at which a quorum is present, all questions other than the contested election of directors shall be decided by determining if the votes cast by shareholders favoring the action exceed the votes casts by shareholders opposing the action, without regard to abstentions, unless the matter is one upon which a different vote is required by express provision of Arizona law, the NASDAQ or our articles of incorporation or bylaws. Directors, in a contested election, will be elected by a plurality of the votes of the shares present at a meeting. Holders of shares of common stock have cumulative voting rights with respect to the election of directors.

Dividends. Holders of our common stock are entitled to receive dividends or other distributions when, as and if declared by our board of directors. The right of our board of directors to declare dividends, however, is subject to any rights of the holders of other classes of our capital stock and the availability of sufficient funds under Arizona law to pay dividends.

Preemptive Rights. Other than as described under the heading Stockholders Rights Plan below, the holders of our common stock do not have preemptive rights to purchase or subscribe for any of our capital stock or other securities.

Redemption. The shares of our common stock are not subject to redemption by operation of a sinking fund or otherwise.

Liquidation Rights. In the event of any liquidation, dissolution or winding up of the Company, subject to the rights, if any, of the holders of other classes of our capital stock, the holders of shares of our common stock are entitled to receive any of our assets available for distribution to our shareholders ratably in proportion to the number of shares held by them.

Listing. Our common stock is listed on the NASDAQ under the symbol ASYS.

Table of Contents

Transfer Agent and Registrar. The transfer agent and registrar for our common stock is Computershare Trust Company, 350 Indiana Street, Suite 800, Golden, Colorado 80401.

Preferred Stock

A certificate of designation or amendment to our articles of incorporation will specify the terms of the preferred stock being offered, and will be filed or incorporated by reference as an exhibit to the registration statement before the preferred stock is issued. The following description of our preferred stock, and any description of the preferred stock in a prospectus supplement, may not be complete and is subject to, and qualified in its entirety by reference to, Arizona law and the actual terms and provisions contained in our articles of incorporation and bylaws, each as amended from time to time.

As of December 31, 2016, under our articles of incorporation, we had the authority to issue 100,000,000 shares of preferred stock, which are issuable in series on terms to be determined by our board of directors. Accordingly, our board of directors is authorized, without action by the shareholders, to issue preferred stock from time to time with such dividend, liquidation, conversion, voting and other rights and restrictions as it may determine. As of December 31, 2016, our board of directors had designated 540,000 shares as Series A Convertible Preferred Stock (the Series A Preferred Stock), but no shares of the Series A Preferred Stock were outstanding. No Series A Preferred Stock will be issued in connection with this registration statement, rather new series of preferred stock with different rights from the Series A Preferred Stock may be issued.

The terms of any particular series of preferred stock will be described in the prospectus supplement relating to that particular series of preferred stock, including, where applicable:

the title and stated value of the preferred stock;

the number of shares of preferred stock to be issued and the offering price of the preferred stock;

any dividend rights;

any dividend rates, periods, or payment dates, or methods of calculation of dividends applicable to the preferred stock;

the date from which distributions on the preferred stock shall accumulate, if applicable;

the terms and conditions, if applicable, upon which the preferred stock will be convertible into our common stock, including the conversion price (or manner of calculation thereof);

any right to convert the preferred stock into a different type of security;

any rights and preferences upon our liquidation or winding up of our affairs;

any terms of redemption;

the procedures for any auction and remarketing, if any, for the preferred stock;

the provisions for a sinking fund, if any, for the preferred stock;

any listing of the preferred stock on any securities exchange;

a discussion of federal income tax considerations applicable to the preferred stock;

the relative ranking and preferences of the preferred stock as to distribution rights (including whether any liquidation preference as to the preferred stock will be treated as a liability for purposes of determining the availability of assets for distributions to holders of stock ranking junior to the shares of preferred stock as to distribution rights);

any limitations on issuance of any series of preferred stock ranking senior to or on a parity with the series of preferred stock being offered as to distribution rights and rights upon the liquidation, dissolution or winding up of our affairs; and

any other specific terms, preferences, rights, limitations, or restrictions of the preferred stock.

Table of Contents

Registrar and Transfer Agent. The registrar and transfer agent for our preferred stock will be set forth in the applicable prospectus supplement. **Certain Provisions of Arizona Law and The Company's Articles of Incorporation and Bylaws**

Certain provisions of our articles of incorporation and bylaws and Arizona law could make our acquisition by a third party, a change in our incumbent management or a similar change in control more difficult, including:

an acquisition of us by means of a tender or exchange offer;

an acquisition of us by means of a proxy contest or otherwise; or

the removal of a majority or all of our incumbent officers and directors.

These provisions, which are summarized below, are likely to discourage certain types of coercive takeover practices and inadequate takeover bids. These provisions are also designed to encourage persons seeking to acquire control of us to first negotiate with our board of directors. We believe that these provisions help to protect our potential ability to negotiate with the proponent of an unfriendly or unsolicited proposal to acquire or restructure us, and that this benefit outweighs the potential disadvantages of discouraging such a proposal because our ability to negotiate with the proponent could result in an improvement of the terms of the proposal. The existence of these provisions which are described below could limit the price that investors might otherwise pay in the future for our securities. This description is intended as a summary only and is qualified in its entirety by reference to our articles of incorporation and bylaws, as well as Arizona law.

Articles of Incorporation, Bylaws and Arizona Law

Authorized But Unissued Capital Stock. We have shares of common stock and preferred stock available for future issuance without shareholder approval, subject to any limitations imposed by the listing standards of the NASDAQ. We may utilize these additional shares for a variety of corporate purposes, including for future public offerings to raise additional capital or facilitate corporate acquisitions or for payment as a dividend on our capital stock. The existence of unissued and unreserved common stock and preferred stock may enable our board of directors to issue shares to persons friendly to current management or to issue preferred stock with terms that could have the effect of making it more difficult for a third party to acquire, or could discourage a third party from seeking to acquire, a controlling interest in the Company by means of a merger, tender offer, proxy contest or otherwise. In addition, if we issue preferred stock, the issuance could adversely affect the likelihood that such holders will receive dividend payments and payments upon liquidation.

Blank Check Preferred Stock. Our board of directors, without shareholder approval, has the authority under our articles of incorporation to issue preferred stock with rights superior to the rights of the holders of common stock. As a result, preferred stock could be issued quickly and easily, could impair the rights of holders of common stock and could be issued with terms calculated to delay or prevent a change in control or make removal of management more difficult.

Number of Directors; Removal; Filling Vacancies. Our articles of incorporation provide that the number of directors shall be fixed by the bylaws which our board of directors can amend without shareholder approval. Our bylaws default to Arizona law with respect to the removal of directors. Arizona law provides that directors may be removed with or

without cause where the votes cast by shareholders opposing the action would not be sufficient to elect the director under cumulative voting. A vote to remove one or more directors must be taken at a shareholder's meeting at which a quorum is present where one of the purposes of the meeting is to remove one or more directors. A director cannot be removed by written consent of shareholders unless written consents are obtained from the holders of all the outstanding shares entitled to vote on the removal of the director. Our bylaws provide that vacancies on our board of directors may be filled by a majority vote of the remaining directors, though not less than a quorum. Arizona law also provides that shareholders may fill any vacancy on our board of directors.

Table of Contents

Shareholder Meetings and Action. Our bylaws provide that shareholders can only call a special meeting with the approval of holders of not less than fifty percent (50%) of all votes entitled to be cast on any issue proposed to be considered at the proposed special meeting. Our bylaws also provide that the business of special meetings of shareholders shall be confined to the purposes stated in the notice of the meeting. These provisions may discourage another person or entity from making a tender offer, unless it acquired a majority of our outstanding voting stock, because the person or entity could only take action at a duly called shareholders' meeting relating to the business specified in the notice of meeting and not by written consent. Arizona law provides that shareholders may act outside of a meeting if one or more written consents describing the action taken are signed by the holders of outstanding shares having one hundred percent (100%) of the votes entitled to be cast at a meeting at which all shares entitled to vote on the action were present and voted.

Anti-Takeover Effects of Various Provisions of Arizona Law

Arizona Revised Statutes (ARS) Sections 10-2701 et seq. were adopted by the Arizona legislature in an attempt to prevent corporate "greenmail" and restrict the ability of a potential suitor to acquire domestic corporations. These statutes generally apply to business combinations or control share acquisitions of "issuing public corporations," which defined term includes Amtech. The provisions summarized below could discourage, deter, delay or impede a tender offer or other attempt to acquire control of Amtech.

Arizona Business Combination Statute. The Arizona business combination statute would limit our ability to engage in Business Combinations with Interested Shareholders (each as defined below).

Business Combination means any (A) merger or consolidation of Amtech or any subsidiary of Amtech with an Interested Shareholder, (B) exchange of shares of the Amtech's common stock or any subsidiary for shares of an Interested Shareholder, or (C) sale, lease, transfer or other disposition to or with an Interested Shareholder of 10% or more of the consolidated assets of Amtech.

