

Avinger Inc
Form 424B5
August 10, 2016

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As filed pursuant to Rule 424(b)(5)
Registration No. 333-209368

The information in this 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 preliminary prospectus supplement and the accompanying prospectus are not an offer to sell these securities and we are not soliciting an offer to buy these securities in any state where the offer or sale is not permitted.

SUBJECT TO COMPLETION, DATED AUGUST 10, 2016

PROSPECTUS SUPPLEMENT

(to Prospectus dated March 8, 2016)

Shares

Common Stock

Avinger, Inc. is offering _____ shares of its common stock pursuant to this prospectus supplement and the accompanying prospectus. Our common stock is quoted on the Nasdaq Global Market under the symbol "AVGR." On August 9, 2016, the last reported sale price of our common stock on the Nasdaq Global Market was \$4.70 per share.

Jeffrey M. Soinski and Matthew B. Ferguson, our chief executive officer and chief financial officer, respectively, as well as other employees have indicated a preliminary interest in purchasing up to an aggregate of approximately \$250,000 of shares of our common stock in this offering at the public offering price. Because these indications of interest are not binding agreements or commitments to purchase, these persons may elect to purchase more, fewer or no shares in this offering or the underwriters may elect to sell more, fewer or no shares in this offering to such persons. The underwriters will receive the same discount from any shares of our common stock purchased by such persons as they will from any other shares of our common stock sold to the public in this offering.

We are an "emerging growth company" as defined under the federal securities laws and, as such, have elected to comply with certain reduced public company reporting requirements.

INVESTING IN OUR SECURITIES INVOLVES SIGNIFICANT RISKS. YOU SHOULD REVIEW CAREFULLY THE "RISK FACTORS" BEGINNING ON PAGE S-10 OF THIS PROSPECTUS SUPPLEMENT AND PAGE 4 OF THE ACCOMPANYING PROSPECTUS, AS WELL AS THE RISK FACTORS DESCRIBED UNDER THE SECTION ENTITLED "RISK FACTORS" CONTAINED IN OUR QUARTERLY REPORT ON FORM 10-Q FOR THE QUARTER ENDED JUNE 30, 2016, BEFORE

INVESTING IN OUR SECURITIES.

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 supplement. Any representation to the contrary is a criminal offense.

| | PER SHARE | TOTAL |
|---|------------------|--------------|
| Public Offering Price | \$ | \$ |
| Underwriting Discounts and Commissions ⁽¹⁾ | \$ | \$ |
| Proceeds to Avinger, before expenses | \$ | \$ |

⁽¹⁾ We have agreed to reimburse the underwriters for certain Financial Industry Regulatory Authority, Inc. ("FINRA") related and other expenses. See "Underwriting."

Delivery of the common stock is expected to be made on or about August , 2016. We have granted the underwriters a 30-day option to purchase up to an additional shares of our common stock, less underwriting discounts and commissions, solely to cover overallocments, if any. If the underwriters exercise this option in full, the total underwriting discounts and commissions payable by us will be \$ and the total proceeds to us, before expenses, will be \$.

Joint Book-Running Managers

Canaccord Genuity

Cowen and Company

Co-Managers

BTIG

Stephens Inc.

The date of this prospectus supplement is August , 2016

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ABOUT THIS PROSPECTUS SUPPLEMENT

This prospectus supplement and accompanying prospectus relates to the offering of our common stock. Before buying any of the common stock that we are offering, we urge you to carefully read this prospectus supplement, the accompanying prospectus, any free writing prospectus that we have authorized for use in connection with this offering, and the information incorporated by reference as described under the headings "Where You Can Find More Information" and "Information Incorporated by Reference" in this prospectus supplement. These documents contain important information that you should consider when making your investment decision.

This document is comprised of two parts. The first part is this prospectus supplement, which describes the specific terms of this offering 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, including the documents incorporated by reference into the accompanying prospectus, provides more general information, some of which may not apply to this offering. Generally, when we refer to this prospectus, we are referring to the combined document consisting of this prospectus supplement and the accompanying prospectus. In this prospectus supplement, as permitted by law, we "incorporate by reference" information from other documents that we file with the Securities and Exchange Commission, or the SEC. This means that we can disclose important information to you by referring to those documents. The information incorporated by reference is considered to be a part of this prospectus supplement and the accompanying prospectus and should be read with the same care. When we make future filings with the SEC to update the information contained in documents that have been incorporated by reference, the information included or incorporated by reference in this prospectus supplement is considered to be automatically updated and superseded. In other words, in case of a conflict or inconsistency between information contained in this prospectus supplement and information in the accompanying prospectus or incorporated by reference into this prospectus supplement, you should rely on the information contained in the document that was filed later.

This prospectus supplement and the accompanying prospectus are part of a registration statement on Form S-3 that we filed on February 3, 2016 with the SEC using a "shelf" registration process with respect to up to \$150,000,000 in securities that may be sold thereunder. The shelf registration statement was declared effective by the SEC on March 8, 2016.

Under the shelf registration process, we may offer and sell any combination of securities described in the accompanying prospectus in one or more offerings. The purpose of this prospectus supplement is to provide supplemental information regarding us in connection with this offering of common stock.

You should rely only on the information contained in, or incorporated by reference into, this prospectus supplement, the accompanying prospectus, and in any free writing prospectus that we have authorized for use in connection with this offering. We have not authorized any other person to provide you with different information. We are not making an offer to sell or soliciting an offer to buy our securities in any jurisdiction in which an offer or solicitation is not authorized or in which the person making that offer or solicitation is not qualified to do so or to anyone to whom it is unlawful to make an offer or solicitation. You should assume that the information appearing in this prospectus supplement, the accompanying prospectus, the documents incorporated by reference into this prospectus supplement and the accompanying prospectus, and in any free writing prospectus that we have authorized for use in connection with this offering, is accurate only as of the date of those respective documents. Our business, financial condition, results of operations, and prospects may have changed since those dates.

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PROSPECTUS SUPPLEMENT SUMMARY

This summary description about us and our business highlights selected information contained elsewhere in this prospectus supplement or the accompanying prospectus, or incorporated in this prospectus supplement or the accompanying prospectus by reference. This summary does not contain all of the information you should consider before buying securities in this offering. You should carefully read this entire prospectus supplement and the accompanying prospectus, including each of the documents incorporated herein or therein by reference, before making an investment decision. Unless the context otherwise requires, the terms "Avinger," "the Company," "we," "us" and "our" in this prospectus supplement and accompanying prospectus refer to Avinger, Inc., and its subsidiaries.

Avinger, Inc.

Overview

We are a commercial-stage medical device company that designs, manufactures and sells image-guided, catheter-based systems that are used by physicians to treat patients with peripheral artery disease, or PAD. Patients with PAD have a build-up of plaque in the arteries that supply blood to areas away from the heart, particularly the pelvis and legs. Our mission is to dramatically improve the treatment of vascular disease through the introduction of products based on our Lumivascular platform, the only intravascular image-guided system available in this market. We manufacture and sell a suite of products in the United States and select European markets. Our current products include our Lightbox imaging console, as well as our Wildcat, Kittycat, and the Ocelot family of catheters, which are designed to allow physicians to penetrate a total blockage in an artery, known as a chronic total occlusion, or CTO, and Pantheris, our image-guided atherectomy device which is designed to allow physicians to precisely remove arterial plaque in PAD patients. In October 2015, we received 510(k) clearance from the U.S. Food and Drug Administration, or FDA, for commercialization of Pantheris, and we received an additional 510(k) clearance for an enhanced version of Pantheris in March 2016 and commenced sales of Pantheris in the U.S. and select European countries promptly thereafter. We believe that Pantheris will significantly enhance our market opportunity within PAD and can expand the overall addressable market for PAD endovascular procedures.

Additional Information about the Company

The following information updates, and should be read in conjunction with, the business information supplied in Part 1, Item 1 of our Form 10-K for the fiscal year ended December 31, 2015, filed with the SEC on March 8, 2016:

Market Opportunity

Current treatments for PAD, including bypass surgery and amputations, can be invasive, costly and may result in high rates of complications, high levels of post-surgery pain, lengthy hospital stays and recovery times, increased mortality and decreased quality of life. In 2016, according to the Sage Group, there were expected to be 200,000 amputations performed in the United States to treat PAD. We also believe that in 2016 150,000 bypass surgery procedures will be performed in the United States to treat PAD. Minimally invasive, or endovascular, treatments include stents, which are permanently implanted in the vessel and have the risk of fractures, angioplasty, which could result in arterial dissections, treatments for chronic total occlusions, which are technique dependent and lack direct reimbursement, and atherectomy devices, which are catheter-based products for the removal of plaque and have the risk of perforating the vessel. These treatments also have limitations in their safety or efficacy profiles and frequently result in recurrence of the disease, also known as restenosis. We

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believe one of the main contributing factors to high restenosis rates for PAD patients treated with endovascular technologies is the amount of vascular injury, or adventitial disruption, that occurs during an intervention. Specifically, these treatments often disrupt the membrane between the outermost layers of the artery, which is referred to as the external elastic lamina. The Millennium Research Group estimates that 620,000 endovascular procedures will be performed in the United States in 2016, representing a \$1.31 billion market. Of those procedures (and multiple techniques can be used in a single procedure), 314,000 are estimated to include stents, representing a \$523 million market, 560,000 are estimated to include angioplasty, representing a \$240 million market, 155,000 are estimated to include treatments for chronic total occlusions, representing an \$82 million market, and 149,000 are estimated to include atherectomy, representing a \$464 million market.

Fluoroscopy

Fluoroscopy is the primary imaging tool currently used during endovascular treatments but delivers limited information to physicians. As described in our Form 10-K for the fiscal year ended December 31, 2015, we believe that decreased radiation exposure for physicians and patients who use our Lumivasular platform, which utilizes radiation-free OCT imaging to provide real-time visualization from the inside of the artery, is one of the primary benefits of our products. When using our Lumivasular platform, physicians may elect to use less fluoroscopy during a procedure as a result of having an additional means of visualization that does not involve radiation. The use of fluoroscopy exposes physicians, hospital staff and patients to radiation, which can lead to cataracts, cancer and abnormal blood cell counts. For example, according to an article published in 2013 in the *American Journal of Cardiology*, there is an increasing prevalence of left sided brain tumors (85% of identified tumors) in physicians conducting these treatments since the left side of the head is typically closest to the radiation source during endovascular procedures, according to a 2001 article in the *European Heart Journal*, there is an exacerbation of reactive oxygen species and blood-borne cancers for those exposed, and according to a 1996 article in the journal *Radiographics*, soft tissue cancers, hair loss and skin mottling are noticeable in the non-dominant hand of physicians as a result of exposure. In addition, according to a 2010 article in the journal *Radiation Research*, there is more than 3.2 times the risk of accelerated cataracts among practitioners of such procedures. As such, endovascular procedures to treat PAD pose substantial health risks to physicians performing these procedures due to high levels of radiation exposure. Both Ocelot and Pantheris require the use of fluoroscopy for positioning the device at the site of the lesion, but they rely primarily on our Lumivasular platform for imaging during the crossing or treatment of the lesion. In a study of 16 CTO procedures at St. John Hospital in Detroit, Michigan, the mean time of fluoroscopy exposure was 5.99 minutes for the diagnostic portion of the procedure (which did not utilize our Lumivasular platform products), 0.24 minutes of exposure for chronic total occlusion crossing purposes (which utilized Ocelot) and 14.88 minutes of exposure per use for therapeutic purposes (which used no Lumivasular platform products). We have not yet conducted studies quantifying the fluoroscopy use during Pantheris procedures, but we believe it will be reduced compared to directional atherectomy procedures using products that do not have integrated intravascular imaging.

VISION (Pantheris)

VISION was our pivotal, non-randomized, prospective, single-arm trial to evaluate the safety and effectiveness of Pantheris across 20 sites within the United States and Europe. Physicians used Pantheris on 130 patients at 20 clinical sites and treated 164 lesions. The mean lesion length was 7.3 centimeters plus or minus a standard deviation of 4.1 centimeters.

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VISION's primary efficacy endpoint required that at least 87% of lesions treated have a residual stenosis of less than 50%, as verified by an independent core laboratory. As previously reported in our Form 10-K for the fiscal year ended December 31, 2015, the VISION trial surpassed its primary efficacy endpoint with residual restenosis of less than 50% achieved in 96.3% of lesions treated. Furthermore, as shown in the figure below, across all 164 lesions treated, the average stenosis before treatment was 79%, and following treatment with Pantheris, residual stenosis was 30%. Following adjunctive treatment, if any, residual stenosis on average was 22%.

Another important endpoint measured in the VISION Trial was target lesion revascularization, or TLR, which occurs when a narrowing of the vessel recurs at the site of the original lesion to the point that retreatment is required. Target lesion revascularization occurred in 8% of patients treated through 6 months of follow-up.

Several statistics on subsets of patients and lesions treated in our VISION trial have also been presented. In the figure on the left below, a trend of improved TLR rates as physicians treated more patients was shown, with TLR occurring in only 2.9% of lesions after 5 lesions had been treated and zero TLRs occurring after 10 lesions had been treated.

The middle figure below indicates that TLRs occurred at an identical rate of 6.5% in CTO lesions (i.e., the vessel was 100% blocked) and in non-CTO lesions (i.e., the vessel was less than 100% blocked).

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The figure on the right below reports that adjunctive stenting was used at a low rate in the VISION trial, with non-CTO lesions receiving a stent in addition to Pantheris treatment only 5% of the time and CTO lesions receiving a stent just 3% of the time.

Commercialization

We have grown our commercial presence since our initial public offering in 2015. Our lumivasular accounts have grown from 63 in the first quarter of 2015, to 69 in the second quarter of 2015, to 82 in the third quarter of 2015, to 95 in the fourth quarter of 2015, to 107 in the first quarter of 2016 and to 126 in the second quarter of 2016. The size of our sales organization has also grown from 35 people in the first quarter of 2015, to 38 in the second quarter of 2015, to 41 in the third quarter of 2015, to 57 in the fourth quarter of 2015, to 62 in the first quarter of 2016 and declined to 59 in the second quarter of 2016.

Corporate Information

We were incorporated in Delaware on March 8, 2007. Our principal executive offices are located at 400 Chesapeake Drive, Redwood City, California 94063, and our telephone number is (650) 241-7900. Our website address is www.avinger.com. The information on, or that may be accessed through, our website is not incorporated by reference into this prospectus supplement or accompanying prospectus and should not be considered a part of this prospectus supplement or accompanying prospectus.

"Avinger," "Pantheris" and "Lumivasular" are trademarks of our company. Our logo and our other trade names, trademarks and service marks appearing in this prospectus supplement and accompanying prospectus are our property. Other trade names, trademarks and service marks appearing in this prospectus and accompanying prospectus are the property of their respective owners. Solely for convenience, our trademarks and tradenames referred to in this prospectus and accompanying prospectus appear without the symbol, but those references are not intended to indicate, in any way, that we will not assert, to the fullest extent under applicable law, our rights, or the right of the applicable licensor to these trademarks and tradenames.

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Implications of Being an Emerging Growth Company

We qualify as an "emerging growth company" as defined in the Jumpstart Our Business Startups Act of 2012, or the JOBS Act. An emerging growth company may take advantage of relief from certain reporting requirements and other burdens that are otherwise applicable generally to public companies. As an emerging growth company:

we have availed ourselves of the exemption from the requirement to obtain an attestation and report from our auditors on the assessment of our internal control over financial reporting pursuant to the Sarbanes-Oxley Act of 2002;

we will provide less extensive disclosure about our executive compensation arrangements; and

we will not require shareholder non-binding advisory votes on executive compensation or golden parachute arrangements.

We may use these provisions until the last day of our fiscal year following the fifth anniversary of our initial public offering, or December 31, 2020. However, if certain events occur prior to the end of such five-year period, including if we become a "large accelerated filer," our annual gross revenues exceed \$1.0 billion or we issue more than \$1.0 billion of non-convertible debt in any three-year period, we will cease to be an emerging growth company prior to the end of such five-year period. We may choose to take advantage of some but not all of these reduced burdens. To the extent that we take advantage of these reduced burdens, the information that we provide stockholders may be different than you might obtain from other public companies in which you hold equity interests.

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The Offering

| | |
|--|--|
| Common Stock Offered by Us | shares of our common stock. |
| Common Stock to be Outstanding Immediately after this Offering | shares. |
| Overallotment Option to Purchase Additional Shares | shares. |
| Use of Proceeds | We intend to use the net proceeds from this offering for general corporate purposes, including working capital, capital expenditures, other corporate expenses and acquisitions of complementary products, technologies or businesses. Use of proceeds may also include the partial repayment of debt under our loan agreement with CRG Partners III L.P, and certain of its affiliated funds, or CRG, in order to cure potential non-compliance with the covenant in the loan agreement requiring that we achieve minimum revenue of \$23.0 million in 2016. See "Use of Proceeds" on page S-14. |
| Risk Factors | Investing in our common stock involves significant risks. You should read the "Risk Factors" section beginning on page S-10 of this prospectus supplement and in the documents incorporated by reference in this prospectus supplement and accompanying prospectus, including the risk factors described under the section entitled "Risk Factors" contained in our Quarterly Report on Form 10-Q for the quarter ended June 30, 2016, for a discussion of factors to consider before deciding to purchase shares of our common stock. |
| NASDAQ Global Market Symbol | "AVGR." |
| Indications of Interest | Jeffrey M. Soinski and Matthew B. Ferguson, our chief executive officer and our chief financial officer, respectively, as well as other employees have indicated a preliminary interest in purchasing up to an aggregate of approximately \$250,000 of shares of our common stock in this offering at the public offering price. Because these indications of interest are not binding agreements or commitments to purchase, these persons may elect to purchase more, fewer or no shares in this offering or the underwriters may elect to sell more, fewer or no shares in this offering to such persons. The underwriters will receive the same discount from any shares of our common stock purchased by such persons as they will from any other shares of our common stock sold to the public in this offering. |

The number of shares of our common stock to be outstanding after this offering is based on 12,836,144 shares of our common stock outstanding as of June 30, 2016, and excludes:

3,801,543 shares of common stock issuable upon the exercise of stock options outstanding as of June 30, 2016 with a weighted average exercise price of \$8.25 per share;

2,152,117 shares of common stock issuable upon exercise of outstanding warrants;

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267,558 unvested restricted stock units;

1,067,665 shares of common stock reserved for future issuance under our 2015 Equity Incentive Plan, or our 2015 Plan, and any additional shares that become available under our 2015 Plan pursuant to provisions thereof that automatically increase the share reserve under the plan each year, and

625,052 shares of common stock reserved for future issuance under our 2015 Employee Stock Purchase Plan, or ESPP, and any additional shares that become available under our ESPP pursuant to provisions thereof that automatically increase the share reserve under the plan each year.

Except as otherwise indicated, all information in this prospectus supplement assumes no exercise of by the underwriters of their overallotment option.

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Summary Financial Data

The table below presents financial data for the periods indicated. The summary financial data for the years ended December 31, 2013, 2014 and 2015 are derived from our audited financial statements and related notes for those periods that are incorporated by reference in this prospectus supplement and accompanying prospectus. The summary financial data for the six month ended June 30, 2015 and 2016 have been derived from our unaudited financial statements and related notes that are incorporated by reference in this prospectus supplement and accompanying prospectus. In the opinion of management, such unaudited interim financial data contains all adjustments necessary for the fair statement of our financial position and results of operations as of and for such periods. Historical results are not necessarily indicative of results that may be expected or attained for future periods.

The following information is only a summary. You should read this data in conjunction with our historical financial statements and related notes and "Management's Discussion and Analysis of Financial Condition and Results of Operations" contained in our Annual Report filed on Form 10-K, Quarterly Reports filed on Form 10-Q and other information on file with the SEC that is incorporated by reference in this prospectus supplement and the accompanying prospectus. For more details on how you can obtain our SEC reports and other information, you should read the section of this prospectus supplement entitled "Where You Can Find More Information." Our results of operations are for historical periods and are not necessarily indicative of results of operations for future periods.

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Statements of Operations Data:

| | Six Months Ended June 30, | | Year Ended December 31, | | |
|--|---------------------------------------|-------------|-------------------------|-------------|-------------|
| | 2016 | 2015 | 2015 | 2014 | 2013 |
| | (in thousands, except per share data) | | | | |
| Revenues | \$ 9,219 | \$ 5,135 | \$ 10,713 | \$ 11,213 | \$ 12,964 |
| Cost of revenues | 7,005 | 2,922 | 6,478 | 6,513 | 8,205 |
| Gross profit | 2,214 | 2,213 | 4,235 | 4,700 | 4,759 |
| Operating expenses: | | | | | |
| Research and development | 7,914 | 7,812 | 15,694 | 11,224 | 15,973 |
| Selling, general and administrative | 21,622 | 12,910 | 29,231 | 18,503 | 25,758 |
| Total operating expenses | 29,536 | 20,722 | 44,925 | 29,727 | 41,731 |
| Loss from operations | (27,322) | (18,509) | (40,690) | (25,027) | (36,972) |
| Interest income (expense), net | (2,345) | (2,655) | (5,127) | (6,014) | (2,923) |
| Other income (expense), net | 5 | 534 | (1,527) | (909) | 5 |
| Loss before provision for income taxes | (29,662) | (20,630) | (47,344) | (31,950) | (39,890) |
| Provision for income taxes | | 7 | | 14 | 11 |
| Net loss and comprehensive loss | (29,662) | (20,637) | (47,344) | (31,964) | (39,901) |
| Adjustment to net loss resulting from convertible preferred stock modification | | (2,384) | (2,384) | | |
| Net loss and comprehensive loss attributable to common stockholders | \$ (29,662) | \$ (23,021) | \$ (49,728) | \$ (31,964) | \$ (39,901) |
| Net loss attributable to common stockholders per share, basic and diluted | \$ (2.34) | \$ (2.23) | \$ (4.38) | \$ (132.63) | \$ (170.52) |
| Weighted average common shares used to compute net loss per share, basic and diluted | 12,702 | 10,317 | 11,362 | 241 | 234 |

Balance Sheets Data:

| | As of June 30, 2016 | As of December 31, | |
|--|---------------------------|--------------------|-----------|
| | | 2015 | 2014 |
| | (in thousands) | | |
| Cash and cash equivalents | \$ 22,439 | \$ 43,059 | \$ 12,316 |
| Working capital | 28,123 | 43,576 | 9,917 |
| Total assets | 38,191 | 54,104 | 24,437 |
| Long-term borrowings | 40,141 | 29,565 | 18,228 |
| Convertible notes and accrued interest | | | 8,609 |

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| | | | |
|--------------------------------------|-----------|-----------|-----------|
| Convertible preferred stock | | | 132,260 |
| Accumulated deficit | (225,923) | (196,261) | (146,533) |
| Total stockholders' equity (deficit) | (8,735) | 15,589 | (143,868) |

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RISK FACTORS

An investment in our securities involves a high degree of risk. Prior to making a decision about investing in our securities, you should carefully consider the specific factors discussed below, the risk factors beginning on page 4 of the accompanying prospectus, as well as the risk factors discussed under the section entitled "Risk Factors" contained in our Quarterly Report on Form 10-Q for the quarter ended June 30, 2016 as updated by our subsequent filings under the Securities Exchange Act of 1934, as amended, or the Exchange Act, each of which is incorporated by reference in this prospectus supplement and accompanying prospectus in their entirety, together with all of the other information contained or incorporated by reference in this prospectus supplement, the accompanying prospectus, the documents incorporated by reference herein and therein, and any related free writing prospectus. The risks and uncertainties we have described are not the only ones we face. Additional risks and uncertainties not presently known to us or that we currently deem immaterial may also affect our operations. The occurrence of any of these known or unknown risks might cause you to lose all or part of your investment in the offered securities.

Risks Related to this Offering

The market price of our common stock may be volatile, and the value of your investment could decline significantly.

The trading price for our common stock has been, and we expect it to continue to be, volatile. The price at which our common stock trades depends upon a number of factors, including our historical and anticipated operating results, our ability to meet our own financial projections or those of analysts who follow our company, our financial situation, announcements of technological innovations or new products by us or our competitors, our ability or inability to raise the additional capital we may need and the terms on which we raise it, and general market and economic conditions, some of which are beyond our control. These broad market fluctuations may lower the market price of our common stock and affect the volume of trading in our stock.

We have broad discretion in the use of the net proceeds from this offering and may not use them effectively.

Our management will have broad discretion in the application of the net proceeds from this offering and could spend the proceeds in ways with which you may not agree. Accordingly, you will be relying on the judgment of our management with regard to the use of these net proceeds, and you will not have the opportunity, as part of your investment decision, to assess whether the proceeds are being used appropriately. It is possible that the proceeds will be invested or otherwise used in a way that does not yield a favorable, or any, return for our company.

You will experience immediate and substantial dilution.

The offering price per share in this offering may exceed the net tangible book value per share of our common stock outstanding prior to this offering. After giving effect to the sale of our common stock in the aggregate amount of \$ in this offering at an offering price of \$ per share for aggregate gross proceeds of \$ million, and after deducting commissions and estimated offering expenses payable by us, you will experience immediate dilution of \$ per share, representing the difference between our as adjusted net tangible book value per share as of June 30, 2016 after giving effect to this offering, on the one hand, and the assumed offering price, on the other. The exercise of outstanding stock options and warrants will result in further dilution of your investment. See the section titled "Dilution" below for a more detailed illustration of the dilution you would incur if you participate in this offering.

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You may experience future dilution as a result of future equity offerings.

To the extent that we raise additional funds through the sale of equity or convertible debt securities, the issuance of such securities will result in dilution to our stockholders. We may sell shares or other securities in any other offering at a price per share that is less than the price per share paid by investors in this offering, and investors purchasing shares or other securities in the future could have rights superior to existing stockholders. The price per share at which we sell additional shares of our common stock, or securities convertible or exchangeable into common stock, in future transactions may be higher or lower than the price per share paid by investors in this offering.

Future sales of our common stock in the public market could cause our stock price to fall.

Sales of a substantial number of shares of our common stock in the public market, or the perception that these sales might occur, could depress the market price of our common stock and could impair our ability to raise capital through the sale of additional equity securities. As of June 30, 2016, we had 12,836,144 shares of common stock outstanding, all of which shares, other than shares held by our directors and executive officers which are subject to ninety (90) day lock-up agreements in connection with this offering, were, and continue to be, eligible for sale in the public market, subject in some cases to compliance with the requirements of Rule 144, including the volume limitations and manner of sale requirements. In addition, all of the shares offered under this prospectus supplement and the accompanying prospectus will be freely tradable without restriction or further registration upon issuance.

We have never declared or paid dividends on our capital stock and we do not anticipate paying dividends in the foreseeable future.

Our business requires significant funding, and we currently invest available funds and earnings in product development. Therefore, we do not anticipate paying any cash dividends on our common stock in the foreseeable future. We currently plan to invest all available funds and future earnings in the development and growth of our business. As a result, capital appreciation, if any, of our common stock will be your sole source of potential gain for the foreseeable future.

Our Certificate of Incorporation, Bylaws and Delaware law contain provisions that could discourage a takeover that is beneficial to stockholders.

Provisions of our Certificate of Incorporation, our Bylaws and Delaware law could make it difficult for a third party to acquire us, even if doing so would be beneficial to our stockholders.

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CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus supplement, the accompanying prospectus, the documents we have filed with the SEC that are incorporated by reference in this prospectus supplement and accompanying prospectus and any free writing prospectus that we have authorized for use in connection with this offering contain "forward-looking statements" within the meaning of Section 27A of the Securities Act and Section 21E of the Securities Exchange Act of 1934, as amended, or the Exchange Act, concerning our business, operations and financial performance and condition. In some cases, you can identify forward-looking statements by terminology such as "anticipate," "assume," "believe," "contemplate," "continue," "could," "due," "estimate," "expect," "goal," "intend," "may," "objective," "plan," "predict," "potential," "positioned," "seek," "should," "target," "will," "would" and other similar expressions that are predictions of or indicate future events and future trends, or the negative of these terms or other comparable terminology.