Interested Shareholder means any person other than Amtech or a subsidiary of Amtech that is either (A) a direct or indirect beneficial owner of 10% or more of the voting power of the outstanding common stock of Amtech or (B) an affiliate of Amtech who at any time during the three years immediately before the date in question was the beneficial owner of 10% or more of the voting power of the then outstanding common stock of Amtech.

Share Acquisition Date means the date that a person first becomes an Interested Shareholder of Amtech.

Business Combinations within Three Years After Share Acquisition Date. For three years after an Interested Shareholder's Share Acquisition Date, Amtech may not directly or indirectly engage in any Business Combination with an Interested Shareholder or any affiliate of an Interested Shareholder unless, before the Interested Shareholder's Share Acquisition Date, a committee of disinterested directors approved either:

the Business Combination; or

the acquisition of common stock made by the Interested Shareholder on the Interested Shareholder's Share Acquisition Date.

Business Combinations More Than Three Years After Share Acquisition Date. If a committee of disinterested directors has not approved the Business Combination or the acquisition of common stock as provided above, Amtech

may not directly or indirectly engage in any Business Combination with an Interested Shareholder or any affiliate of an Interested Shareholder unless:

the Business Combination is consummated no earlier than three years after the Interested Shareholder's Share Acquisition Date, and before the Share Acquisition Date, Amtech's Board of Directors approved either

the Business Combination; or

Table of Contents

the acquisition of common stock made by the Interested Shareholder on the Share Acquisition Date;

the Business Combination is approved no earlier than three years after the Interested Shareholder's Share Acquisition Date by the affirmative vote of a majority of the outstanding voting shares of the common stock of Amtech (excluding shares of common stock beneficially owned by the Interested Shareholder or any affiliate thereof); or

the Business Combination is consummated no earlier than three years after the Interested Shareholder's Share Acquisition Date and meets certain specified conditions designed to ensure against discriminatory pricing. Arizona Control Share Acquisition Statute. The Arizona control share acquisition statute would limit the voting rights of a person who acquires shares of Amtech under certain circumstances in a control share acquisition (as defined below).

Control Share Acquisition means an acquisition, directly or indirectly (in one or more transactions within 120 days or pursuant to a plan), by a person of beneficial ownership of shares of common stock of Amtech that would, but for the limitations in the control share acquisition statute, entitle the acquiring person to exercise a new range of voting power within the following specified ranges: (A) at least 20% but less than 33-1/3%, (B) at least 33-1/3% but less than or equal to 50% and (C) over 50%.

Within ten days after a Control Share Acquisition, the acquiring person must deliver to the corporation an information statement specifying, among other things, the range of voting power in the election of directors that, but for the limitations in the statute, the acquiring person believes would result from the Control Share Acquisition. At the time of delivery of the information statement, the acquiring person may request that a special meeting of shareholders be called to consider the voting rights of excess shares (referred to below).

To the extent that shares of common stock of Amtech acquired in a Control Share Acquisition exceed the threshold of voting power of any of the next specified range of voting power, such excess shares will have the same voting rights as other shares of common stock for election of directors but will not have the right to vote on other matters unless approved by a shareholder resolution at an annual or special meeting. Such resolution must be approved by the affirmative vote of a majority of the outstanding voting shares of common stock (excluding shares owned by the acquiring person, its affiliates or any officer or director of Amtech).

The status of voting rights of excess shares is not required to be presented for consideration at any meeting of shareholders unless, at the time of delivery of the information statement referred to above, the acquiring person has entered into a definitive financing agreement for any financing of the acquisition not to be provided by monies of the acquiring person.

If an acquiring person fails to deliver the required information statement within ten days after a Control Share Acquisition or if the Companies' shareholders have voted not to accord voting rights to an acquiring person's excess shares referred to above, then Amtech may call for the redemption of such excess shares at the fair market value of those shares at the time the call for redemption is given.

Stockholder Rights Plan

On December 15, 2008, we entered into an Amended and Restated Rights Agreement (the "Restated Rights Agreement") with Computershare Trust Company, N.A., as Rights Agent, which amended and restated the terms governing the previously authorized shareholder rights (each a "Right") to purchase fractional shares of the Company's Series A Participating Preferred Stock currently attached to each of the outstanding Common Shares of the Company. As amended, each Right entitles the registered holder to purchase from the Company one one-thousandth of a share of Series A Preferred at an exercise price of \$51.60 (the "Exercise Price"), subject to

Table of Contents

adjustment. The rights will expire 10 years after issuance and will be exercisable if (a) a person or group becomes the beneficial owner of 15% or more of the Company's common stock or (b) a person or group commences a tender or exchange offer that would result in the offeror beneficially owning 15% or more of the Company's common stock. The plan is currently set to expire on December 14, 2018.

On October 1, 2015, the Company entered into a Second Amended and Restated Rights Agreement (the "Second Restated Rights Agreement") with Computershare Trust Company, N.A., which expands the definition of Exempted Person to include any person that the Board, in its sole and absolute discretion, exempts from becoming an Acquiring Person under the Second Restated Rights Agreement. A Person deemed an Exempted Person under the Second Restated Rights Agreement cannot trigger any of the Rights provided therein so long as such Exempted Person complies with the terms and conditions by which the Board approved such exemption from the Restated Rights Agreement.

Limitation of Liability and Indemnification

Pursuant to Amtech's articles of incorporation, Amtech shall indemnify any and all of its existing and former directors, officers, employees and agents against all expenses incurred by them and each of them, including, but not limited to legal fees, judgments, penalties and amounts paid in settlement or compromise, which may arise or be incurred, rendered, or levied in any legal action brought or threatened against any of them for or on account of any action or omission alleged to have been committed while acting within the scope of employment as director, officer, employee or agent of the Company, whether or not any action is or has been filed against them and whether or not any settlement or compromise is approved by a court, indemnification shall be made by the Company whether the legal action brought or threatened is by or in the right of the Company or by any other person. Whenever any existing or former director, officer, employee, or agent shall report to the President of the Company or the chairman of the board of directors that he or she has incurred or may incur expenses, including, but not limited to, legal fees, judgments, penalties and amounts paid in settlement or compromise in a legal action brought or threatened against him or her for or on account of any action or omission alleged to have been committed by him or her while acting within the scope of his or her employment as a director, officer, employee or agent of the Company, the board of directors shall, at its next regular or at a special meeting held within a reasonable time thereafter, determine in good faith, whether in regard to the matter involved in the action or contemplated action, such person acted, failed to act, or refused to act willfully or with gross negligence or with fraudulent or criminal intent. If the board of directors determines, in good faith, that such person did not act, fail to act, or refuse to act willfully or with gross negligence or with fraudulent or criminal intent, in regard to the matter involved in the action or contemplated action, such person acted, failed to act, or refused to act willfully or with gross negligence or with fraudulent criminal intent, indemnification shall be mandatory and shall be automatically extended as specified herein; provided, that the Company shall have the right to refuse indemnification in any instance in which the person to whom indemnification would otherwise have been applicable shall have unreasonably refused to permit the Company, at its own expense and through counsel of its own choosing, to defend him or her in the action.

Section 10-851 of Arizona's Revised Statutes enables a corporation to eliminate or limit personal liability of members of its board of directors for violations of their fiduciary duty of care. However, Arizona law does not permit the elimination of a director's or officer's liability: (i) in connection with a proceeding by or in the right of the corporation in which the director was adjudged liable to the corporation; and (ii) in connection with any other proceeding charging improper financial benefit to the director, whether or not involving action in the director's official capacity, in which the director was adjudged liable on the basis that financial benefit was improperly received by the director.

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers or persons controlling Amtech pursuant to the foregoing provision, Amtech has been informed that in the opinion of the

SEC such indemnification is against public policy as expressed in the Securities Act and is therefore unenforceable.

Table of Contents

DESCRIPTION OF DEBT SECURITIES

This prospectus describes certain general terms and provisions of the debt securities we may offer under this prospectus and one or more prospectus supplements. When we offer to sell a particular series of debt securities, we will describe the specific terms of the series in a prospectus supplement. The following description of debt securities will apply to the debt securities offered by this prospectus unless we provide otherwise in the applicable prospectus supplement. The applicable prospectus supplement for a particular series of debt securities may specify different or additional terms.

We may issue senior, senior subordinated, or subordinated debt securities. Senior securities will be direct obligations of ours and will rank equally and ratably in right of payment with other indebtedness of ours that is not subordinated.

Senior subordinated securities will be subordinated in right of payment to the prior payment in full of senior indebtedness, as defined in the applicable prospectus supplement, and may rank equally and ratably with the senior subordinated notes and any other senior subordinated indebtedness. Subordinated securities will be subordinated in right of payment to senior subordinated securities.

We need not issue all debt securities of one series at the same time. Unless we provide otherwise, we may reopen a series, without the consent of the holders of such series, for issuances of additional securities of that series.