These forward-looking statements may include, but are not limited to, statements about:

the outcome of our clinical studies and plans to conduct further clinical studies;

our plans to modify our current products, or develop new products, to address additional indications;

our ability to obtain additional financing through our "at-the-market" program and future public offerings;

the expected timing of 510(k) submissions to FDA, and associated marketing clearances by FDA, for enhanced versions of Pantheris;

the expected growth in our business and our organization;

our expectations regarding government and third-party payor coverage and reimbursement;

our ability to retain and recruit key personnel, including the continued development of a sales and marketing infrastructure;

our ability to obtain and maintain intellectual property protection for our products;

our estimates of our expenses, ongoing losses, future revenue, capital requirements and our needs for, or ability to obtain, additional financing;

our expectations regarding the time during which we will be an emerging growth company under the Jumpstart Our Business Startups Act or a smaller reporting company under the Securities Act;

our ability to identify and develop new and planned products and acquire new products;

our financial performance;

our ability to remain in compliance with laws and regulations that currently apply or become applicable to our business, both in the United States and internationally; and

developments and projections relating to our competitors or our industry.

We believe that it is important to communicate our future expectations to our investors. However, there may be events in the future that we are not able to accurately predict or control and that may cause our actual results to differ materially from the expectations we describe in our forward-looking statements. These forward-looking statements are based on management's current expectations, estimates, forecasts and projections about our business and the industry in which we operate and management's beliefs and assumptions and are not guarantees of future performance or developments and involve known and unknown risks, uncertainties and other factors that are in some cases beyond

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our control. As a result, any or all of our forward-looking statements in this prospectus supplement, the accompanying prospectus, the documents we have filed with the SEC that are incorporated by reference in this prospectus supplement and accompanying prospectus, and any free writing prospectus that we have authorized for use in connection with this offering may turn out to be inaccurate. Factors that may cause actual results to differ materially from current expectations include, among other things, those listed under the heading "Risk Factors" beginning on page S-10 of this prospectus supplement and elsewhere in the accompanying prospectus and those included in our Quarterly Report on Form 10-Q for the quarter ended June 30, 2016 and other documents we periodically file with the SEC that are incorporated by reference in this prospectus supplement and accompanying prospectus. We urge you to consider these factors carefully in evaluating the forward-looking statements. We assume no obligation to update or revise these forward-looking statements for any reason, even if new information becomes available in the future.

You should not rely upon forward-looking statements as predictions of future events. Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee that the future results, levels of activity, performance or events and circumstances reflected in the forward-looking statements will be achieved or occur. Moreover, neither we nor any other person assumes responsibility for the accuracy and completeness of the forward-looking statements. We undertake no obligation to update publicly any forward-looking statements for any reason after the date of this prospectus supplement to conform these statements to actual results or to changes in our expectations.

You should read this prospectus supplement, the accompanying prospectus, the documents we have filed with the SEC that are incorporated by reference in this prospectus supplement and accompanying prospectus and any free writing prospectus that we have authorized for use in connection with this offering completely and with the understanding that our actual future results, levels of activity, performance and events and circumstances may be materially different from what we expect. We qualify all of the forward-looking statements in the foregoing documents by these cautionary statements.

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USE OF PROCEEDS

We intend to use the net proceeds from this offering for general corporate purposes, including working capital, capital expenditures, other corporate expenses and acquisitions of complementary products, technologies or businesses. Use of proceeds may also include the partial repayment of debt under our loan agreement with CRG in order to cure potential non-compliance with the covenant in the loan agreement requiring that we achieve minimum revenue of \$23.0 million in 2016. We do not have agreements or commitments for any specific acquisitions at this time.

As of June 30, 2016, we had \$40.1 million outstanding under our loan agreement with CRG. Interest is calculated at a fixed rate of 12.5% per annum. Until June 30, 2019, we have the right to make the 12.5% interest payment by making a cash payment for 8.5% per annum of interest and making a payment-in-kind, or PIK, for the remaining amount, for which the 4.0% per annum of interest would be added to the outstanding principal amount of the loan. To date, we have elected the PIK interest option to the extent available and have made a cash payment for the remaining amount. All unpaid principal, and accrued and unpaid interest, is due and payable in full on September 30, 2021. We used the proceeds that we borrowed under the loan agreement with CRG to retire our outstanding principal and accrued interest with PDL Biopharma and to retire the principal and accrued interest underlying our outstanding promissory notes. If we fail to meet the minimum revenue target in any calendar year under the covenant in the loan agreement with CRG, the loan agreement provides us with a cure right if we prepay a portion of the outstanding principal equal to 2.0 times the revenue shortfall.

The timing and amount of our actual expenditures will be based on many factors, including cash flows from operations and the anticipated growth of our business. As of the date of this prospectus supplement, we cannot specify with certainty all of the particular uses for the net proceeds to us from this offering. As a result, our management will have broad discretion regarding the timing and application of the net proceeds from this offering. Pending their ultimate use, we intend to invest the net proceeds in short-term, investment-grade, interest-bearing instruments.

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

Our common stock is listed on the NASDAQ Global Market under the symbol "AVGR." Prior to January 30, 2015, there was no public market for our common stock. In our IPO, our common stock priced at \$13.00 per share on January 29, 2015. The following table sets forth, for the periods indicated, the high and low sales prices of our common stock as reported on The NASDAQ Global Market:

| | Low | High |
|---|----------|----------|
| Fiscal Year ending December 31, 2015 | | |
| First Quarter (beginning January 30, 2015) | \$ 9.35 | \$ 14.42 |
| Second Quarter | \$ 10.20 | \$ 13.39 |
| Third Quarter | \$ 12.25 | \$ 17.47 |
| Fourth Quarter | \$ 14.35 | \$ 25.11 |
| Fiscal Year ending December 31, 2016 | | |
| First Quarter | \$ 8.25 | \$ 22.46 |
| Second Quarter | \$ 9.47 | \$ 14.48 |
| Third Quarter (through August 9, 2016) | \$ 4.22 | \$ 12.10 |

As of August 9, 2016, there were 199 holders of record of our common stock. On August 9, 2016, the last reported sale price of our common stock as reported on The NASDAQ Global Market was \$4.70 per share.

DIVIDEND POLICY

We have never declared or paid any dividends on our capital stock. We currently expect to retain future earnings, if any, for use in the operation and expansion of our business and do not anticipate paying any cash dividends in the foreseeable future. In addition, our Loan Agreement with CRG prohibits us from, among other things, paying any dividends or making any other distribution or payment on account of our common stock.

Table of Contents**DILUTION**

If you invest in our common stock, your interest will be diluted to the extent of the difference between the price per share of our common stock you pay in this offering and the as adjusted net tangible book value per share of our common stock immediately after this offering.

Our net tangible book value as of June 30, 2016 was approximately \$(8.7) million, or \$(0.68) per share. Net tangible book value per share is determined by dividing our total tangible assets, less total liabilities, by the number of shares of our common stock outstanding as of June 30, 2016. Dilution in net tangible book value per share represents the difference between the amount per share paid by purchasers of shares of common stock in this offering and the as adjusted net tangible book value per share of our common stock immediately after giving effect to this offering.

After giving effect to the sale of our common stock in the aggregate amount of \$ _____ in this offering at an offering price of \$ _____, and after deducting commissions and estimated aggregate offering expenses payable by us, our as adjusted net tangible book value as of June 30, 2016 would have been approximately \$ _____ million, or \$ _____ per share. This represents an immediate increase in net tangible book value of \$ _____ per share to existing stockholders and immediate dilution in net tangible book value of \$ _____ per share to new investors purchasing our common stock in this offering.

The following table illustrates this dilution on a per share basis:

| | |
|---|-----------|
| Assumed public offering price per share | \$ _____ |
| Net tangible book value per share as of June 30, 2016 | \$ (0.68) |
| Increase in net tangible book value per share attributable to new investors | \$ _____ |

As adjusted net tangible book value per share after this offering

| | |
|--|----------|
| Dilution per share to investors in this offering | \$ _____ |
|--|----------|

An increase of \$1.00 per share in the price at which the shares are sold from the assumed offering price of \$ _____ per share shown in the table above would increase our adjusted net tangible book value per share after the offering to \$ _____ per share and would increase the dilution in net tangible book value per share to new investors in this offering to \$ _____ per share, after deducting commissions and estimated offering expenses payable by us. A decrease of \$1.00 per share in the price at which the shares are sold from the assumed offering price of \$ _____ per share shown in the table above would decrease our adjusted net tangible book value per share after the offering to \$ _____ per share and would decrease the dilution in net tangible book value per share to new investors in this offering to \$ _____ per share, after deducting commissions and estimated aggregate offering expenses payable by us.

To the extent that outstanding options or warrants are exercised or outstanding restricted stock units vest, investors purchasing our common stock in this offering 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.

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MATERIAL UNITED STATES FEDERAL INCOME TAX CONSEQUENCES TO NON-U.S. HOLDERS OF OUR COMMON STOCK

The following is a summary of the material U.S. federal income tax consequences to non-U.S. holders (as defined below) of the ownership and disposition of our common stock, but does not purport to be a complete analysis of all the potential tax considerations relating thereto. This summary is based upon the provisions of the Internal Revenue Code of 1986, as amended, or the Code, Treasury regulations promulgated thereunder, administrative rulings and judicial decisions, all as of the date hereof. These authorities may be changed, possibly retroactively, and any changes may result in U.S. federal income tax consequences different from those set forth below. We have not sought any ruling from the Internal Revenue Service, or the IRS, with respect to the statements made and the conclusions reached in the following summary, and there can be no assurance that the IRS will agree with such statements and conclusions. This summary assumes that a non-U.S. holder will hold our common stock issued pursuant to this offering as a capital asset (generally, property held for investment) within the meaning of section 1221 of the Code.

This summary also does not address the tax considerations arising under the laws of any state, local or non-U.S. jurisdiction or under U.S. federal non-income tax laws. In addition, this discussion does not address the potential application of the Medicare contribution tax on net investment income or any tax considerations applicable to an investor's particular circumstances or to investors that may be subject to special tax rules, including, without limitation:

banks, insurance companies or other financial institutions;

persons subject to the alternative minimum tax;

tax-exempt organizations or accounts;

controlled foreign corporations, passive foreign investment companies or corporations that accumulate earnings to avoid U.S. federal income tax;

dealers in securities or currencies;

traders in securities that elect to use a mark-to-market method of accounting for their securities holdings;

persons that own, or are deemed to own, more than 5% of our capital stock (except to the extent specifically set forth below);

certain former citizens or long-term residents of the United States;

persons who hold our common stock as a position in a hedging transaction, "straddle," "conversion transaction" or other risk reduction transaction; or

persons deemed to sell our common stock under the constructive sale provisions of the Code.

In addition, if a partnership (or entity or arrangement classified as a partnership for U.S. federal income tax purposes) holds our common stock, the tax treatment of a person treated as a partner for such purposes generally will depend on the status of the partner and upon the activities of the partnership. Accordingly, partnerships that hold our common stock, and partners in such partnerships, should consult their tax advisors regarding the ownership and disposition of our common stock.

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You are urged to consult your tax advisor with respect to the application of the U.S. federal income tax laws to your particular situation, as well as any tax consequences of the purchase, ownership and disposition of our common stock arising under the U.S. federal estate or gift tax rules or under the laws of any state, local, non-U.S. or other taxing jurisdiction or under any applicable tax treaty.

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Non-U.S. Holder Defined

For purposes of this discussion, you are a non-U.S. holder if you are a beneficial owner of our common stock that is not, for U.S. federal income tax purposes, any of the following:

a partnership, or other entity or arrangement treated as a partnership for U.S. federal income tax purposes;

an individual who is a citizen or resident of the United States;

a corporation or other entity taxable as a corporation, created or organized in the United States or under the laws of the United States or any political subdivision thereof;

an estate whose income is subject to U.S. federal income tax regardless of its source; or

a trust (x) whose administration is subject to the primary supervision of a U.S. court and which has one or more U.S. persons who have the authority to control all substantial decisions of the trust or (y) which has made a valid election under applicable Treasury Regulations to be treated as a U.S. person.

Distributions

We have not made any distributions on our common stock and do not intend to make any distributions on our common stock for the foreseeable future. However, if we do make distributions on our common stock, those distributions will constitute dividends for U.S. tax purposes to the extent paid from our current or accumulated earnings and profits, as determined under U.S. federal income tax principles. To the extent those distributions exceed both our current and accumulated earnings and profits, they will constitute a return of capital and will first reduce your basis in our common stock (determined separately with respect to each share of our common stock), but not below zero, and then will be treated as gain from the sale of that stock.

Any dividend paid to you generally will be subject to U.S. withholding tax either at a rate of 30% of the gross amount of the dividend or such lower rate as may be specified by an applicable income tax treaty. In order to receive a reduced treaty rate, you must provide us in a timely manner an IRS Form W-8BEN, IRS Form W-8BEN-E or other appropriate version of IRS Form W-8, certifying qualification for the reduced rate. If you are eligible for a reduced rate of U.S. withholding tax pursuant to an income tax treaty, you may obtain a refund of any excess amounts withheld by filing an appropriate claim for refund with the IRS in a timely manner. If you hold our common stock through a financial institution or other agent acting on your behalf, you will be required to provide appropriate documentation to the agent, who then will be required to provide the required certification to us or our paying agent, either directly or through other intermediaries. You should consult your tax advisor regarding your entitlement to benefits under any applicable income tax treaty.

Dividends received by you that are effectively connected with your conduct of a U.S. trade or business (and, if an income tax treaty applies, that are attributable to a permanent establishment or fixed base maintained by you in the United States), are exempt from such withholding tax. In order to obtain this exemption, you must provide us with an IRS Form W-8ECI or other applicable IRS Form W-8 properly certifying such exemption. Such effectively connected dividends, although not subject to withholding tax, generally are taxed at the same graduated rates applicable to U.S. persons, net of certain deductions and credits. In addition, if you are a corporate non-U.S. holder, dividends you receive that are effectively connected with your conduct of a U.S. trade or business may also be subject to a branch profits tax at a rate of 30% or such lower rate as may be specified by an applicable income tax treaty, subject to certain adjustments.

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Gain on Disposition of Our Common Stock

Subject to the discussion below, including under "Backup Withholding and Information Reporting" and "Foreign Accounts," you generally will not be required to pay U.S. federal income tax on any gain realized upon the sale or other disposition of our common stock unless:

the gain is effectively connected with your conduct of a U.S. trade or business (and, if an income tax treaty applies, the gain is attributable to a permanent establishment or fixed base maintained by you in the United States);

you are an individual who is present in the United States for a period or periods aggregating 183 days or more during the calendar year in which the sale or disposition occurs and certain other conditions are met; or

our common stock constitutes a U.S. real property interest by reason of our status as a "United States real property holding corporation," or USRPHC, for U.S. federal income tax purposes at any time within the shorter of the five-year period preceding your disposition of, or your holding period for, our common stock.

We believe that we are not currently and will not become a USRPHC. However, because the determination of whether we are a USRPHC depends on the fair market value of our U.S. 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 future. Even if we are or 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 U.S. real property interests to you only if you actually or constructively hold more than 5% of our common stock at any time during the shorter of the five-year period preceding your disposition of, or your holding period for, our common stock.

If you are a non-U.S. holder described in the first bullet above, you will be required to pay tax on the net gain derived from the sale under regular graduated U.S. federal income tax rates, and a corporate non-U.S. holder described in the first bullet above also may be subject to the branch profits tax at a 30% rate, or such lower rate as may be specified by an applicable income tax treaty. If you are an individual non-U.S. holder described in the second bullet above, you will be required to pay a flat 30% tax on the gain derived from the sale, which tax may be offset by U.S.-source capital losses for the year, provided you have timely filed U.S. federal income tax returns with respect to such losses. You should consult any applicable income tax or other treaties that may provide for different rules.

Backup Withholding and Information Reporting

Generally, we must report annually to the IRS the amount of dividends paid to you, your name and address, and the amount of tax withheld, if any. A similar report will be sent to you. Pursuant to applicable income tax treaties or other agreements, the IRS may make these reports available to tax authorities in your country of residence.

Payments of dividends on or of proceeds from the disposition of our common stock made to you may be subject to additional information reporting and backup withholding at a current rate of 28% unless you establish an exemption, for example, by properly certifying your non-U.S. status on an IRS Form W-8BEN, Form W-8BEN-E or another appropriate version of IRS Form W-8. Notwithstanding the foregoing, backup withholding and information reporting may apply if either we or our paying agent has actual knowledge, or reason to know, that you are a U.S. person.

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Backup withholding is not an additional tax; rather, the U.S. income tax liability of persons subject to backup withholding will be reduced by the amount of tax withheld. If withholding results in an overpayment of taxes, a refund or credit may generally be obtained from the IRS, provided that the required information is furnished to the IRS in a timely manner.

Foreign Accounts

The Foreign Account Tax Compliance Act, or FATCA, generally imposes a U.S. federal withholding tax of 30% on dividends on and the gross proceeds of a disposition of our common stock, paid to a "foreign financial institution" (as specially defined under these rules), unless such institution enters into an agreement with the U.S. government to withhold on certain payments and to collect and provide to the U.S. tax authorities substantial information regarding the U.S. account holders of such institution (which includes certain equity and debt holders of such institution, as well as certain account holders that are foreign entities with U.S. owners) or otherwise establishes an exemption. FATCA also generally imposes a U.S. federal withholding tax of 30% on dividends on and the gross proceeds of a disposition of our common stock paid to a "non-financial foreign entity" (as specially defined under these rules) unless such entity provides the withholding agent with a certification identifying certain substantial direct and indirect U.S. owners of the entity, certifies that there are none or otherwise establishes an exemption. The withholding obligations under FATCA generally apply to payments of dividends on our common stock, and under transition rules, are expected to apply to payments of gross proceeds from a sale or other disposition of our common stock on or after January 1, 2019. Under certain circumstances, a non-U.S. holder might be eligible for refunds or credits of such taxes. An intergovernmental agreement between the United States and an applicable foreign country may modify the requirements described in this paragraph. The rules of FATCA are new and complex. We will not pay any additional amounts to holders in respect of any amounts withheld, including pursuant to FATCA. Under certain circumstances, you may be eligible for refunds or credits of such taxes. Prospective investors are encouraged to consult with their own tax advisors regarding the possible implications of this legislation on their investment in our common stock.

Each prospective investor should consult its own tax advisor regarding the particular U.S. federal, state and local and non-U.S. tax consequences of purchasing, holding and disposing of our common stock, including the consequences of any proposed change in applicable laws.

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UNDERWRITING

We are offering the shares of common stock described in this prospectus supplement through four underwriters. Subject to the terms and conditions set forth in the underwriting agreement between us and Canaccord Genuity Inc. and Cowen and Company, LLC, as representatives of the underwriters, we have agreed to sell to the underwriters, and each underwriter has severally agreed to purchase from us, at the public offering price of \$ _____ per share less the underwriting discount of \$ _____ per share, the number of shares of common stock listed next to its name in the following table:

| Name | Number of shares |
|------------------------|---------------------|
| Canaccord Genuity Inc. | |
| Cowen and Company, LLC | |
| BTIG, LLC | |
| Stephens Inc. | |
| Total | |

Subject to the terms and conditions set forth in the underwriting agreement, the underwriters have agreed, severally and not jointly, to purchase all of the shares sold under the underwriting agreement if any of these shares are purchased, other than the shares covered by the option described below unless and until this option is exercised.

We have agreed to indemnify the underwriters against certain liabilities, including liabilities under the Securities Act of 1933, as amended, and to contribute to payments the underwriters may be required to make for certain liabilities.

The underwriters are offering the shares, subject to prior sale, when, as and if issued to and accepted by them, subject to approval of legal matters by their counsel, including the validity of the shares, and other conditions contained in the underwriting agreement, such as the receipt by the underwriters of officer's certificates and legal opinions. The underwriters reserve the right to withdraw, cancel or modify offers to the public and to reject orders in whole or in part.

Commissions and Discounts

The underwriters have advised us that they propose to offer the shares of common stock directly to the public at the public offering price set forth on the cover page of this prospectus supplement, and to dealers at the public offering price less a selling concession not in excess of \$ _____ per share. The underwriters also may allow, and dealers may reallow, a concession not in excess of \$ _____ per share to brokers and dealers. After the public offering of the shares, the underwriters may change the offering price and other selling terms.

The underwriting fee is equal to the public offering price per share of common stock less the amount paid by the underwriters to us per share of common stock. The underwriting fee is \$ _____ per share. The following table shows the per share and total underwriting discounts to be paid to the

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underwriters assuming both no exercise and full exercise of the underwriters' over-allotment option to purchase additional shares.

| | | | Total | |
|---|--------------|---------------------------------------|------------------------------------|--|
| | Per Share | Without Over-allotment Exercise | With Over-allotment Exercise | |
| Public offering price | \$ | \$ | \$ | |
| Underwriting discounts and commissions paid by us | | | | |
| Net Proceeds, before expenses, to us | | | | |

The expenses of the offering payable by us in connection with the offering, other than the underwriting discounts and commissions and the expense reimbursement referred to below, are estimated to be approximately \$. We are responsible for all of our expenses related to the offering, whether or not it is completed.

In addition to the underwriting discounts and commissions to be paid by us, we have agreed to reimburse the underwriters for (i) the first \$100,000 of certain of their out-of-pocket expenses incurred in connection with the offering, including travel, document production and distribution and database and research expenses and the reasonable fees and disbursements of counsel to the underwriters and (ii) the fees and disbursements of counsel to the underwriters in connection with the review by, and clearance of the offering with, FINRA of the terms of the sale of the shares of common stock in an amount not to exceed \$10,000 in the aggregate.

Option to Purchase Additional Shares

We have granted an option to the underwriters to purchase up to an aggregate of additional shares of our common stock at the public offering price less the underwriting discount. The underwriters may exercise this option for 30 days from the date of this prospectus supplement solely to cover any over-allotments. If any shares are purchased with this over-allotment option, the underwriters will purchase shares in approximately the same proportion as shown in the table above. If any additional shares of common stock are purchased, the underwriters will offer the additional shares on the same terms as those on which the shares are being offered.

Lock-Up Agreements

We have agreed that during a period of 90 days from the date of this prospectus, we will not, without the prior written consent of Canaccord Genuity Inc. and Cowen and Company, LLC, (i) directly or indirectly, offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase or otherwise transfer or dispose of any shares of our common stock or any securities convertible into or exercisable or exchangeable for shares of our common stock or file any registration statement under the Securities Act with respect to any of the foregoing or (ii) enter into any swap or any other agreement or any transaction that transfers, in whole or in part, directly or indirectly, the economic consequence of ownership of shares of our common stock, whether any such swap or transaction described in clause (i) or (ii) above is to be settled by delivery of shares of common stock or such other securities, in cash or otherwise, subject to certain exceptions.

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All of our executive officers and directors have agreed that they will not, without the prior written consent of Canaccord Genuity Inc. and Cowen and Company, LLC, offer, sell, contract to sell, pledge or otherwise transfer or dispose of (or enter into any transaction which is designed to, or might reasonably be expected to, result in the disposition of (whether by actual disposition or effective economic disposition due to cash settlement or otherwise) by them or any of their affiliates or any person in privity with them or any of their affiliates), directly or indirectly, including the filing (or participation in the filing) of a registration statement with the SEC in respect of, or establish or increase a put equivalent position or liquidate or decrease a call equivalent position within the meaning of Section 16 of the Exchange Act, and the rules and regulations of the SEC promulgated thereunder with respect to, any shares of our common stock or any securities convertible into, or exercisable or exchangeable for our common stock, or publicly announce an intention to effect any such transaction, for a period from the date of this prospectus supplement until, and including the date that is, 90 days after the date of this prospectus supplement. Each of the lock-up agreements contains certain exceptions, including the establishment of a Rule 10b5-1 trading plan, provided that (i) such plan does not provide for the transfer of shares of common stock during the 90-day period and (ii) no public announcement or filing under the Exchange Act is required or voluntarily made regarding the establishment of such plan. This lock-up provision applies to shares of our common stock owned now or acquired later by the person executing the agreement or for which the person executing the agreement later acquires the power of disposition. Certain of our executive offices and directors may enter into Rule 10b5-1 trading plans.

Canaccord Genuity Inc. and Cowen and Company, LLC may, in their discretion, release any of the securities subject to these lock-up agreements at any time without notice.

Price Stabilization, Short Positions and Penalty Bids

In connection with the offering, the underwriters may purchase and sell our common stock in the open market. These transactions may include over-allotment and stabilizing transactions, passive market making and purchases to cover syndicate short positions created in connection with the offering. Until distribution of the shares of our common stock is completed, SEC rules may limit the underwriters from bidding for and purchasing shares of our common stock. However, the underwriters may engage in transactions that stabilize the price of the shares of our common stock, such as bids or purchases to peg, fix or maintain that price. A "stabilizing transaction" is a bid for or the purchase of common stock on behalf of an underwriter in the open market for the purpose of fixing or maintaining the price of the shares of common stock. Stabilizing transactions may cause the price of shares of our common stock to be higher than the price that might otherwise prevail in the open market.

If an underwriter creates a short position in our common stock in connection with the offering (i.e., if it sells more shares of our common stock than are listed on the cover page of this prospectus supplement), the underwriter may reduce that short position by purchasing shares of our common stock in the open market. A "covering transaction" is the bid for or purchase of common stock on behalf of an underwriter to reduce a short position incurred by the underwriter in connection with the offering. The underwriters may also elect to reduce any short position by exercising all or part of the over-allotment option described above. A short position is more likely to be created if an underwriter is concerned that there may be downward pressure on the price of the shares in the open market after pricing that could adversely affect investors who purchase shares in this offering. Similar to other purchase transactions, an underwriter's purchases to cover the short sales may have the effect of raising or maintaining the market price of our shares or preventing or retarding a decline in the

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market price of our shares. As a result, the price of our shares may be higher than the price that might otherwise prevail in the open market.

An underwriter also may impose a penalty bid, whereby the underwriter may reclaim selling concessions allowed to syndicate members or other broker-dealers in respect of the common stock sold in the offering for their account if the underwriter repurchases the shares in stabilizing or covering transactions. These activities may stabilize, maintain or otherwise affect the market price of the common stock, which may be higher than the price that might otherwise prevail in the open market. The imposition of a penalty bid may also affect the price of the shares of our common stock in that it discourages resales of those shares of our common stock.

In connection with the offering, the underwriters may also engage in passive market making transactions in our common stock on The NASDAQ Stock Market in accordance with Rule 103 of Regulation M during a period before the commencement of offers or sales of shares of our common stock in this offering and extending through the completion of 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.

The underwriters have advised us that these transactions may be effected on The NASDAQ Stock Market or otherwise. Neither we nor the underwriters make any representation or prediction as to the direction or magnitude of any effect that the transactions described above may have on the price of shares of our common stock. In addition, neither we nor the underwriters make any representation that the underwriters will engage in these transactions or that these transactions, once commenced, will not be discontinued without notice.

Electronic Distribution

This prospectus supplement and the accompanying prospectus may be made available in electronic format on websites or through other online services maintained by the underwriters of the offering, or by their affiliates. Other than this prospectus supplement and the accompanying prospectus in electronic format, the information on such websites and any information contained in any other website maintained by the underwriters or any of their affiliates is not part of this prospectus supplement, the accompanying prospectus or the registration statement of which this prospectus supplement and the accompanying prospectus form a part, has not been approved or endorsed by us or the underwriters in their capacities as underwriters and should not be relied upon by investors.

Disclaimers About Non-U.S. Jurisdictions

United Kingdom

The underwriters:

have only communicated or caused to be communicated and will only communicate or cause to be communicated an invitation or inducement to engage in investment activity (within the meaning of section 21 of Financial Services and Markets Act 2000 (as amended) ("FSMA")) to persons who have professional experience in matters relating to investments falling within Article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005 or in circumstances in which section 21 of FSMA does not apply to us; and

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

Switzerland

The securities will not be offered, directly or indirectly, to the public in Switzerland and this prospectus does not constitute a public offering prospectus as that term is understood pursuant to article 652a or 1156 of the Swiss Federal Code of Obligations.

European Economic Area

In relation to each Member State of the European Economic Area (the "EEA") which has implemented the Prospectus Directive (each, a "Relevant Member State"), an offer of our shares may not be made to the public in a Relevant Member State other than:

to any legal entity which is a qualified investor as defined in the Prospectus Directive;

to fewer than 150 natural or legal persons (other than qualified investors as defined in the Prospectus Directive), subject to obtaining the prior consent of the relevant dealer or dealers nominated by us for any such offer, or;

in any other circumstances falling within Article 3(2) of the Prospectus Directive,

provided that no such offer of our shares shall require us or any underwriter to publish a prospectus pursuant to Article 3 of the Prospectus Directive or supplement prospectus pursuant to Article 16 of the Prospectus Directive.