We will issue the senior debt securities and senior subordinated debt securities under a senior indenture, which we will enter into with the trustee to be named in the senior indenture, and we will issue the subordinated debt securities under a subordinated indenture, which we will enter into with the trustee to be named in the subordinated indenture. We use the term indenture or indentures to refer to both the senior indenture and the subordinated indenture. Each indenture will be subject to and governed by the Trust Indenture Act of 1939, as amended, or the Trust Indenture Act, and we may supplement the indenture from time to time. Any trustee under any indenture may resign or be removed with respect to one or more series of debt securities, and we may appoint a successor trustee to act with respect to that series. We have filed a form of indenture as an exhibit to this registration statement, of which this prospectus forms a part. The terms of the senior indenture and subordinated indenture will be substantially similar, except that the subordinated indenture will include provisions pertaining to the subordination of the subordinated debt securities and senior subordinated debt securities to the senior debt securities and any other of our senior securities. The following statements relating to the debt securities and the indenture are summaries only, are subject to change and are qualified in their entirety to the detailed provisions of the indenture, any supplemental indenture and the discussion contained in any prospectus supplements.

General

The debt securities will be our direct obligations. We may issue debt securities from time to time and in one or more series as our board of directors may establish by resolution or as we may establish in one or more supplemental indentures. The particular terms of each series of debt securities will be described in a prospectus supplement relating to the series. We may issue debt securities with terms different from those of debt securities that we previously issued.

We may issue debt securities from time to time and in one or more series with the same or various maturities, at par, at a premium or at a discount. We will set forth in a prospectus supplement, relating to any series of debt securities being offered, the initial offering price and the following terms of the debt securities:

the title of the debt securities;

the series designation and whether they are senior securities, senior subordinated securities or subordinated securities; the aggregate principal amount of the debt securities and any limit on the aggregate amount of the series of debt securities; the price or prices (expressed as a percentage of the

Table of Contents

aggregate principal amount) at which we will issue the debt securities and, if other than the principal amount of the debt securities, the portion of the principal amount of the debt securities payable upon the maturity of the debt securities;

the date or dates on which we will pay the principal on the debt securities;

the rate or rates (which may be fixed or variable) per annum or the method used to determine the rate or rates (including any commodity, commodity index, stock exchange index or financial index) at which the debt securities will bear interest, the date or dates from which interest will accrue, the date or dates on which interest will commence and be payable and any regular record date for the interest payable on any interest payment date;

the place where principal, interest and any additional amounts will be payable and where the debt securities can be surrendered for transfer, exchange or conversion;

the terms, if any, by which holders of the debt securities may convert or exchange the debt securities for our common stock, preferred stock or any other security or property;

if convertible, the initial conversion price, the conversion period and any other terms governing such conversion;

any subordination provisions or limitations relating to the debt securities;

any sinking fund requirements;

any obligation we have to redeem or purchase the debt securities pursuant to any sinking fund or analogous provisions or at the option of a holder of debt securities;

the dates on which and the price or prices at which we will repurchase the debt securities at the option of the holders of debt securities and other detailed terms and provisions of these repurchase obligations;

the denominations in which the debt securities will be issued, if other than denominations of \$1,000 and any integral multiple thereof;

the portion of principal amount of the debt securities payable upon declaration of acceleration of the maturity date, if other than the principal amount;

whether we will issue the debt securities in certificated or book-entry form;

whether the debt securities will be in registered or bearer form and, if in registered form, the denominations if other than in even multiples of \$1,000 and, if in bearer form, the denominations and terms and conditions relating thereto;

the designation of the currency, currencies or currency units in which payment of principal of, premium, and interest on the debt securities will be made;

if payments of principal of, and interest and any additional amounts on, the debt securities will be made in one or more currencies or currency units other than that or those in which the debt securities are denominated, the manner in which the exchange rate with respect to these payments will be determined;

the manner in which the amounts of payment of principal of, and interest and any additional amounts on, the debt securities will be determined, if these amounts may be determined by reference to an index based on a currency or currencies other than that in which the debt securities are denominated or designated to be payable or by reference to a commodity, commodity index, stock exchange index or financial index;

any applicability of the defeasance provisions described in this prospectus or any prospectus supplement;

Table of Contents

whether and under what circumstances, if any, we will pay additional amounts on any debt securities in respect of any tax, assessment or governmental charge and, if so, whether we will have the option to redeem the debt securities instead of making this payment;

any addition to or change in the events of default described in this prospectus or in the indenture with respect to the debt securities and any change in the acceleration provisions described in this prospectus or in the indenture with respect to the debt securities;

any addition to or change in the covenants described in this prospectus or in the indenture with respect to the debt securities;

if the debt securities are to be issued upon the exercise of debt warrants, the time, manner and place for them to be authenticated and delivered;

any securities exchange on which we will list the debt securities;

any restrictions on transfer, sale or other assignment;

any provisions relating to any security provided for the debt securities;

any other terms of the debt securities, which may modify or delete any provision of the indenture as it applies to that series; and

any depositaries, interest rate calculation agents, exchange rate calculation agents or other agents with respect to the debt securities.

We may issue debt securities that are exchangeable for or convertible into shares of our common stock or other securities or property. The terms, if any, on which the debt securities may be exchanged for or converted into shares of our common stock or other securities or property will be set forth in the applicable prospectus supplement. Such terms may include provisions for conversion, either mandatory, at the option of the holder, or at our option, in which case the number of shares of common stock or other securities or property to be received by the holders of debt securities would be calculated as of a time and in the manner stated in the prospectus supplement.

We may issue debt securities at less than the principal amount payable upon maturity. We refer to these securities as original issue discount securities. If material or applicable, we will describe in the applicable prospectus supplement special U.S. federal income tax, accounting and other considerations applicable to original issue discount securities.

If we denominate the purchase price of any of the debt securities in a foreign currency or currencies or a foreign currency unit or units, or if the principal of, and interest and any additional amounts on, any series of debt securities is payable in a foreign currency or currencies or a foreign currency unit or units, we will provide you with information on the restrictions, elections, general tax considerations, specific terms and other information with respect to that issue

of debt securities and such foreign currency or currencies or foreign currency unit or units in the applicable prospectus supplement.

Except as may be set forth in any prospectus supplement relating to the debt securities, an indenture will not contain any other provisions that would limit our ability to incur indebtedness or that would afford holders of the debt securities protection in the event of a highly leveraged or similar transaction involving us or in the event of a change in control. You should review carefully the applicable prospectus supplement for information with respect to events of default and any covenants applicable to the debt securities being offered.

Payments and Paying Agents

Unless we otherwise indicate in the applicable prospectus supplement, we will make payment of the interest on any debt securities on any interest payment date to the person in whose name the debt securities, or one or more predecessor securities, are registered at the close of business on the regular record date for the interest.

Table of Contents

We will pay principal of, and interest and any additional amounts on, the debt securities of a particular series at the office of the paying agents designated by us, except that, unless we otherwise indicate in the applicable prospectus supplement, we may make interest payments by check, which we will mail to the holder, or by wire transfer to certain holders. Unless we otherwise indicate in a prospectus supplement, we will designate the corporate trust office of the trustee as our sole paying agent for payments with respect to debt securities of each series. We will name in the applicable prospectus supplement any other paying agents that we initially designate for the debt securities of a particular series.

Form, Transfer and Exchange

Each debt security will be represented by either one or more global securities registered in the name of The Depository Trust Company, New York, New York, known as DTC, as depository, or a nominee of the depository (as a book-entry debt security), or a certificate issued in definitive registered form (as a certificated debt security), as described in the applicable prospectus supplement. Except as described under Global Debt Securities and Book-Entry System below, book-entry debt securities will not be issuable in certificated form.

Certificated Debt Securities

You may transfer or exchange certificated debt securities at the trustee's office or paying agencies in accordance with the terms of the indenture. No service charge will be made for any transfer or exchange of certificated debt securities, but we may require payment of a sum sufficient to cover any tax or other governmental charge payable in connection with a transfer or exchange.

You may transfer certificated debt securities and the right to receive the principal of, and interest and any additional amounts on, certificated debt securities only by surrendering the old certificate representing those certificated debt securities and either we or the trustee will reissue the old certificate to the new holder, or we or the trustee will issue a new certificate to the new holder.

Global Debt Securities and Book-Entry System

Each global debt security representing book-entry debt securities will be deposited with, or on behalf of, the depository, and registered in the name of the depository or a nominee of the depository. Ownership of beneficial interests in book-entry debt securities will be limited to persons that have accounts with the depository for the related global debt security, whom we refer to as participants, or persons that may hold interests through participants.

Except as described in this prospectus or any applicable prospectus supplement, beneficial owners of book-entry debt securities will not be entitled to have securities registered in their names, will not receive or be entitled to receive physical delivery of a certificate in definitive form representing securities and will not be considered the owners or holders of those securities under the indenture. Accordingly, to exercise any rights of a holder under the indenture, each person beneficially owning book-entry debt securities must rely on the procedures of the depository for the related global debt security and, if that person is not a participant, on the procedures of the participant through which that person owns its interest.