For the purposes of this description, the expression an "offer of our shares to the public" in relation to any of our shares 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 shares to be offered so as to enable an investor to decide to purchase or subscribe for the shares, as the expression may be varied in that Relevant Member State by any measure implementing the Prospectus Directive in that member state, and the expression "Prospectus Directive" means European Union Directive 2003/71/EC (as amended by Directive 2010/73/EU and includes any relevant implementing measure in each Relevant Member State.

Neither this prospectus supplement nor the accompanying prospectus is a prospectus for the purposes of the Prospectus Directive. This prospectus supplement and the accompanying prospectus have been prepared on the basis that any offer of our shares in any Relevant Member State will be made pursuant to an exemption under the Prospectus Directive from the requirement to publish a prospectus for offers of shares. We have not authorized and do not authorize the making of any offer of securities through any financial intermediary on our behalf, other than offers made by the underwriters and their respective affiliates, with a view to the final placement of the securities as contemplated in this document. Accordingly, no purchaser of the shares, other than the underwriters, is authorized to make any further offer of shares on our behalf or on behalf of the underwriters.

Canada

The securities may be sold only to purchasers purchasing, or deemed to be purchasing, as principal that are accredited investors, as defined in National Instrument 45-106 Prospectus Exemptions or subsection 73.3(1) of the Securities Act (Ontario), and are permitted clients, as defined in National Instrument 31-103 Registration Requirements, Exemptions and Ongoing Registrant

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Obligations. Any resale of the securities must be made in accordance with an exemption from, or in a transaction not subject to, the prospectus requirements of applicable securities laws.

Securities legislation in certain provinces or territories of Canada may provide a purchaser with remedies for rescission or damages if the prospectus supplement or the prospectus (including any amendment thereto) contains a misrepresentation, provided that the remedies for rescission or damages are exercised by the purchaser within the time limit prescribed by the securities legislation of the purchaser's province or territory. The purchaser should refer to any applicable provisions of the securities legislation of the purchaser's province or territory for particulars of these rights or consult with a legal advisor.

Pursuant to section 3A.3 (or, in the case of securities issued or guaranteed by the government of a non-Canadian jurisdiction, section 3A.4) of National Instrument 33-105 Underwriting Conflicts (NI 33-105), the underwriters are not required to comply with the disclosure requirements of NI 33-105 regarding underwriter conflicts of interest in connection with this offering.

Relationship with Avinger, Inc.

In the ordinary course of business, the underwriters and their affiliates have provided, and in the future may provide, various investment banking, financial advisory and other services to us for which they have received, and may receive, customary compensation. In the course of their business, the underwriters and their affiliates may actively trade our securities for their own account or for the accounts of customers, and, accordingly the underwriters and their affiliates may at any time hold long or short positions in such securities.

Listing

Our common stock is listed on the NASDAQ Global Market under the symbol "AVGR."

Transfer Agent

The transfer agent for our common stock is Computershare, N.A., 250 Royall Street, Canton, MA 02021.

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LEGAL MATTERS

The validity of the securities offered by this prospectus supplement and accompanying prospectus will be passed upon by Wilson Sonsini Goodrich & Rosati, P.C., Palo Alto, California. Certain members of, and investment partnerships comprised of members of, and persons associated with, Wilson Sonsini Goodrich & Rosati, P.C., own an aggregate of 4,921 shares of our common stock. Certain legal matters in connection with this offering will be passed upon for the underwriters by Jones Day.

EXPERTS

Ernst & Young LLP, independent registered public accounting firm, has audited our financial statements included in our Annual Report on Form 10-K for the year ended December 31, 2015 (including the schedule appearing therein), as set forth in their report which is incorporated herein by reference in this prospectus supplement and elsewhere in the registration statement of which this prospectus supplement and the accompanying prospectus are a part. Our financial statements and schedule are incorporated by reference in reliance on Ernst & Young LLP's report, given on their authority as experts in accounting and auditing.

WHERE YOU CAN FIND MORE INFORMATION

We file annual, quarterly and other reports, proxy statements and other information with the SEC. Our SEC filings are available to the public 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, NE, Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for further information on the Public Reference Room. Our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, and Current Reports on Form 8-K, including any amendments to those reports, and other information that we file with or furnish to the SEC pursuant to Section 13(a) or 15(d) of the Exchange Act can also be accessed free of charge on our website, www.avinger.com. We have not incorporated by reference into this prospectus supplement or the accompanying prospectus the information on our website, and you should not consider it to be a part of this prospectus supplement or the accompanying prospectus. These filings will be available as soon as reasonably practicable after we electronically file such material with, or furnish it to, the SEC.

We have filed with the SEC a registration statement under the Securities Act of 1933 relating to the offering of these securities. The registration statement, including the exhibits attached thereto, contains additional relevant information about us and the securities. This prospectus supplement and the accompanying prospectus do not contain all of the information set forth in the registration statement. You can obtain a copy of the registration statement, at prescribed rates, from the SEC at the address listed above. The registration statement and the documents referred to below under "Information Incorporated by Reference" are also available on our website, www.avinger.com. We have not incorporated by reference into this prospectus supplement or the accompanying prospectus the information on our website, and you should not consider it to be a part of this prospectus supplement or the accompanying prospectus.

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INFORMATION INCORPORATED BY REFERENCE

The SEC allows us to incorporate by reference into this prospectus supplement and the accompanying prospectus certain information we file with it, which means that we can disclose important information by referring you to those documents. The information incorporated by reference is considered to be a part of this prospectus supplement and the accompanying prospectus, and information that we file later with the SEC will automatically update and supersede information contained in this prospectus supplement and the accompanying prospectus. We incorporate by reference the documents listed below that we have previously filed with the SEC (excluding any portions of any Form 8-K that are not deemed "filed" pursuant to the General Instructions of Form 8-K):

our Annual Report on Form 10-K for the fiscal year ended December 31, 2015, filed with the SEC on March 8, 2016;

our Quarterly Reports on Form 10-Q (i) for the quarter ended March 31, 2016, filed with the SEC on May 9, 2016 and (ii) for the quarter ended June 30, 2016, filed with the SEC on August 5, 2016;

our Current Reports on Form 8-K filed with the SEC on March 9, 2016, May 4, 2016, June 7, 2016 and June 17, 2016; and

the description of our common stock contained in our Registration Statement on Form 8-A as filed with the SEC on January 27, 2015 pursuant to Section 12(b) of the Exchange Act.

We also incorporate by reference into this prospectus supplement and accompanying prospectus additional documents (other than current reports furnished under Item 2.02 or Item 7.01 of Form 8-K and exhibits on such form that are related to such items) that we may file with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act prior to the completion or termination of the offering. Any statements contained in a previously filed document incorporated by reference into this prospectus supplement and accompanying prospectus is deemed to be modified or superseded for purposes of this prospectus supplement and accompanying prospectus to the extent that a statement contained in this prospectus supplement or accompanying prospectus, or in a subsequently filed document also incorporated by reference herein, modifies or supersedes that statement.

This prospectus supplement and accompanying prospectus may contain information that updates, modifies or is contrary to information in one or more of the documents incorporated by reference in this prospectus supplement and accompanying prospectus. You should rely only on the information incorporated by reference or provided in this prospectus supplement and accompanying prospectus. We have not authorized anyone else to provide you with different information. You should not assume that the information in this prospectus supplement or accompanying prospectus is accurate as of any date other than the date of this prospectus supplement or accompanying prospectus, or the date of the documents incorporated by reference in this prospectus supplement and accompanying prospectus.

We will provide to each person to whom this prospectus supplement and accompanying prospectus is delivered, upon written or oral request, at no cost to the requester, a copy of any and all of the information that is incorporated by reference in this prospectus supplement and accompanying prospectus.

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Requests for such documents should be directed to:

Avinger, Inc.
400 Chesapeake Drive
Redwood City, CA 94063
Attention: Secretary

You may also access the documents incorporated by reference in this prospectus supplement and accompanying prospectus through our website at www.avinger.com. Except for the specific incorporated documents listed above, no information available on or through our website shall be deemed to be incorporated in this prospectus supplement and accompanying prospectus or the registration statement of which they forms a part.

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PROSPECTUS

\$150,000,000

Avinger, Inc.

**Common stock
Preferred stock
Depository shares
Warrants
Debt securities
Subscription Rights
Units**

**348,262 Shares of Common Stock
Offered by the Selling Stockholders**

Avinger, Inc., a Delaware corporation ("Avinger"), may offer and sell from time to time, in one or more series or issuances and on terms that we will determine at the time of the offering, any combination of the securities described in this prospectus, up to an aggregate amount of \$150,000,000.

In addition, the selling stockholders may from time to time offer and sell up to 348,262 shares of our common stock. We will not receive any of the proceeds from the sale of our common stock by the selling stockholders.

We will provide specific terms of any offering in a supplement to this prospectus. Any prospectus supplement may also add, update or change information contained in this prospectus. 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.

These securities may be offered and sold in the same offering or in separate offerings; to or through underwriters, dealers and agents; or directly to purchasers. The names of any underwriters, dealers or agents involved in the sale of our securities, their compensation and any over-allotment options held by them will be described in the applicable prospectus supplement. See the section titled "Plan of Distribution."

Our common stock is listed on The NASDAQ Global Market under the symbol "AVGR". We will provide information in any applicable prospectus supplement regarding any listing of securities other than shares of our common stock on any securities exchange.

We are an "emerging growth company" as defined under the federal securities laws and, as such, have elected to comply with certain reduced public company reporting requirements.

INVESTING IN OUR SECURITIES INVOLVES SIGNIFICANT RISKS. YOU SHOULD REVIEW CAREFULLY THE "RISK FACTORS" ON PAGE 4 OF THIS PROSPECTUS AND IN THE APPLICABLE

PROSPECTUS SUPPLEMENT BEFORE INVESTING IN OUR SECURITIES.

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 date of this prospectus is March 8, 2016

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ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement on Form S-3 that we filed with the United States Securities and Exchange Commission, or the SEC, using a "shelf" registration process. Under this shelf process, we may, from time to time, sell any combination of the securities described in this prospectus in one or more offerings up to a total amount of \$150,000,000. In addition, under this shelf process, the selling stockholders named in this prospectus may sell from time to time up to 348,262 shares of Avinger common stock.

This prospectus provides you with a general description of the securities we or the selling stockholders may offer. Each time we or the selling stockholders sell securities, we will provide a prospectus supplement that will contain specific information about the terms of that offering. The prospectus supplement may also add to, update or change information contained in the prospectus and, accordingly, to the extent inconsistent, information in this prospectus is superseded by the information in the prospectus supplement.

The prospectus supplement to be attached to the front of this prospectus may describe, as applicable: the terms of the securities offered; the initial public offering price; the price paid for the securities; net proceeds; and the other specific terms related to the offering of the securities.

You should only rely on the information contained or incorporated by reference in this prospectus and any prospectus supplement or free writing prospectus relating to a particular offering. No person has been authorized to give any information or make any representations in connection with this offering other than those contained or incorporated by reference in this prospectus, any accompanying prospectus supplement and any related free writing prospectus in connection with the offering described herein and therein, and, if given or made, such information or representations must not be relied upon as having been authorized by us. Neither this prospectus nor any prospectus supplement nor any related free writing prospectus shall constitute an offer to sell or a solicitation of an offer to buy offered securities in any jurisdiction in which it is unlawful for such person to make such an offering or solicitation. This prospectus does not contain all of the information included in the registration statement. For a more complete understanding of the offering of the securities, you should refer to the registration statement, including its exhibits.

You should read the entire prospectus and any prospectus supplement and any related free writing prospectus, as well as the documents incorporated by reference into this prospectus or any prospectus supplement or any related free writing prospectus, before making an investment decision. Neither the delivery of this prospectus or any prospectus supplement or any free writing prospectus nor any sale made hereunder shall under any circumstances imply that the information contained or incorporated by reference herein or in any prospectus supplement or free writing prospectus is correct as of any date subsequent to the date hereof or of such prospectus supplement or free writing prospectus, as applicable. You should assume that the information appearing in this prospectus, any prospectus supplement or any document incorporated by reference is accurate only as of the date of the applicable documents, regardless of the time of delivery of this prospectus or any sale of securities. Our business, financial condition, results of operations and prospects may have changed since that date.

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PROSPECTUS SUMMARY

This summary description about us and our business highlights selected information contained elsewhere in this prospectus or incorporated in this prospectus by reference. This summary does not contain all of the information you should consider before buying securities in this offering. You should carefully read this entire prospectus and any applicable prospectus supplement, including each of the documents incorporated herein or therein by reference, before making an investment decision. Unless the context otherwise requires, the terms "Avinger," "the Company," "we," "us" and "our" in this prospectus refer to Avinger, Inc., and its subsidiaries.

Avinger, Inc.

Overview

We are a commercial-stage medical device company that designs, manufactures and sells image-guided, catheter-based systems that are used by physicians to treat patients with peripheral arterial disease, or PAD. Patients with PAD have a build-up of plaque in the arteries that supply blood to the arms and legs. Our mission is to dramatically improve the treatment of vascular disease through the introduction of products based on our lumivascular platform, the only intravascular image-guided system available in this market. We manufacture and sell a suite of products in the United States and select European markets. Our current products include our Lightbox imaging console, as well as our Wildcat, Kittycat, and the Ocelot family of catheters, which are designed to allow physicians to penetrate a total blockage in an artery, known as a chronic total occlusion, or CTO. Pantheris, our image-guided atherectomy device, is designed to allow physicians to precisely remove arterial plaque in PAD patients. In October 2015, we received 510(k) clearance from the U.S. Food and Drug Administration, or FDA, for commercialization of Pantheris. We believe that Pantheris will significantly enhance our market opportunity within PAD and can expand the overall addressable market for PAD endovascular procedures. We intend to commence U.S. sales of Pantheris early in 2016, subject to obtaining FDA approval for an enhanced version of Pantheris.

Corporate Information

We were incorporated in Delaware on March 8, 2007. Our principal executive offices are located at 400 Chesapeake Drive, Redwood City, California 94063, and our telephone number is (650) 241-7900. Our website address is www.avinger.com. The information on, or that may be accessed through, our website is not incorporated by reference into this prospectus and should not be considered a part of this prospectus.

"Avinger" and "Pantheris" are trademarks of our company. Our logo and our other trade names, trademarks and service marks appearing in this prospectus are our property. Other trade names, trademarks and service marks appearing in this prospectus are the property of their respective owners. Solely for convenience, our trademarks and tradenames referred to in this prospectus appear without the symbol, but those references are not intended to indicate, in any way, that we will not assert, to the fullest extent under applicable law, our rights, or the right of the applicable licensor to these trademarks and tradenames.