We understand, however, that under existing industry practice, the depository will authorize the persons on whose behalf it holds a global debt security to exercise certain rights of holders of debt securities, and the indenture provides that we, the trustee and our respective agents will treat as the holder of a debt security the persons specified in a written statement of the depository with respect to that global debt security for purposes of obtaining any consents or directions required to be given by holders of the debt securities pursuant to the indenture.

We will make payments of principal of, and interest and any additional amounts on, book-entry debt securities to the depositary or its nominee, as the case may be, as the registered holder of the related global debt

Table of Contents

security. We, the trustee and any other agent of ours or agent of the trustee will not have any responsibility or liability for any aspect of the records relating to or payments made on account of beneficial ownership interests in a global debt security or for maintaining, supervising or reviewing any records relating to such beneficial ownership interests.

Any certificated debt securities issued in exchange for a global debt security will be registered in such name or names as the depositary shall instruct the trustee. We expect that such instructions will be based upon directions received by the depositary from participants with respect to ownership of book-entry debt securities relating to such global debt security.

For additional discussion of book entry and certificated securities, see the section entitled "Legal Ownership of Securities" included in this prospectus. We have obtained the foregoing information in this section and the "Legal Ownership of Securities" section concerning the depositary and the depositary's book-entry system from sources we believe to be reliable. We take no responsibility for the depositary's performance of its obligations under the rules and regulations governing its operations.

No Protection in the Event of a Change in Control

Unless we provide otherwise in the applicable prospectus supplement, the debt securities will not contain any provisions that may afford holders of the debt securities protection in the event we have a change in control or in the event of a highly leveraged transaction (whether or not such transaction results in a change in control).

Covenants

Unless we provide otherwise in the applicable prospectus supplement, the debt securities will not contain any restrictive covenants, including covenants restricting us or any of our subsidiaries from incurring, issuing, assuming or guaranteeing any indebtedness secured by a lien on any of our or our subsidiaries' property or capital stock or restricting us or any of our subsidiaries from entering into any sale and leaseback transactions.

Merger, Consolidation, and Sale of Assets

Unless we provide otherwise in the applicable prospectus supplement, we may not merge with or into or consolidate with, or convey, transfer or lease all or substantially all of our properties and assets to, any person (a "successor person"), and we may not permit any person to merge into, or convey, transfer, or lease its properties and assets substantially as an entirety to us, unless the following applies:

either (a) Amtech Systems, Inc. is the surviving entity or (b) the successor person is a corporation, partnership, trust or other entity organized and validly existing under the laws of any United States domestic jurisdiction and expressly assumes our obligations on the debt securities and under the indenture;

immediately after giving effect to the transaction, no event of default, and no event that, after notice or lapse of time, or both, would become an event of default, shall have occurred and be continuing under the indenture; and

certain other conditions that may be set forth in the applicable prospectus supplement are met.

This covenant would not apply to any recapitalization transaction, a change in control of us or a transaction in which we incur a large amount of additional debt unless the transactions or change in control included a merger, consolidation, or transfer or lease of substantially all of our assets. Except as may be described in the applicable prospectus supplement, there are no covenants or other provisions in the indenture providing for a put right or increased interest or that would otherwise afford holders of debt securities additional protection in the event of a recapitalization transaction, a change in control of us or a transaction in which we incur a large amount of additional debt.

Table of Contents

Events of Default Under the Indenture

Unless we provide otherwise in the applicable prospectus supplement, an event of default will mean, with respect to any series of debt securities, any of the following:

default in the payment of any interest upon any debt security of that series when it becomes due and payable and continuance of that default for a period of 30 days (unless the entire amount of such payment is deposited by us with the trustee or with a paying agent before the expiration of the 30-day period);

default in the payment of principal of, or premium, if any, on any debt security of that series when due and payable either at maturity, redemption or otherwise;

default in the deposit of any sinking fund payment, when and as due in respect of any debt security of that series;

default in the performance or breach of any other covenant or warranty by us in the indenture (other than a covenant or warranty that has been included in the indenture solely for the benefit of a series of debt securities other than that series) or in the debt security, which default continues uncured for a period of 90 days after we receive written notice from the trustee or we and the trustee receive written notice from the holders of not less than a majority in principal amount of the outstanding debt securities of that series as provided in the indenture;

we, pursuant to or within the meaning of any applicable bankruptcy law, commence a voluntary case, consent to the entry of an order for relief against us in an involuntary case, consent to the appointment of a custodian for all or substantially all of our property, make a general assignment for the benefit of our creditors or admit in writing our inability generally to pay our debts as they become due; or, similarly, a court enters an order or decree under any applicable bankruptcy law that provides for relief against us in an involuntary case, appoints a custodian for all or substantially all of our properties or orders our liquidation (and the order remains in effect for 90 days); and

any other event of default provided with respect to debt securities of that series that is included in any supplemental indenture or is described in the applicable prospectus supplement accompanying this prospectus.

No event of default with respect to a particular series of debt securities (except as to certain events of bankruptcy, insolvency or reorganization) necessarily constitutes an event of default with respect to any other series of debt securities. An event of default may also be an event of default under our bank credit agreements or other debt securities in existence from time to time and under certain guaranties by us of any subsidiary indebtedness. In addition, certain events of default or an acceleration under the indenture may also be an event of default under some of our other indebtedness outstanding from time to time.

Unless we provide otherwise in the applicable prospectus supplement, if an event of default with respect to debt securities of any series at the time outstanding occurs and is continuing (other than certain events of our bankruptcy, insolvency or reorganization), then the trustee or the holders of not less than a majority in principal amount of the outstanding debt securities of that series may, by written notice to us (and to the trustee if given by the holders), declare to be due and payable immediately the principal (or, if the debt securities of that series are discount securities, that portion of the principal amount as may be specified in the terms of that series) of and accrued and unpaid interest, if any, of all debt securities of that series. In the case of an event of default resulting from certain events of bankruptcy, insolvency or reorganization, the principal (or such specified amount) of and accrued and unpaid interest, if any, of all outstanding debt securities will become and be immediately due and payable without any declaration or other act by the trustee or any holder of outstanding debt securities.

At any time after an acceleration with respect to debt securities of a series has been made, but before a judgment or decree for payment of the money due has been obtained by the trustee, the holders of not less than a

Table of Contents

majority in principal amount of the outstanding debt securities of that series may cancel the acceleration and annul its consequences if the rescission would not conflict with any judgment or decree and if all existing events of default with respect to that series have been cured or waived except nonpayment of principal (or such lesser amount) or interest that has become due solely because of the acceleration.

The indenture also provides that the holders of not less than a majority in principal amount of the outstanding debt securities of any series may waive any past default with respect to that series and its consequences, except a default involving the following:

our failure to pay the principal of, and interest and any additional amounts on, any debt security; or

a covenant or provision contained in the indenture that cannot be modified or amended without the consent of the holders of each outstanding debt security affected by the default.

The trustee is generally required to give notice to the holders of debt securities of each affected series within 90 days of a default actually known to a responsible officer of the trustee unless the default has been cured or waived. The indenture provides that the trustee may withhold notice to the holders of debt securities of any series of any default or event of default (except in payment on any debt securities of that series) with respect to debt securities of that series if it in good faith determines that withholding notice is in the interest of the holders of those debt securities.

Unless we provide otherwise in the applicable prospectus supplement, the indenture will provide that the trustee will be under no obligation to exercise any of its rights or powers under the indenture at the request or direction of any holder of any such outstanding debt securities unless the trustee receives indemnity satisfactory to it against any loss, liability or expense. Subject to certain rights of the trustee, the holders of a majority in principal amount of the outstanding debt securities of any series will have the right to direct the time, method and place of conducting any proceeding for any remedy available to the trustee or exercising any trust or power conferred on the trustee with respect to the debt securities of that series. The trustee may, however, refuse to follow any direction that conflicts with the indenture or any law or which may be unduly prejudicial to the holders of the debt securities of the applicable series not joining in the direction. Unless we provide otherwise in the applicable prospectus supplement, no holder of any debt security of any series will have any right to institute any proceeding, judicial or otherwise, with respect to the indenture or for the appointment of a receiver or trustee, or for any remedy under the indenture, unless:

that holder has previously given to the trustee written notice of a continuing event of default with respect to debt securities of that series; and

the holders of at least 25% in principal amount of the outstanding debt securities of that series have made written request, and offered reasonable indemnity, to the trustee to institute such proceeding as trustee, and the trustee shall not have received from the holders of a majority in principal amount of the outstanding debt securities of that series a direction inconsistent with that request and has failed to institute the proceeding within 60 days.

Notwithstanding the foregoing, except as provided in the subordination provisions, if any, the holder of any debt security will have an absolute and unconditional right to receive payment of the principal of, and any interest or additional amounts on, that debt security on or after the due dates expressed in that debt security and to institute suit

for the enforcement of payment.

The indenture requires us, within 120 days after the end of our fiscal year, to furnish to the trustee a certificate as to compliance with the indenture, or, in the event of noncompliance, specify the noncompliance and the nature and status of the noncompliance.