Implications of Being an Emerging Growth Company

We qualify as an "emerging growth company" as defined in the Jumpstart Our Business Startups Act of 2012, or the JOBS Act. An emerging growth company may take advantage of relief from certain

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reporting requirements and other burdens that are otherwise applicable generally to public companies. As an emerging growth company:

we have availed ourselves of the exemption from the requirement to obtain an attestation and report from our auditors on the assessment of our internal control over financial reporting pursuant to the Sarbanes-Oxley Act of 2002;

we will provide less extensive disclosure about our executive compensation arrangements; and

we will not require shareholder non-binding advisory votes on executive compensation or golden parachute arrangements.

We may use these provisions until the last day of our fiscal year following the fifth anniversary of our initial public offering, or December 31, 2020. However, if certain events occur prior to the end of such five-year period, including if we become a "large accelerated filer," our annual gross revenues exceed \$1.0 billion or we issue more than \$1.0 billion of non-convertible debt in any three-year period, we will cease to be an emerging growth company prior to the end of such five-year period. We may choose to take advantage of some but not all of these reduced burdens. To the extent that we take advantage of these reduced burdens, the information that we provide stockholders may be different than you might obtain from other public companies in which you hold equity interests.

The Securities We May Offer

We may offer up to \$150,000,000 of common stock, preferred stock, depositary shares, warrants, debt securities, subscription rights and units in one or more offerings and in any combination. In addition, the selling stockholders may sell up to 348,262 shares of our common stock from time to time in one or more offerings. This prospectus provides you with a general description of the securities we and the selling stockholders may offer. A prospectus supplement, which we will provide each time we offer securities, will describe the specific amounts, prices and terms of these securities.

Common Stock

Holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of stockholders. Our amended and restated certificate of incorporation does not provide for cumulative voting rights. Subject to preferences that may apply to any shares of preferred stock outstanding at the time, the holders of our common stock are entitled to receive dividends out of funds legally available if our board of directors, in its discretion, determines to issue dividends and then only at the times and in the amounts that our board of directors may determine. If we become subject to a liquidation, dissolution or winding-up, the assets legally available for distribution to our stockholders would be distributable ratably among the holders of our common stock and any participating preferred stock outstanding at that time, subject to prior satisfaction of all outstanding debt and liabilities and the preferential rights of and the payment of liquidation preferences, if any, on any outstanding shares of preferred stock.

Preferred Stock and Depositary Shares

Our board of directors has the authority, subject to limitations prescribed by Delaware law, to issue preferred stock in one or more series, to establish from time to time the number of shares to be included in each series, and to fix the designation, powers, preferences and rights of the shares of each series and any of its qualifications, limitations or restrictions, in each case without further vote or action by our stockholders.

We may also issue fractional shares of preferred stock that will be represented by depositary shares and depositary receipts.

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Each series of preferred stock, depositary shares or depositary receipts, if issued, will be more fully described in the particular prospectus supplement that will accompany this prospectus, including redemption provisions, rights in the event of our liquidation, dissolution or winding-up, voting rights and rights to convert into common stock. We have no present plans to issue any shares of preferred stock, depositary shares or depositary receipts nor are any shares of our preferred stock, depositary shares or depositary receipts presently outstanding.

Warrants

We may issue warrants for the purchase of common stock, preferred stock or debt securities. We may issue warrants independently or together with other securities.

Debt Securities

We may offer secured or unsecured obligations in the form of one or more series of senior or subordinated debt. The senior debt securities and the subordinated debt securities are together referred to in this prospectus as the "debt securities." The subordinated debt securities generally will be entitled to payment only after payment of our senior debt. Senior debt generally includes all debt for money borrowed by us, except debt that is stated in the instrument governing the terms of that debt to be not senior to, or to have the same rank in right of payment as, or to be expressly junior to, the subordinated debt securities. We may issue debt securities that are convertible into shares of our common stock.

The senior and subordinated debt securities will be issued under separate indentures between us and a trustee. We have summarized the general features of the debt securities to be governed by the indentures. These indentures have been filed as exhibits to the registration statement of which this prospectus forms a part. We encourage you to read these indentures. Instructions on how you can get copies of these documents are provided in the section titled "Where You Can Find More Information."

Subscription Rights

We may issue subscription rights to purchase our common stock, preferred stock or debt securities. These subscription rights may be offered independently or together with any other security offered hereby and may or may not be transferable by the stockholder receiving the subscription rights in such offering.

Units

We may issue units comprised of one or more of the other classes of securities issued by us as described in this prospectus 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.

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RISK FACTORS

An investment in our securities involves a high degree of risk. The prospectus supplement applicable to each offering of our securities will contain a discussion of the risks applicable to an investment in our securities. Prior to making a decision about investing in our securities, you should carefully consider the specific factors discussed in the section titled "Risk Factors" in the applicable prospectus supplement, together with all of the other information contained or incorporated by reference in the prospectus supplement or appearing or incorporated by reference in this prospectus. You should also consider the risks, uncertainties and assumptions discussed under "Part I Item 1A Risk Factors" in our Annual Report on Form 10-K for the fiscal year ended December 31, 2014, and "Part II Item 1A Risk Factors" in our Quarterly Reports on Form 10-Q, all of which are incorporated herein by reference, and as may be amended, supplemented or superseded from time to time by other reports we file with the SEC in the future and any prospectus supplement related to a particular offering. The risks and uncertainties we have described are not the only ones we face. Additional risks and uncertainties not presently known to us or that we currently deem immaterial may also affect our operations. The occurrence of any of these known or unknown risks might cause you to lose all or part of your investment in the offered securities.

FORWARD-LOOKING STATEMENTS

This prospectus, each prospectus supplement and the information incorporated by reference in this prospectus and each prospectus supplement contain certain statements that constitute "forward-looking statements" within the meaning of Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934. The words "anticipate," "could," "expect," "believe," "goal," "plan," "intend," "estimate," "may," "seek," "potential," "predict," "project," "should," "would," "will," and similar expressions and variations thereof are intended to identify forward-looking statements, but are not the exclusive means of identifying such statements. Those statements appear in this prospectus, any accompanying prospectus supplement and the documents incorporated herein and therein by reference, particularly in the sections entitled "Prospectus Summary," "Risk Factors," "Management's Discussion and Analysis of Financial Condition and Results of Operations" and "Business," and include statements regarding the intent, belief or current expectations of the company and management that are subject to known and unknown risks, uncertainties and assumptions and other factors that could cause actual results and the timing of certain events to differ materially from future results expressed or implied by such forward-looking statements. Factors that could cause or contribute to such differences include, but are not limited to those discussed in the section titled "Risk Factors" set forth above.

This prospectus, any prospectus supplement and the information incorporated by reference in this prospectus and any prospectus supplement also contain statements that are based on management's current expectations and beliefs, including estimates and projections about our company, industry, financial condition, results of operations and other matters. These statements are not guarantees of future performance and are subject to numerous risks, uncertainties, and assumptions that are difficult to predict.

Because forward-looking statements are inherently subject to risks and uncertainties, some of which cannot be predicted or quantified, you should not rely upon forward-looking statements as predictions of future events. The events and circumstances reflected in the forward-looking statements may not be achieved or occur and actual results could differ materially from those projected in the forward-looking statements. Except as required by applicable law, including the securities laws of the United States and the rules and regulations of the SEC, we do not plan to publicly update or revise any forward-looking statements contained herein after we distribute this prospectus, whether as a result of any new information, future events or otherwise.

Table of Contents**RATIO OF EARNINGS TO FIXED CHARGES**

The following table sets forth our ratio of earnings to fixed charges for each of the periods indicated. You should read these ratios in connection with our financial statements and accompanying notes, and our annual report on Form 10-K for the year ended December 31, 2014, incorporated by reference in this prospectus.

| | Year Ended December 31, | | | Nine Months Ended September 30, 2015 |
|------------------------------------|----------------------------|------|------|---|
| | 2012 | 2013 | 2014 | |
| Ratio of earnings to fixed charges | n/a | n/a | n/a | n/a |

For purposes of calculating the ratio of earnings to fixed charges, earnings represent net loss before provision for income taxes plus fixed charges. Fixed charges consist of interest expense and an estimate of the interest factor inherent in our operating leases. The portion of total rental expense that represents the interest factor is estimated to be approximately 33%.

We did not record earnings for the periods indicated in the table above. Accordingly, our earnings were insufficient to cover fixed charges for such periods and we are unable to disclose a ratio of earnings to fixed charges for such periods. For the years ended December 31, 2012, 2013 and 2014 and for the nine months ended September 30, 2015, the coverage deficiency necessary for the ratio of earnings to fixed charges equal 1.00 (one-to-one coverage) was \$33.5 million, \$36.6 million, \$25.6 million, and \$29.7 million, respectively, for each of such periods.

Currently, we have no shares of preferred stock outstanding and we have not paid any dividends on preferred stock in the periods presented. Therefore, the ratios of earnings to combined fixed charges and preferred stock dividends are not different from the ratios of earnings to fixed charges.

USE OF PROCEEDS

Unless otherwise indicated in the prospectus supplement, we will use the net proceeds from the sale of securities offered by this prospectus for general corporate purposes, which may include working capital, capital expenditures, other corporate expenses and acquisitions of complementary products, technologies or businesses. We do not have agreements or commitments for any specific acquisitions at this time. The timing and amount of our actual expenditures will be based on many factors, including cash flows from operations and the anticipated growth of our business. As a result, unless otherwise indicated in the prospectus supplement, our management will have broad discretion to allocate the net proceeds of the offerings. Pending their ultimate use, we intend to invest the net proceeds in short-term, investment-grade, interest-bearing instruments.

We will not receive any proceeds from the sale of shares of our common stock by the selling stockholders.

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DESCRIPTION OF CAPITAL STOCK

The following description summarizes the most important terms of our capital stock and does not purport to be complete and is qualified in its entirety by the provisions of our amended and restated certificate of incorporation and amended and restated bylaws, which documents are incorporated by reference as exhibits to the registration statement of which this prospectus is a part, and the applicable provisions of the Delaware General Corporation Law (the "DGCL").

General

Our authorized capital stock consists of one hundred million (100,000,000) shares of common stock, \$0.001 par value per share, and five million (5,000,000) shares of undesignated preferred stock, \$0.001 par value per share.

Common Stock

Outstanding Shares

On September 30, 2015, there were 12,620,682 shares of common stock outstanding, held of record by 274 stockholders. Our board of directors is authorized, without stockholder approval, to issue additional shares of our capital stock.

As of September 30, 2015, there were 2,213,395 shares of common stock subject to outstanding warrants, and 3,056,207 shares of common stock subject to outstanding options.

Dividend Rights

Subject to preferences that may be applicable to any then outstanding preferred stock, holders of our common stock are entitled to receive dividends, if any, as may be declared from time to time by our board of directors out of legally available funds. We have never declared or paid cash dividends on any of our capital stock and currently do not anticipate paying any cash dividends after this offering or in the foreseeable future.

Voting Rights

There are 100,000,000 shares of common stock authorized for issuance. Pursuant to our amended and restated certificate of incorporation, each holder of our common stock is entitled to one vote for each share on all matters submitted to a vote of stockholders; provided, however, that, except as otherwise required by law, holders of our common stock, as such, shall not be entitled to vote on any amendment to our amended and restated certificate of incorporation that relates solely to the terms of one or more outstanding series of preferred stock if the holders of such affected series are entitled, either separately or together with the holders of one or more other such series, to vote thereon pursuant to our amended and restated certificate of incorporation. Pursuant to our amended and restated certificate of incorporation and amended and restated bylaws, corporate actions can generally be taken by a majority of our board and/or stockholders holding a majority of our outstanding shares, except as otherwise indicated in the section entitled "Anti-takeover Effects of Delaware Law and Our Certificate of Incorporation and Bylaws," where certain amendments to our amended and restated certificate of incorporation and amended and restated bylaws require the vote of at least 66²/₃% of our then outstanding voting securities. Additionally, our stockholders do not have cumulative voting rights in the election of directors. Accordingly, holders of a plurality of the votes cast at a meeting of stockholders will be able to elect all of the directors then standing for election.

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Right to Receive Liquidation Distributions

In the event of our liquidation, dissolution or winding up, holders of our common stock are entitled to share ratably in the net assets legally available for distribution to stockholders after the payment of all of our debts and other liabilities and the satisfaction of any liquidation preference granted to the holders of any then outstanding shares of preferred stock.

Rights and Preferences

Holders of our common stock have no preemptive, conversion, subscription or other rights, and there are no redemption or sinking fund provisions applicable to our common stock. The rights, preferences and privileges of the holders of our common stock are subject to, and may be adversely affected by, the rights of the holders of shares of any series of our preferred stock that we may designate in the future.

Fully Paid and Nonassessable

All of our outstanding shares of common stock are, and the shares of common stock to be issued pursuant to this offering, when paid for, will be fully paid and nonassessable.

Preferred Stock

Our board of directors has the authority, without further action by our stockholders, to issue up to 5,000,000 shares of preferred stock in one or more series and to fix the rights, preferences, privileges and restrictions thereof. These rights, preferences and privileges could include dividend rights, conversion rights, voting rights, terms of redemption, liquidation preferences, sinking fund terms and the number of shares constituting any series or the designation of such series, any or all of which may be greater than the rights of common stock. The issuance of preferred stock by us could adversely affect the voting power of holders of common stock and the likelihood that such holders will receive dividend payments and payments upon liquidation. In addition, the issuance of preferred stock could have the effect of delaying, deferring or preventing a change of control of our company or other corporate action. No shares of preferred stock are outstanding, and we have no present plan to issue any shares of preferred stock.

Stock Options

As of September 30, 2015, there were 3,056,207 shares of our common stock issuable upon exercise of outstanding stock options, at a weighted-average exercise price of \$6.12 per share.

Warrants

As of September 30, 2015, we had outstanding warrants to purchase an aggregate of 2,213,395 shares of our common stock at an exercise price of \$12.60 per share. These warrants are immediately exercisable and expire upon the earlier of September 2, 2019 or upon the consummation of a change of control.