Modification of Indenture and Waiver

Except as specified below, modifications and amendments to the indenture require the approval of not less than a majority in principal amount of our outstanding debt securities.

Table of Contents

Changes Requiring the Unanimous Approval

We and the trustee may not make any modification or amendment to the indenture without the consent of the holder of each affected debt security then outstanding if that amendment will have any of the following results:

reduce the rate of or extend the time for payment of interest, including default interest, on any debt security;

reduce the principal of or any additional amounts on or change the fixed maturity of any debt security or reduce the amount of, or postpone the date fixed for, the payment of any sinking fund or analogous obligation with respect to any series of debt securities;

reduce the principal amount of discount securities payable upon acceleration of maturity;

waive a default in the payment of the principal of, and interest or any additional amounts on, any debt security, except a rescission of acceleration of the debt securities of any series by the holders of at least a majority in aggregate principal amount of the then outstanding debt securities of that series and a waiver of the payment default that resulted from that acceleration;

make the principal of, or interest or any additional amounts on, any debt security payable in currency other than that stated in the debt security;

change the place of payment on a debt security;

change the currency or currencies of payment of the principal of, and any premium, make-whole payment, interest or additional amounts on, any debt security;

impair the right to initiate suit for the enforcement of any payment on or with respect to any debt security;

reduce the percentage of holders of debt securities whose consent is needed to modify or amend an indenture, to waive compliance with certain provisions of an indenture or to waive certain defaults;

reduce the percentage of the holders of outstanding debt securities of any series necessary to modify or amend the indenture, to waive compliance with provisions of the indenture or defaults and their consequences under the indenture or to reduce the quorum or voting requirements contained in the indenture;

make any change that adversely affects the right to convert or exchange any debt security other than as permitted by the indenture or decrease the conversion or exchange rate or increase the conversion or exchange price of any such debt security;

waive a redemption payment with respect to any debt security; or

make any change to certain provisions of the indenture relating to, among other things, the right of holders of debt securities to receive payment of the principal of, and interest and any additional amount on, those debt securities, the right of holders to institute suit for the enforcement of any payment or the right of holders to waive past defaults.

Changes Not Requiring Approval of Debt Holders

We and the trustee may modify or amend an indenture, without the consent of any holder of debt securities, for any of the following purposes:

to evidence the succession of another person to us as obligor under the indenture;

to add to our existing covenants additional covenants for the benefit of the holders of all or any series of debt securities, or to surrender any right or power conferred upon us in the indenture;

to add events of default for the benefit of the holders of all or any series of debt securities;

Table of Contents

to add or change any provisions of the indenture to facilitate the issuance of, or to liberalize the terms of, debt securities in bearer form, or to permit or facilitate the issuance of debt securities in uncertificated form, provided that this action will not adversely affect the interests of the holders of the debt securities of any series in any material respect;

to add, change or eliminate any provisions of the indenture, provided that any addition, change or elimination (a) shall neither (i) apply to any debt security of any series created prior to the execution of such supplemental indenture and entitled to the benefit of such provision nor (ii) modify the rights of the holder of any debt security with respect to such provision, or (b) shall become effective only when there are no outstanding debt securities;

to establish additional series of debt securities;

to secure previously unsecured debt securities;

to establish the form or terms of debt securities of any series, including the provisions and procedures, if applicable, for the conversion or exchange of the debt securities into our common stock, preferred stock or other securities or property;

to evidence and provide for the acceptance or appointment of a successor trustee or facilitate the administration of the trusts under the indenture by more than one trustee;

to make any provision with respect to the conversion or exchange of rights of holders pursuant to the requirements of the indenture;

to cure any ambiguity, defect or inconsistency in the indenture, provided that the action does not adversely affect the interests of holders of debt securities of any series issued under the indenture;

to close the indenture with respect to the authentication and delivery of additional series of debt securities or to qualify, or maintain qualification of, the indenture under the Trust Indenture Act; or

to supplement any of the provisions of the indenture to the extent necessary to permit or facilitate defeasance and discharge of any series of debt securities, provided that the action shall not adversely affect the interests of the holders of the debt securities of any series in any material respect.

A vote by holders of debt securities will not be required for clarifications and certain other changes that would not adversely affect holders of the debt securities.

Defeasance of Debt Securities and Certain Covenants in Certain Circumstances

Legal Defeasance

Unless the terms of the applicable series of debt securities provide otherwise, we may be discharged from any and all obligations in respect of the debt securities of any series (except for certain obligations to register the transfer or exchange of debt securities of the series; to replace stolen, lost or mutilated debt securities of the series; and to maintain paying agencies and certain provisions relating to the treatment of funds held by paying agents). We will be so discharged upon the deposit with the trustee, in trust, of money and/or U.S. government obligations or, in the case of debt securities denominated in a single currency other than U.S. dollars, foreign government obligations (as described at the end of this section), that, through the payment of interest and principal in accordance with their terms, will provide money in an amount sufficient to pay and discharge each installment of principal, interest and any additional amounts on and any mandatory sinking fund payments in respect of the debt securities of that series on the stated maturity of such payments in accordance with the terms of the indenture and those debt securities.

This discharge may occur only if, among other things, we have delivered to the trustee an officers' certificate and an opinion of counsel stating that we have received from, or there has been published by, the U.S. Internal Revenue Service a ruling or, since the date of execution of the indenture, there has been a change in the

Table of Contents

applicable U.S. federal income tax law, in either case to the effect that holders of the debt securities of such series will not recognize income, gain or loss for U.S. federal income tax purposes as a result of the deposit, defeasance and discharge and will be subject to U.S. federal income tax on the same amount and in the same manner and at the same times as would have been the case if the deposit, defeasance and discharge had not occurred.

Defeasance of Certain Covenants

Unless the terms of the applicable series of debt securities provide otherwise, upon compliance with certain conditions, we may omit to comply with the restrictive covenants contained in the indenture, as well as any additional covenants contained in the applicable prospectus supplement.

The conditions include, among others, the following:

depositing with the trustee money and/or U.S. government obligations or, in the case of debt securities denominated in a single currency other than U.S. dollars, foreign government obligations, that, through the payment of interest and principal in accordance with their terms, will provide money in an amount sufficient, in the opinion of a nationally recognized firm of independent public accountants, to pay principal, interest and any additional amounts on and any mandatory sinking fund payments in respect of the debt securities of that series on the stated maturity of those payments in accordance with the terms of the indenture and those debt securities; and

delivering to the trustee an opinion of counsel to the effect that the holders of the debt securities of that series will not recognize income, gain or loss for U.S. federal income tax purposes as a result of the deposit and related covenant defeasance and will be subject to U.S. federal income tax in the same amount and in the same manner and at the same times as would have been the case if the deposit and related covenant defeasance had not occurred.

Covenant Defeasance and Events of Default

If we exercise our option, as described above, not to comply with certain covenants of the indenture with respect to any series of debt securities, and the debt securities of that series are declared due and payable because of the occurrence of any event of default, the amount of money and/or U.S. government obligations or foreign government obligations on deposit with the trustee will be sufficient to pay amounts due on the debt securities of that series at the time of their stated maturity but may not be sufficient to pay amounts due on the debt securities of that series at the time of the acceleration resulting from the event of default. However, we will remain liable for those payments.

Foreign government obligations means, with respect to debt securities of any series that are denominated in a currency other than United States dollars:

direct obligations of the government that issued or caused to be issued such currency for the payment of which obligations its full faith and credit is pledged, which are not callable or redeemable at the option of the issuer thereof; or

obligations of a person controlled or supervised by or acting as an agency or instrumentality of that government, the timely payment of which is unconditionally guaranteed as a full faith and credit obligation by that government, which are not callable or redeemable at the option of the issuer thereof.

Subordination

We will set forth in the applicable prospectus supplement the terms and conditions, if any, upon which any series of senior subordinated securities or subordinated securities is subordinated to debt securities of another series or to other indebtedness of ours. The terms will include a description of the following:

the indebtedness ranking senior to the debt securities being offered;

Table of Contents

any restrictions on payments to the holders of the debt securities being offered while a default with respect to the senior indebtedness is continuing;

any restrictions on payments to the holders of the debt securities being offered following an event of default; and

provisions requiring holders of the debt securities being offered to remit some payments to holders of senior indebtedness.

Conversion and Exchange Rights

The terms on which debt securities of any series may be convertible into or exchangeable for our common stock, preferred stock, or other securities or property of the Company will be described in the applicable prospectus supplement. These terms will include the following:

the conversion or exchange price, or the manner of calculating the price;

the exchange or conversion period;

whether the conversion or exchange is mandatory, or voluntary at the option of the holder, or at our option;

any restrictions on conversion or exchange in the event of redemption of the debt securities and any restrictions on conversion or exchange; and

the means of calculating the number of shares of our common stock, preferred stock or other securities or property of Amtech Systems, Inc. to be received by the holders of debt securities.

The conversion or exchange price of any debt securities of any series that are convertible into our common stock or preferred stock may be adjusted for any stock dividends, stock splits, reclassification, combinations or similar transactions, as set forth in the applicable prospectus supplement.

Redemption of Debt Securities

The debt securities may be subject to optional or mandatory redemption on terms and conditions described in the applicable prospectus supplement. Subject to such terms, we may opt at any time to partially or entirely redeem the debt securities.

If less than all the debt securities of any series are to be redeemed or purchased in an offer to purchase at any time, the trustee will select the debt securities of that series to be redeemed or purchased as follows: (1) if the securities of such series are listed on any national securities exchange, in compliance with the requirements of the principal national securities exchange on which the debt securities of that series are listed; or (2) if the debt securities of that series are not listed on a national securities exchange, on a pro rata basis, by lot or by such other method as the trustee deems

fair and appropriate.

Except as otherwise provided as to any particular series of debt securities, at least 30 days but not more than 60 days before a redemption date, we or the trustee will mail a notice of redemption to each holder whose debt securities are to be redeemed. From and after notice has been given as provided in the applicable indenture, if funds for the redemption of any debt securities called for redemption shall have been made available on the redemption date, the debt securities will cease to bear interest on the date fixed for the redemption specified in the notice, and the only right of the holders of the debt securities will be to receive payment of the redemption price.

Governing Law

The indentures and the debt securities will be governed by and construed in accordance with the laws of the state of New York, except to the extent that the Trust Indenture Act is applicable.

Table of Contents

DESCRIPTION OF WARRANTS

General

We may issue warrants to purchase common stock (which we refer to as common stock warrants), preferred stock (which we refer to as preferred stock warrants) or debt securities (which we refer to as debt security warrants). Any of these warrants may be issued independently or together with any other securities offered by this prospectus and may be attached to or separate from those securities.

While the terms we have summarized below will generally apply to any future warrants we may offer under this prospectus, we will describe the particular terms of any warrants that we may offer in more detail in the applicable prospectus supplement. The terms of any warrants we offer under a prospectus supplement may differ from the terms we describe below.

We may issue the warrants under a warrant agreement, which we will enter into with a warrant agent to be selected by us. Each warrant agent will act solely as our agent under the applicable warrant agreement and will not assume any obligation or relationship of agency or trust with any holder of any warrant. A single bank or trust company may act as warrant agent for more than one issue of warrants. A warrant agent will have no duty or responsibility in case of any default by us under the applicable warrant agreement or warrant, including any duty or responsibility to initiate any proceedings at law or otherwise, or to make any demand upon us. Any holder of a warrant may, without the consent of the related warrant agent or the holder of any other warrant, enforce by appropriate legal action its right to exercise, and receive the securities purchasable upon exercise of, its warrants.

We will incorporate by reference into the registration statement of which this prospectus is a part the form of warrant agreement, including a form of warrant certificate, that describes the terms of the series of warrants we are offering before the issuance of the related series of warrants. The following summaries of material provisions of the warrants and the warrant agreements are subject to, and qualified in their entirety by reference to, all the provisions of the warrant agreement applicable to a particular series of warrants. We urge you to read the applicable prospectus supplements related to the warrants that we sell under this prospectus, as well as the complete warrant agreements that contain the terms of the warrants.

We will set forth in the applicable prospectus supplement the terms of the warrants in respect of which this prospectus is being delivered, including, when applicable, the following:

the title of the warrants;

the aggregate number of the warrants;

the price or prices at which the warrants will be issued;

the designation, number and terms of the securities purchasable upon exercise of the warrants;

the designation and terms of the other securities, if any, with which the warrants are issued and the number of warrants issued with each such security;

the date, if any, on and after which the warrants and the related underlying securities will be separately transferable;

the price at which each underlying security purchasable upon exercise of the warrants may be purchased;

the date on which the right to exercise the warrants will commence and the date on which such right will expire;

the minimum amount of the warrants that may be exercised at any one time;

any information with respect to book-entry procedures;

Table of Contents

the effect of any merger, consolidation, sale or other disposition of our business on the warrant agreement and the warrants;

any other terms of the warrants, including terms, procedures and limitations relating to the transferability, exchange and exercise of such warrants;

the terms of any rights to redeem or call, or accelerate the expiration of, the warrants;

the date on which the right to exercise the warrants begins and the date on which that right expires;

the U.S. federal income tax consequences of holding or exercising the warrants; and

any other specific terms, preferences, rights or limitations of, or restrictions on, the warrants.

Unless specified in an applicable prospectus supplement, common stock warrants, preferred stock warrants, or debt security warrants will be in registered form only.

A holder of warrant certificates may exchange them for new certificates of different denominations, present them for registration of transfer and exercise them at the corporate trust office of the warrant agent or any other office indicated in the applicable prospectus supplement. Until any common stock warrants, preferred stock warrants or debt security warrants are exercised, holders of the warrants will not have any rights of holders of the underlying common stock, preferred stock or debt securities, except to the extent set forth under the heading "Warrant Adjustments" below.

Exercise of Warrants

Each warrant will entitle the holder to purchase for cash shares of common stock, preferred stock or debt securities at the applicable exercise price set forth in, or determined as described in, the applicable prospectus supplement. Warrants may be exercised at any time up to the close of business on the expiration date set forth in the applicable prospectus supplement. After the close of business on the expiration date, unexercised warrants will become void.

Warrants may be exercised by delivering to the corporation trust office of the warrant agent or any other officer indicated in the applicable prospectus supplement (a) the warrant certificate properly completed and duly executed and (b) payment of the amount due upon exercise. As soon as practicable following exercise, we will forward the shares of common stock, preferred stock or debt securities, as applicable. If less than all of the warrants represented by a warrant certificate are exercised, a new warrant certificate will be issued for the remaining warrants. If we so indicate in the applicable prospectus supplement, holders of the warrants may surrender securities as all or a part of the exercise price for the warrants.

Amendments and Supplements to the Warrant Agreements

We may amend or supplement a warrant agreement without the consent of the holders of the applicable warrants to cure ambiguities in the warrant agreement, to cure or correct a defective provision in the warrant agreement or to provide for other matters under the warrant agreement that we and the warrant agent deem necessary or desirable, so long as, in each case, such amendments or supplements do not materially adversely affect the interests of the holders

of the warrants.

Warrant Adjustments

Unless the applicable prospectus supplement states otherwise, the exercise price of, and the number of securities covered by, a common stock warrant, preferred stock warrant or debt security warrant will be adjusted proportionately if we subdivide or combine our common stock or preferred stock, as applicable. In addition, unless the prospectus supplement states otherwise, if we, without payment:

issue capital stock or other securities convertible into or exchangeable for common stock or preferred stock, or any rights to subscribe for, purchase or otherwise acquire any of the foregoing, as a dividend or distribution to holders of our common stock or preferred stock;

Table of Contents

pay any cash to holders of our common stock or preferred stock other than a cash dividend paid out of our current or retained earnings or other than in accordance with the terms of the preferred stock;

issue any evidence of our indebtedness or rights to subscribe for or purchase our indebtedness to holders of our common stock or preferred stock; or

issue common stock or preferred stock or additional stock or other securities or property to holders of our common stock or preferred stock by way of a spin-off, split-up, reclassification, combination of shares or similar corporate rearrangement, then the holders of common stock warrants, preferred stock warrants and debt security warrants, as applicable, will be entitled to receive upon exercise of the warrants, in addition to the securities otherwise receivable upon exercise of the warrants and without paying any additional consideration, the amount of stock and other securities and property such holders would have been entitled to receive had they held the common stock, preferred stock or debt securities, as applicable, issuable under the warrants on the dates on which holders of those securities received or became entitled to receive such additional stock and other securities and property.

Except as stated above, the exercise price and number of securities covered by a common stock warrant, preferred stock warrant and debt security warrant, and the amounts of other securities or property to be received, if any, upon exercise of those warrants, will not be adjusted or provided for if we issue those securities or any securities convertible into or exchangeable for those securities, or securities carrying the right to purchase those securities or securities convertible into or exchangeable for those securities.

Holders of common stock warrants, preferred stock warrants and debt security warrants may have additional rights under the following circumstances:

certain reclassifications, capital reorganizations or changes of the common stock or preferred stock, as applicable;

certain share exchanges, mergers or similar transactions involving us and which result in changes of the common stock or preferred stock, as applicable; or

certain sales or dispositions to another entity of all or substantially all of our property and assets.

If one of the above transactions occurs and holders of our common stock, preferred stock or debt securities are entitled to receive stock, securities or other property with respect to or in exchange for their securities, the holders of the common stock warrants, preferred stock warrants and debt security warrants then outstanding, as applicable, will be entitled to receive upon exercise of their warrants the kind and amount of shares of stock and other securities or property that they would have received upon the applicable transaction if they had exercised their warrants immediately before the transaction.