Exclusive Jurisdiction

Unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware is the sole and exclusive forum for:

any derivative action or proceeding brought on behalf of us;

any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers or other employees to us or our stockholders;

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any action asserting a claim against us arising pursuant to any provision of the DGCL or our amended and restated certificate of incorporation or amended and restated bylaws;

any action asserting a claim against us governed by the internal affairs doctrine.

The enforceability of similar choice of forum provisions in other companies' certificates of incorporation has been challenged in legal proceedings, and it is possible that, in connection with any action, a court could find the choice of forum provisions contained in our amended and restated certificate of incorporation to be inapplicable or unenforceable in such action.

Registration Rights Under our Amended and Restated Investors' Rights Agreement

The holders of an aggregate of up to 2,875,110 shares of our common stock, as of January 31, 2016, including shares of common stock issuable upon the exercise of outstanding options and warrants, or their permitted transferees, are entitled to rights with respect to the registration of such shares under the Securities Act. We refer to these shares as "registrable securities." These rights are provided under the terms of our amended and restated investors' rights agreement between us and the holders of registrable securities, and include demand registration rights, "piggyback" registration rights and Form S-3 registration rights.

These registration rights will terminate as to a given holder of registrable securities upon the earliest of (a) five (5) years following the consummation of our initial public offering (b) such time after our initial public offering at which such holder (i) can sell all shares held by it in compliance with Rule 144(b)(1)(i) or (ii) holds one percent (1%) or less of our outstanding Common Stock and all registrable securities held by such holder can be sold in any three (3) month period without registration in compliance with Rule 144 or (c) after the consummation of a Liquidation Event, as that term is defined in our amended and restated certificate of incorporation.

Generally, we are required to pay the registration expenses (other than underwriters' and brokers' discounts and commissions) in connection with the registrations described below, including the reasonable fees and disbursements of one counsel for the selling holder or holders of registrable securities. In an underwritten offering, the underwriters have the right to limit the number of shares registered by the holders of registrable securities for marketing reasons, subject to certain limitations.

Demand Registration Rights

Upon the written request of 50% or more of the then outstanding registrable securities that we file a registration statement under the Securities Act (provided that the anticipated aggregate offering price of such shares is greater than \$25 million), we will be obligated to notify all holders of registrable securities of such request and to use our reasonable best efforts to register the sale of all registrable securities that holders may request to be registered. We are only obligated to file up to two registration statements which are declared or ordered effective in connection with the exercise of these demand registration rights. These demand registration rights are subject to specified conditions and limitations, including the right of the underwriters to limit the number of shares included in any such registration under certain circumstances.

Piggyback Registration Rights

If we propose to register any of our securities under the Securities Act in connection with the public offering of such securities, the holders of registrable securities will be entitled to certain "piggyback" registration rights allowing such holders to include their shares in such registration, subject to certain limitations. As a result, whenever we propose to file a registration statement under the Securities Act, other than with respect to a registration related to either the sale of securities to our employees pursuant to a stock plan, stock purchase or similar plan or a registration related to a

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corporate reorganization or transaction under Rule 145 of the Securities Act of registrable securities are entitled to notice of the registration and have the right to include their shares in the registration. These registration rights are subject to specified conditions and limitations, including the right of the underwriters to limit the number of shares included in any such registration statement under certain circumstances.

Form S-3 Registration Rights

Upon the written request from the holders of at least 30% of the outstanding shares of registrable securities, holders of registrable securities have the right to demand that we file a registration statement on Form S-3 so long as the aggregate amount of shares to be offered and sold under such registration statement on Form S-3 is at least \$5 million (net of any underwriters' discounts or commissions). We are not required to effect a registration on Form S-3 if we have already effected two registrations on Form S-3 for the holders pursuant to Form S-3 registration rights within the twelve-month period preceding the date of the request. Additionally, we are not required to effect such registration in any jurisdiction in which we would be required to qualify to do business or execute a general consent of process in effecting such registration.

CRG Registration Rights

In September 2015, we entered into a Securities Purchase Agreement with CRG Partner III L.P. and certain of its affiliated funds, collectively referred to as CRG, pursuant to which we sold 348,262 shares of our common stock to CRG for a purchase price of \$14.357 per share. Under the Purchase Agreement, CRG is entitled to certain rights with respect to the registration of such shares under the Securities Act as described below.

Within 30 business days of our becoming eligible to use Form S-3, we must file a registration statement covering the resale of the shares sold to CRG under the Purchase Agreement. Further, we must cause the registration statement to become effective within 30 business days of its filing with the SEC or, if the SEC reviews the registration statement, within 45 business days after it receives notification from the SEC of such review. Our failure to file the registration statement, to have the registration statement declared effective within certain time periods, or to maintain the effectiveness of the registration statement are each considered a registration default and will result in penalty payments payable by us to CRG equal to 1% of the aggregate purchase price paid by CRG under the Purchase Agreement for each 30-day period (or portion thereof) in which there is a registration default. During the time that Avinger must maintain the effectiveness of the registration statement, we must comply with other affirmative covenants.

Anti-Takeover Effects of Delaware Law and Our Certificate of Incorporation and Bylaws

The provisions of Delaware law, our amended and restated certificate of incorporation and our amended and restated bylaws may have the effect of delaying, deferring or discouraging another person from acquiring control of our company. These provisions, which are summarized below, may have the effect of discouraging takeover bids. They are also designed, in part, to encourage persons seeking to acquire control of us to negotiate first with our board of directors. We believe that the benefits of increased protection of our potential ability to negotiate with an unfriendly or unsolicited acquirer outweigh the disadvantages of discouraging a proposal to acquire us because negotiation of these proposals could result in an improvement of their terms.

Delaware Law

We are governed by the provisions of Section 203 of the DGCL. In general, Section 203 prohibits a public Delaware corporation from engaging in a "business combination" with an "interested

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stockholder" for a period of three years after the date of the transaction in which the person became an interested stockholder, unless the business combination is approved in a prescribed manner. A "business combination" includes mergers, asset sales or other transactions resulting in a financial benefit to the stockholder. An "interested stockholder" is a person who, together with affiliates and associates, owns, or within three years of the date on which it is sought to be determined whether such person is an "interested stockholder," did own, 15% or more of the corporation's outstanding voting stock. These provisions may have the effect of delaying, deferring or preventing a change in our control.

Amended and Restated Certificate of Incorporation and Amended and Restated Bylaw Provisions

Our amended and restated certificate of incorporation and our amended and restated bylaws include a number of provisions that could deter hostile takeovers or delay or prevent changes in control of our management team, including the following:

Board of directors vacancies. Our amended and restated certificate of incorporation and amended and restated bylaws authorize only our board of directors to fill vacant directorships, including newly created seats. In addition, the number of directors constituting our board of directors is permitted to be set only by a resolution adopted by our board of directors. These provisions prevent a stockholder from increasing the size of our board of directors and then gaining control of our board of directors by filling the resulting vacancies with its own nominees. This makes it more difficult to change the composition of our board of directors but promotes continuity of management.

Classified board. Our amended and restated certificate of incorporation and amended and restated bylaws provide that our board is classified into three classes of directors. A third party may be discouraged from making a tender offer or otherwise attempting to obtain control of us as it is more difficult and time consuming for stockholders to replace a majority of the directors on a classified board of directors.

Stockholder action; special meeting of stockholders. Our amended and restated certificate of incorporation provides that our stockholders may not take action by written consent, but may only take action at annual or special meetings of our stockholders. As a result, a holder controlling a majority of our capital stock is not be able to amend our amended and restated bylaws or remove directors without holding a meeting of our stockholders called in accordance with our amended and restated bylaws. Our amended and restated bylaws further provide that special meetings of our stockholders may be called only by our board of directors, the Chairman of our Board of Directors, our Chief Executive Officer or our President, thus prohibiting a stockholder from calling a special meeting. These provisions might delay the ability of our stockholders to force consideration of a proposal or for stockholders controlling a majority of our capital stock to take any action, including the removal of directors.

Advance notice requirements for stockholder proposals and director nominations. Our amended and restated bylaws provide advance notice procedures for stockholders seeking to bring business before our annual meeting of stockholders or to nominate candidates for election as directors at our annual meeting of stockholders. Our amended and restated bylaws also specify certain requirements regarding the form and content of a stockholder's notice. These provisions might preclude our stockholders from bringing matters before our annual meeting of stockholders or from making nominations for directors at our annual meeting of stockholders if the proper procedures are not followed. We expect that these provisions may also discourage or deter a potential acquirer from conducting a solicitation of proxies to elect the acquirer's own slate of directors or otherwise attempting to obtain control of our company.

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No cumulative voting. The DGCL provides that stockholders are not entitled to the right to cumulate votes in the election of directors unless a corporation's certificate of incorporation provides otherwise. Our amended and restated certificate of incorporation does not provide for cumulative voting.

Directors removed only for cause. Our amended and restated certificate of incorporation provides that stockholders may remove directors only for cause.

Amendment of charter provisions. Any amendment of the above provisions in our amended and restated certificate of incorporation would require approval by holders of at least 66²/₃% of the voting power of our then outstanding voting securities.

Issuance of undesignated preferred stock. Our board of directors will have the authority, without further action by the stockholders, to issue up to 5,000,000 shares of undesignated preferred stock with rights and preferences, including voting rights, designated from time to time by our board of directors. The existence of authorized but unissued shares of preferred stock would enable our board of directors to render more difficult or to discourage an attempt to obtain control of us by means of a merger, tender offer, proxy contest or other means.

Transfer Agent and Registrar

The transfer agent and registrar for our common stock is Computershare, N.A. The transfer agent and registrar's address is 250 Royall Street, Canton, MA 02021. Our shares of common stock are issued in uncertificated form only, subject to limited circumstances.

Market Listing

Our common stock is listed on The NASDAQ Global Market under the symbol "AVGR."

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DESCRIPTION OF THE DEPOSITARY SHARES

General

At our option, we may elect to offer fractional shares of preferred stock, rather than full shares of preferred stock. If we do elect to offer fractional shares of preferred stock, we will issue receipts for depositary shares and each of these depositary shares will represent a fraction of a share of a particular series of preferred stock, as specified in the applicable prospectus supplement. Each owner of a depositary share will be entitled, in proportion to the applicable fractional interest in shares of preferred stock underlying that depositary share, to all rights and preferences of the preferred stock underlying that depositary share. These rights may include dividend, voting, redemption and liquidation rights.

The shares of preferred stock underlying the depositary shares will be deposited with a bank or trust company selected by us to act as depositary, under a deposit agreement by and among us, the depositary and the holders of the depositary receipts. The depositary will be the transfer agent, registrar and dividend disbursing agent for the depositary shares.

The depositary shares will be evidenced by depositary receipts issued pursuant to the depositary agreement. Holders of depositary receipts agree to be bound by the deposit agreement, which requires holders to take certain actions such as filing proof of residence and paying certain charges.

The summary of terms of the depositary shares contained in this prospectus is not complete, and is subject to modification in any prospectus supplement for any issuance of depositary shares. You should refer to the forms of the deposit agreement, our amended and restated certificate of incorporation and the certificate of designation that are, or will be, filed with the SEC for the applicable series of preferred stock.

Dividends

The depositary will distribute cash dividends or other cash distributions, if any, received in respect of the series of preferred stock underlying the depositary shares to the record holders of depositary receipts in proportion to the number of depositary shares owned by those holders on the relevant record date. The relevant record date for depositary shares will be the same date as the record date for the preferred stock.

In the event of a distribution other than in cash, the depositary will distribute property received by it to the record holders of depositary receipts that are entitled to receive the distribution, unless the depositary determines that it is not feasible to make the distribution. If this occurs, the depositary, with our approval, may adopt another method for the distribution, including selling the property and distributing the net proceeds to the holders.

Liquidation Preference

If a series of preferred stock underlying the depositary shares has a liquidation preference, in the event of our voluntary or involuntary liquidation, dissolution or winding up, holders of depositary shares will be entitled to receive the fraction of the liquidation preference accorded each share of the applicable series of preferred stock, as set forth in the applicable prospectus supplement.

Redemption

If a series of preferred stock underlying the depositary shares is subject to redemption, the depositary shares will be redeemed from the proceeds received by the depositary resulting from the redemption, in whole or in part, of the preferred stock held by the depositary. Whenever we redeem any preferred stock held by the depositary, the depositary will redeem, as of the same redemption date,

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the number of depositary shares representing the preferred stock so redeemed. The depositary will mail the notice of redemption to the record holders of the depositary receipts promptly upon receiving the notice from us and not fewer than 20 or more than 60 days, unless otherwise provided in the applicable prospectus supplement, prior to the date fixed for redemption of the preferred stock.

Voting

Upon receipt of notice of any meeting at which the holders of preferred stock are entitled to vote, the depositary will mail the information contained in the notice of meeting to the record holders of the depositary receipts underlying the preferred stock. Each record holder of those depositary receipts on the record date will be entitled to instruct the depositary as to the exercise of the voting rights pertaining to the amount of preferred stock underlying that holder's depositary shares. The record date for the depositary will be the same date as the record date for the preferred stock. The depositary will, to the extent practicable, vote the preferred stock underlying the depositary shares in accordance with these instructions. We will agree to take all action that may be deemed necessary by the depositary in order to enable the depositary to vote the preferred stock in accordance with these instructions. The depositary will not vote the preferred stock to the extent that it does not receive specific instructions from the holders of depositary receipts.

Withdrawal of Preferred Stock

Owners of depositary shares will be entitled to receive upon surrender of depositary receipts at the principal office of the depositary and payment of any unpaid amount due to the depositary, the number of whole shares of preferred stock underlying their depositary shares.

Partial shares of preferred stock will not be issued. Holders of preferred stock will not be entitled to deposit the shares under the deposit agreement or to receive depositary receipts evidencing depositary shares for the preferred stock.

Amendment and Termination of the Deposit Agreement

The form of depositary receipt evidencing the depositary shares and any provision of the deposit agreement may be amended by agreement between the depositary and us. However, any amendment which materially and adversely alters the rights of the holders of depositary shares, other than fee changes, will not be effective unless the amendment has been approved by at least a majority of the outstanding depositary shares. The deposit agreement may be terminated by the depositary or us only if:

all outstanding depositary shares have been redeemed; or

there has been a final distribution of the preferred stock in connection with our dissolution and such distribution has been made to all the holders of depositary shares.