Table of Contents

DESCRIPTION OF UNITS

The following description, together with the additional information we include in any applicable prospectus supplement, summarizes the material terms and provisions of the units that we may offer under this prospectus. Units may be offered independently or together with common stock, preferred stock, debt securities and warrants offered by any prospectus supplement, and may be attached to or separate from those securities. While the terms we have summarized below will generally apply to any future units that we may offer under this prospectus, we will describe the particular terms of any series of units that we may offer in more detail in the applicable prospectus supplement. The terms of any units offered under a prospectus supplement may differ from the terms described below.

We will incorporate by reference into the registration statement of which this prospectus is a part the form of unit agreement, including a form of unit certificate, if any, that describes the terms of the series of units we are offering before the issuance of the related series of units. The following summaries of material provisions of the units and the unit agreements are subject to, and qualified in their entirety by reference to, all the provisions of the unit agreement applicable to a particular series of units. We urge you to read the applicable prospectus supplements related to the units that we sell under this prospectus, as well as the complete unit agreements that contain the terms of the units.

General

We may issue units consisting of common stock, preferred stock, debt securities and/or warrants in any combination. Each unit will be issued so that the holder of the unit is also the holder of each security included in the unit. Thus, the holder of a unit will have the rights and obligations of a holder of each included security. The unit agreement under which a unit is issued may provide that the securities included in the unit may not be held or transferred separately, at any time or at any time before a specified date.

We will describe in the applicable prospectus supplement the terms of the series of units, including the following:

the designation and terms of the units and of the securities comprising the units, including whether and under what circumstances those securities may be held or transferred separately;

any provisions of the governing unit agreement that differ from those described below; and

any provisions for the issuance, payment, settlement, transfer or exchange of the units or of the securities comprising the units.

The provisions described in this section, as well as those described under Description of Common Stock, Description of Preferred Stock, Description of Debt Securities, and Description of Warrants, will apply to each unit and to any common stock, preferred stock, debt security or warrant included in each unit, respectively.

Issuance in Series

We may issue units in such amounts and in such numerous distinct series as we determine.

Enforceability of Rights by Holders of Units

Each unit agent will act solely as our agent under the applicable unit agreement and will not assume any obligation or relationship of agency or trust with any holder of any unit. A single bank or trust company may act as unit agent for more than one series of units. A unit agent will have no duty or responsibility in case of any default by us under the applicable unit agreement or unit, including any duty or responsibility to initiate any proceedings at law or otherwise, or to make any demand upon us. Any holder of a unit may, without the consent of the related unit agent or the holder of any other unit, enforce by appropriate legal action its rights as holder under any security included in the unit.

Table of Contents

Title

We, the unit agent and any of their agents may treat the registered holder of any unit certificate as an absolute owner of the units evidenced by that certificate for any purposes and as the person entitled to exercise the rights attaching to the units so requested, despite any notice to the contrary.

Table of Contents

LEGAL OWNERSHIP OF SECURITIES

We can issue securities in registered form or in the form of one or more global securities. We refer to those persons who have securities registered in their own names on the books that we or any applicable trustee, depository, or warrant agent maintain for this purpose as the holders of those securities. These persons are the legal holders of the securities. We refer to those persons who, indirectly through others, own beneficial interests in securities that are not registered in their own names as indirect holders of those securities. As we discuss below, indirect holders are not legal holders, and investors in securities issued in book-entry form or in street name will be indirect holders.

See also the section entitled Description of Debt Securities Form, Transfer, and Exchange above for additional discussion of book entry and certificated form of ownership as such forms of ownership impact the rights and obligations of purchasers of debt securities to be issued under this prospectus.

BOOK-ENTRY HOLDERS

We may issue securities in whole or in part in book-entry form, as we will specify in the applicable prospectus supplement. Book-entry form means securities may be represented by one or more global securities registered in the name of a financial institution that holds them as depository on behalf of other financial institutions that participate in the depository's book-entry system. These participating institutions, which are referred to as participants, in turn, hold beneficial interests in the securities on behalf of themselves or their customers. Upon the issuance of a global security, the depository will credit, on its book-entry registration and transfer system, the participants' accounts with the respective principal amounts of the book-entry securities represented by the global security beneficially owned by such participants. The accounts to be credited will be designated by any dealers, underwriters or agents participating in the distribution of the book-entry securities. Ownership of book-entry securities will be shown on, and the transfer of the ownership interests will be effected only through, records maintained by the depository for the related global security (with respect to interests of participants) and on the records of participants (with respect to interests of persons holding through participants). The laws of some states may require that certain purchasers of securities take physical delivery of such securities in definitive form. These laws may impair the ability to own, transfer or pledge beneficial interests in book-entry securities.

Only the person in whose name a security is registered is recognized as the holder of that security. Securities issued in global form will be registered in the name of the depository or its participants. Consequently, for securities issued in global form, we will recognize only the depository as the holder of the securities, and we will make all payments on the securities to the depository. The depository passes along the payments it receives to its participants, which in turn pass the payments along to their customers who are the beneficial owners. The depository and its participants do so under agreements they have made with one another or with their customers; they are not obligated to do so under the terms of the securities.

As a result, investors in a book-entry security will not own securities directly. Instead, they will own beneficial interests in a global security, through a bank, broker or other financial institution that participates in the depository's book-entry system or holds an interest through a participant. As long as the securities are issued in global form, investors will be indirect holders, not holders, of the securities.

Street Name Holders

We may terminate a global security or issue securities in non-global form. In these cases, investors may choose to hold their securities in their own names or in street name. Securities held by an investor in street name would be registered in the name of a bank, broker or other financial institution that the investor chooses, and the investor would

hold only a beneficial interest in those securities through an account he, she, or it maintains at that institution.

Table of Contents

For securities held in street name, we will recognize only the intermediary banks, brokers and other financial institutions in whose names the securities are registered as the holders of those securities, and we will make all payments on those securities to them. These institutions pass along the payments they receive to their customers who are the beneficial owners, but only because they agree to do so in their customer agreements or because they are legally required to do so. Investors who hold securities in street name will be indirect holders, not holders, of those securities.

Legal Holders

Our obligations, as well as the obligations of any applicable trustee and of any third parties employed by us or a trustee, run only to the legal holders of the securities. We do not have obligations to investors who hold beneficial interests in global securities, in street name or by any other indirect means. This will be the case whether an investor chooses to be an indirect holder of a security or has no choice because we are issuing the securities only in global form.

For example, once we make a payment or give a notice to the holder, we have no further responsibility for the payment or notice even if that holder is required, under agreements with depositary participants or customers or by law, to pass it along to the indirect holders but does not do so. Whether and how the holders contact the indirect holders is up to the holders.

Special Considerations For Indirect Holders

If you hold securities through a bank, broker or other financial institution, either in book-entry form or in street name, you should check with your own institution to determine the following:

how it handles securities payments and notices;

whether it imposes fees or charges;

how it would handle a request for the holders' consent, if ever required;

whether and how you can instruct it to send you securities registered in your own name so you can be a holder, if that is permitted in the future;

how it would exercise rights under the securities if there were a default or other event triggering the need for holders to act to protect their interests; and

if the securities are in book-entry form, how the depositary's rules and procedures will affect these matters.

Global Securities

A global security is a security that represents one or any other number of individual securities held by a depositary. Generally, all securities represented by the same global securities will have the same terms. Each security issued in book-entry form will be represented by a global security that we deposit with and register in the name of a financial institution or its nominee that we select. The financial institution that we select for this purpose is called the depositary. Unless we specify otherwise in the applicable prospectus supplement, DTC will be the depositary for all securities issued in book-entry form.

A global security may not be transferred to or registered in the name of anyone other than the depositary, its nominee or a successor depositary, unless special termination situations arise. We describe those situations below under **Special Situations When a Global Security Will Be Terminated**. As a result of these arrangements, the depositary, or its nominee, will be the sole registered owner and holder of all securities represented by a global security, and investors will be permitted to own only beneficial interests in a global security. Beneficial interests must be held by means of an account with a broker, bank or other financial institution that in turn has an account

Table of Contents

with the depositary or with another institution that does. Thus, an investor whose security is represented by a global security will not be a holder of the security, but only an indirect holder of a beneficial interest in the global security.

If the prospectus supplement for a particular security indicates that the security will be issued in global form only, then the security will be represented by a global security at all times unless and until the global security is terminated. If termination occurs, we may issue the securities through another book-entry clearing system or decide that the securities may no longer be held through any book-entry clearing system.

We may at any time and in our sole discretion determine not to have any of the book-entry securities of any series represented by one or more global securities and, in that event, we will issue certificated securities in exchange for the global securities of that series.

Special Considerations For Global Securities

The rights of an indirect holder relating to a global security will be governed by the account rules of the investor's financial institution and of the depositary, as well as general laws relating to securities transfers. We do not recognize an indirect holder as a holder of securities and instead deal only with the depositary that holds the global security.

If securities are issued only in the form of a global security, an investor should be aware of the following:

an investor cannot cause the securities to be registered in his, her or its name, and cannot obtain non-global certificates for his, her or its interest in the securities, except in the special situations we describe below;

an investor will be an indirect holder and must look to his, her or its own bank or broker for payments on the securities and protection of his, her or its legal rights relating to the securities, as we describe above;

an investor may not be able to sell interests in the securities to some insurance companies and to other institutions that are required by law to own their securities in non-book-entry form;

an investor may not be able to pledge his, her or its interest in a global security in circumstances where certificates representing the securities must be delivered to the lender or other beneficiary of the pledge in order for the pledge to be effective;

the depositary's policies, which may change from time to time, will govern payments, transfers, exchanges and other matters relating to an investor's interest in a global security;

we and any applicable trustee have no responsibility for any aspect of the depositary's actions or for its records of ownership interests in a global security, nor do we or any applicable trustee supervise the depositary in any way;

the depositary may, and we understand that DTC will, require that those who purchase and sell interests in a global security within its book-entry system use immediately available funds, and your broker or bank may require you to do so as well; and

financial institutions that participate in the depositary's book-entry system, and through which an investor holds its interest in a global security, may also have their own policies affecting payments, notices and other matters relating to the securities.

There may be more than one financial intermediary in the chain of ownership for an investor. We do not monitor and are not responsible for the actions of any of those intermediaries.

Table of Contents

Special Situations When a Global Security Will Be Terminated

In a few special situations described below, the global security will terminate and interests in it will be exchanged for physical certificates representing those interests. After that exchange, the choice of whether to hold securities directly or in street name will be up to the investor. Investors must consult their own banks or brokers to find out how to have their interests in securities transferred to their own name, so that they will be direct holders. We have described the rights of holders and street name investors above.

Unless we provide otherwise in the applicable prospectus supplement, the global security will terminate when the following special situations occur:

if the depositary notifies us that it is unwilling, unable or no longer qualified under the Exchange Act to continue as depositary for that global security and we do not appoint another institution to act as depositary within 90 days;

if we notify any applicable trustee that we wish to terminate that global security; or

if an event of default has occurred with regard to securities represented by that global security and has not been cured or waived.

The prospectus supplement may also list additional situations for terminating a global security that would apply only to the particular types and series of securities covered by the applicable prospectus supplement. When a global security terminates, the depositary, and not we or any applicable trustee, is responsible for deciding the names of the institutions that will be the initial direct holders.

Table of Contents

PLAN OF DISTRIBUTION

We may sell the securities described in this prospectus from time to time in one or more of the following ways:

to or through underwriters or dealers;

directly to one or more purchasers;

through agents; or

through a combination of any of those methods of sale.

The prospectus supplement with respect to the offered securities will describe the terms of the offering, including the following:

the name or names of any underwriters or agents;

any public offering price;

the proceeds from such sale;

any underwriting discounts or agency fees and other items constituting underwriters' or agents' compensation;

any over-allotment options under which underwriters may purchase additional securities from us;

any discounts or concessions allowed or reallocated or paid to dealers; and

any securities exchanges on which the securities may be listed. We may distribute the securities from time to time in one or more of the following ways:

at a fixed public offering price or prices, which may be changed;

at prices relating to prevailing market prices at the time of sale;

at varying prices determined at the time of sale; or

at negotiated prices.

Unless otherwise indicated in the applicable prospectus supplement, if we use underwriters for a sale of securities, the underwriters will acquire the securities for their own account. The underwriters may resell the securities in one or more transactions, including negotiated transactions, at a fixed public offering price, or at varying prices determined at the time of sale. The obligations of the underwriters to purchase the securities will be subject to the conditions set forth in the applicable underwriting agreement. Unless otherwise indicated in a prospectus supplement, the underwriters will be obligated to purchase all the securities of the series offered if they purchase any of the securities of that series. We may change from time to time any initial public offering price and any discounts or concessions the underwriters allow or realow or pay to dealers. We may use underwriters with whom we have a material relationship. We will describe in the prospectus supplement naming the underwriter the nature of any such relationship. We may designate agents who agree to use their reasonable efforts to solicit purchases for the period of their appointment or to sell securities on a continuing basis. We may also sell securities directly to one or more purchasers without using underwriters or agents.

Underwriters, dealers or agents may receive compensation in the form of discounts, concessions or commissions from us or from purchasers of the securities as their agents in connection with the sale of the securities. These underwriters, dealers or agents may be considered to be underwriters under the Securities Act. As a result, discounts, commissions or profits on resale received by underwriters, dealers or agents may be treated as underwriting discounts and commissions. Each prospectus supplement will identify any underwriter, dealer or agent and describe any compensation received by them from us. Any initial public offering price and any discounts or concessions allowed or reallocated or paid to dealers may be changed from time to time.

Table of Contents

Unless otherwise specified in the applicable prospectus supplement, each class or series of securities will be a new issue with no established trading market, other than our common stock, which is listed on the NASDAQ. We may elect to list any other class or series of securities on any exchange, but we are not obligated to do so. It is possible that one or more underwriters may make a market in a class or series of securities, but the underwriters will not be obligated to do so and may discontinue any market making at any time without notice. We cannot give any assurance as to the liquidity of the trading market for any of the securities.

In connection with any offering, the underwriters may engage in stabilizing transactions, over-allotment transactions, syndicate covering transactions and penalty bids in accordance with Regulation M under the Exchange Act.

Stabilizing transactions permit bids to purchase the underlying security so long as the stabilizing bids do not exceed a specified maximum.

Over-allotment involves sales by the underwriters of shares of our common stock in excess of the number of shares the underwriters are obligated to purchase, which creates a syndicate short position. The short position may be either a covered short position or a naked short position. In a covered short position, the number of shares of our common stock over-allotted by the underwriters is not greater than the number of shares that they may purchase in the over-allotment option. In a naked short position, the number of shares of our common stock involved is greater than the number of shares in the over-allotment option. The underwriters may close out any covered short position by either exercising their over-allotment option or purchasing shares of our common stock in the open market.

Syndicate covering transactions involve purchases of our common stock in the open market after the distribution has been completed in order to cover syndicate short positions. In determining the source of shares to close out the short position, the underwriters will consider, among other things, the price of shares of our common stock available for purchase in the open market as compared to the price at which they may purchase shares through the over-allotment option so that if there is a naked short position, the position can only be closed out by buying shares in the open market. A naked short position is more likely to be created if the underwriters are concerned that there could be downward pressure on the price of the shares of our common stock in the open market after the pricing of any offering that could adversely affect investors who purchase in that offering.

Penalty bids permit the representatives of the underwriters to reclaim a selling concession from a syndicate member when the common stock originally sold by the syndicate member is purchased in a stabilizing or syndicate covering transaction to cover syndicate short positions.

These stabilizing transactions, syndicate covering transactions and penalty bids may have the effect of raising or maintaining the market price of our common stock or preventing or retarding a decline in the market price of our common stock. As a result, the price of our common stock may be higher than the price that might otherwise exist in the open market. These transactions may be effected on the NASDAQ or otherwise and, if commenced, may be discontinued at any time.

Underwriters, dealers and agents may be entitled under agreements entered into with us to indemnification against certain civil liabilities, including liabilities under the Securities Act, or to contribution with respect to payments they

may be required to make in respect of these liabilities thereof. Underwriters, dealers, agents and their affiliates may be customers of, may engage in transactions with or perform services for us in the ordinary course of business for which they receive compensation.

Trading Markets and Listing Of Securities

Unless otherwise specified in the applicable prospectus supplement, each class or series of securities will be a new issue with no established trading market, other than our common stock, which is listed on The NASDAQ Global Select Market. We may elect to list any other class or series of securities on any exchange or market, but

Table of Contents

we are not obligated to do so. It is possible that one or more underwriters may make a market in a class or series of securities, but the underwriters will not be obligated to do so and may discontinue any market making at any time without notice. We cannot give any assurance as to the liquidity of the trading market for any of the securities.

Blue Sky Restrictions on Resale

After you purchase our securities under this registration statement, you will need to comply with state securities laws, also known as Blue Sky laws, with regard to secondary sales in certain states in the United States. All states offer a variety of exemptions from registration for secondary sales. Many states, for example, have an exemption for secondary trading of certain securities registered under Section 12(b) of the Securities Exchange Act. Your broker will be able to advise you about which states exempt our securities from registration for secondary sales.

Table of Contents

LEGAL MATTERS

The validity of the securities offered hereby will be passed upon by Squire Patton Boggs (US) LLP. Certain legal matters may be passed upon for any agents or underwriters by counsel for such agents or underwriters identified in the applicable prospectus supplement.

EXPERTS

The consolidated financial statements of Amtech Systems, Inc. incorporated in this prospectus by reference to our Annual Report on Form 10-K, as amended, for the year ended September 30, 2016 have been so incorporated in reliance on the reports of Mayer Hoffman McCann P.C., an independent registered public accounting firm, given on the authority of said firm as experts in auditing and accounting.

Table of Contents

Shares of Common Stock

Prospectus Supplement

Roth Capital Partners

August , 2017