Charges of Depositary

We will pay all transfer and other taxes and governmental charges arising solely from the existence of the depositary arrangement. We will also pay charges of the depositary in connection with:

the initial deposit of the preferred stock;

the initial issuance of the depositary shares;

any redemption of the preferred stock; and

all withdrawals of preferred stock by owners of depositary shares.

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Holders of depositary receipts will pay transfer, income and other taxes and governmental charges and other specified charges as provided in the deposit agreement for their accounts. If these charges have not been paid, the depositary may:

- refuse to transfer depositary shares;
- withhold dividends and distributions; and
- sell the depositary shares evidenced by the depositary receipt.

Miscellaneous

The depositary will forward to the holders of depositary receipts all reports and communications we deliver to the depositary that we are required to furnish to the holders of the preferred stock. In addition, the depositary will make available for inspection by holders of depositary receipts at the principal office of the depositary, and at such other places as it may from time to time deem advisable, any reports and communications we deliver to the depositary as the holder of preferred stock.

Neither the depositary nor we will be liable if either the depositary or we are prevented or delayed by law or any circumstance beyond the control of either the depositary or us in performing our respective obligations under the deposit agreement. Our obligations and the depositary's obligations will be limited to the performance in good faith of our or the depositary's respective duties under the deposit agreement. Neither the depositary nor we will be obligated to prosecute or defend any legal proceeding in respect of any depositary shares or preferred stock unless satisfactory indemnity is furnished. The depositary and we may rely on:

- written advice of counsel or accountants;
- information provided by holders of depositary receipts or other persons believed in good faith to be competent to give such information; and
- documents believed to be genuine and to have been signed or presented by the proper party or parties.

Resignation and Removal of Depositary

The depositary may resign at any time by delivering a notice to us. We may remove the depositary at any time. Any such resignation or removal will take effect upon the appointment of a successor depositary and its acceptance of such appointment. The successor depositary must be appointed within 60 days after delivery of the notice for resignation or removal. The successor depositary must be a bank and trust company having its principal office in the United States of America and having a combined capital and surplus of at least \$50,000,000.

Federal Income Tax Consequences

Owners of the depositary shares will be treated for U.S. federal income tax purposes as if they were owners of the preferred stock underlying the depositary shares. As a result, owners will be entitled to take into account for U.S. federal income tax purposes and deductions to which they would be entitled if they were holders of such preferred stock. No gain or loss will be recognized for U.S. federal income tax purposes upon the withdrawal of preferred stock in exchange for depositary shares. The tax basis of each share of preferred stock to an exchanging owner of depositary shares will, upon such exchange, be the same as the aggregate tax basis of the depositary shares exchanged. The holding period for preferred stock in the hands of an exchanging owner of depositary shares will include the period during which such person owned such depositary shares.

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DESCRIPTION OF THE WARRANTS

General

We may issue warrants for the purchase of our debt securities, preferred stock or common stock, or any combination thereof. Warrants may be issued independently or together with our debt securities, preferred stock or common stock and may be attached to or separate from any offered securities. Each series of warrants will be issued under a separate warrant agreement to be entered into between us and a bank or trust company, as warrant agent. The warrant agent will act solely as our agent in connection with the warrants. The warrant agent will not have any obligation or relationship of agency or trust for or with any holders or beneficial owners of warrants. This summary of certain provisions of the warrants is not complete. For the terms of a particular series of warrants, you should refer to the prospectus supplement for that series of warrants and the warrant agreement for that particular series.

Debt Warrants

The prospectus supplement relating to a particular issue of warrants to purchase debt securities will describe the terms of the debt warrants, including the following:

the title of the debt warrants;

the offering price for the debt warrants, if any;

the aggregate number of the debt warrants;

the designation and terms of the debt securities, including any conversion rights, purchasable upon exercise of the debt warrants;

if applicable, the date from and after which the debt warrants and any debt securities issued with them will be separately transferable;

the principal amount of debt securities that may be purchased upon exercise of a debt warrant and the exercise price for the warrants, which may be payable in cash, securities or other property;

the dates on which the right to exercise the debt warrants will commence and expire;

if applicable, the minimum or maximum amount of the debt warrants that may be exercised at any one time;

whether the debt warrants represented by the debt warrant certificates or debt securities that may be issued upon exercise of the debt warrants will be issued in registered or bearer form;

information with respect to book-entry procedures, if any; the currency or currency units in which the offering price, if any, and the exercise price are payable;

if applicable, a discussion of material U.S. federal income tax considerations;

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the antidilution provisions of the debt warrants, if any;

the redemption or call provisions, if any, applicable to the debt warrants;

any provisions with respect to the holder's right to require us to repurchase the warrants upon a change in control or similar event; and

any additional terms of the debt warrants, including procedures, and limitations relating to the exchange, exercise and settlement of the debt warrants.

Debt warrant certificates will be exchangeable for new debt warrant certificates of different denominations. Debt warrants may be exercised at the corporate trust office of the warrant agent or

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any other office indicated in the prospectus supplement. Prior to the exercise of their debt warrants, holders of debt warrants will not have any of the rights of holders of the debt securities purchasable upon exercise and will not be entitled to payment of principal or any premium, if any, or interest on the debt securities purchasable upon exercise.

Equity Warrants

The prospectus supplement relating to a particular series of warrants to purchase our common stock or preferred stock will describe the terms of the warrants, including the following:

the title of the warrants;

the offering price for the warrants, if any;

the aggregate number of warrants;

the designation and terms of the common stock or preferred stock that may be purchased upon exercise of the warrants;

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

if applicable, the date from and after which the warrants and any securities issued with the warrants will be separately transferable;

the number of shares of common stock or preferred stock that may be purchased upon exercise of a warrant and the exercise price for the warrants;

the dates on which the right to exercise the warrants shall commence and expire;

if applicable, the minimum or maximum amount of the warrants that may be exercised at any one time;

the currency or currency units in which the offering price, if any, and the exercise price are payable;

if applicable, a discussion of material U.S. federal income tax considerations;

the antidilution provisions of the warrants, if any;

the redemption or call provisions, if any, applicable to the warrants;

any provisions with respect to the holder's right to require us to repurchase the warrants upon a change in control or similar event; and

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any additional terms of the warrants, including procedures, and limitations relating to the exchange, exercise and settlement of the warrants.

Holders of equity warrants will not be entitled:

to vote, consent or receive dividends;

receive notice as stockholders with respect to any meeting of stockholders for the election of our directors or any other matter; or

exercise any rights as stockholders of us.

The descriptions of the warrants in this prospectus and in any prospectus supplement are summaries of the material provisions of the applicable warrants. These descriptions do not restate those warrants in their entirety and may not contain all the information that you may find useful. We urge you to read the applicable warrants because they, and not the summaries, define your rights as holders

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of the warrants. For more information, please review the forms of the relevant warrants, which will be filed with the SEC promptly after the offering of warrants and will be available as described in the section titled "Where You Can Find More Information."

DESCRIPTION OF THE DEBT SECURITIES

The debt securities may be either secured or unsecured and will either be our senior debt securities or our subordinated debt securities. The debt securities will be issued under one or more separate indentures between us and a trustee to be specified in an accompanying prospectus supplement. Senior debt securities will be issued under a senior indenture and subordinated debt securities will be issued under a subordinated indenture. Together, the senior indenture and the subordinated indenture are called indentures in this description. This prospectus, together with the applicable prospectus supplement, will describe the terms of a particular series of debt securities.

The following is a summary of selected provisions and definitions of the indentures and debt securities to which any prospectus supplement may relate. The summary of selected provisions of the indentures and the debt securities appearing below is not complete and is subject to, and qualified entirely by reference to, all of the provisions of the applicable indenture and certificates evidencing the applicable debt securities. For additional information, you should look at the applicable indenture and the certificate evidencing the applicable debt security that is filed as an exhibit to the registration statement that includes the prospectus. In this description of the debt securities, the words "we," "us," or "our" refer only to Avinger, Inc. and not to any of our subsidiaries, unless we expressly state or the context otherwise requires.

The following description sets forth selected general terms and provisions of the applicable indenture and debt securities to which any prospectus supplement may relate. Other specific terms of the applicable indenture and debt securities will be described in the applicable prospectus supplement. If any particular terms of the indenture or debt securities described in a prospectus supplement differ from any of the terms described below, then the terms described below will be deemed to have been superseded by that prospectus supplement.

General

Debt securities may be issued in separate series without limitation as to aggregate principal amount. We may specify a maximum aggregate principal amount for the debt securities of any series.

We are not limited as to the amount of debt securities we may issue under the indentures. Unless otherwise provided in a prospectus supplement, a series of debt securities may be reopened to issue additional debt securities of such series.

The prospectus supplement relating to a particular series of debt securities will set forth:

whether the debt securities are senior or subordinated;

the offering price;

the title;

any limit on the aggregate principal amount;

the person who shall be entitled to receive interest, if other than the record holder on the record date;

the date or dates the principal will be payable;

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the interest rate or rates, which may be fixed or variable, if any, the date from which interest will accrue, the interest payment dates and the regular record dates, or the method for calculating the dates and rates;

the place where payments may be made;

any mandatory or optional redemption provisions or sinking fund provisions and any applicable redemption or purchase prices associated with these provisions;

if issued other than in denominations of U.S. \$1,000 or any multiple of U.S. \$1,000, the denominations in which the debt securities shall be issuable;

if applicable, the method for determining how the principal, premium, if any, or interest will be calculated by reference to an index or formula;

if other than U.S. currency, the currency or currency units in which principal, premium, if any, or interest will be payable and whether we or a holder may elect payment to be made in a different currency;

the portion of the principal amount that will be payable upon acceleration of maturity, if other than the entire principal amount;

if the principal amount payable at stated maturity will not be determinable as of any date prior to stated maturity, the amount or method for determining the amount which will be deemed to be the principal amount;

if applicable, whether the debt securities shall be subject to the defeasance provisions described below under "Satisfaction and discharge; defeasance" or such other defeasance provisions specified in the applicable prospectus supplement for the debt securities;

any conversion or exchange provisions;

whether the debt securities will be issuable in the form of a global security;

the deletion, addition or change in any event of default;

any change or modification to the subordination provisions applicable to the subordinated debt securities if different from those described below under "Subordinated debt securities;"

any deletion, addition or change in the covenants set forth in Article 10 of the indenture;

any paying agents, authenticating agents, security registrars or other agents for the debt securities, if other than the trustee;

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any provisions relating to any security provided for the debt securities, including any provisions regarding the circumstances under which collateral may be released or substituted;

any provisions relating to guaranties for the securities and any circumstances under which there may be additional obligors;

any provisions granting special rights to holders when a specified event occurs;

any special tax provisions that apply to the debt securities;

with respect to the debt securities that do not bear interest, the dates for certain required reports to the applicable trustee;

any and all additional, eliminated or changed terms that will apply to the debt securities; and

any other terms of such debt securities.

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Unless otherwise specified in the prospectus supplement, the debt securities will be registered debt securities. Debt securities may be sold at a substantial discount below their stated principal amount, bearing no interest or interest at a rate which at time of issuance is below market rates. The U.S. federal income tax considerations applicable to debt securities sold at a discount will be described in the applicable prospectus supplement.

Exchange and Transfer

Debt securities may be transferred or exchanged at the office of the security registrar or at the office of any transfer agent designated by us.

We will not impose a service charge for any transfer or exchange, but we may require holders to pay any tax or other governmental charges associated with any transfer or exchange.

In the event of any partial redemption of debt securities of any series, we will not be required to:

issue, register the transfer of, or exchange, any debt security of that series during a period beginning at the opening of business 15 days before the day of mailing of a notice of redemption and ending at the close of business on the day of the mailing; or

register the transfer of or exchange any debt security of that series selected for redemption, in whole or in part, except the unredeemed portion being redeemed in part.

We will appoint the trustee as the initial security registrar. Any transfer agent, in addition to the security registrar initially designated by us, will be named in the prospectus supplement. We may designate additional transfer agents or change transfer agents or change the office of the transfer agent. However, we will be required to maintain a transfer agent in each place of payment for the debt securities of each series.

Global Securities

The debt securities of any series may be represented, in whole or in part, by one or more global securities. Each global security will:

be registered in the name of a depository, or its nominee, that we will identify in a prospectus supplement;

be deposited with the depository or nominee or custodian; and

bear any required legends.

No global security may be exchanged in whole or in part for debt securities registered in the name of any person other than the depository or any nominee unless:

the depository has notified us that it is unwilling or unable to continue as depository or has ceased to be qualified to act as depository;

an event of default is continuing with respect to the debt securities of the applicable series; or

any other circumstance described in a prospectus supplement has occurred permitting or requiring the issuance of any such security.

As long as the depository, or its nominee, is the registered owner of a global security, the depository or nominee will be considered the sole owner and holder of the debt securities represented by the global security for all purposes under the indentures. Except in the above limited

circumstances, owners of beneficial interests in a global security will not be:

entitled to have the debt securities registered in their names;

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entitled to physical delivery of certificated debt securities; or

considered to be holders of those debt securities under the indenture.

Payments on a global security will be made to the depositary or its nominee as the holder of the global security. Some jurisdictions have laws that require that certain purchasers of securities take physical delivery of such securities in definitive form. These laws may impair the ability to transfer beneficial interests in a global security.

Institutions that have accounts with the depositary or its nominee are referred to as "participants." Ownership of beneficial interests in a global security will be limited to participants and to persons that may hold beneficial interests through participants. The depositary will credit, on its book-entry registration and transfer system, the respective principal amounts of debt securities represented by the global security to the accounts of its participants.

Ownership of beneficial interests in a global security will be shown on and effected through records maintained by the depositary, with respect to participants' interests, or any participant, with respect to interests of persons held by participants on their behalf.

Payments, transfers and exchanges relating to beneficial interests in a global security will be subject to policies and procedures of the depositary. The depositary policies and procedures may change from time to time. Neither any trustee nor we will have any responsibility or liability for the depositary's or any participant's records with respect to beneficial interests in a global security.

Payment and Paying Agents

Unless otherwise indicated in a prospectus supplement, the provisions described in this paragraph will apply to the debt securities. Payment of interest on a debt security on any interest payment date will be made to the person in whose name the debt security is registered at the close of business on the regular record date. Payment on debt securities of a particular series will be payable at the office of a paying agent or paying agents designated by us. However, at our option, we may pay interest by mailing a check to the record holder. The trustee will be designated as our initial paying agent.

We may also name any other paying agents in a prospectus supplement. We may designate additional paying agents, change paying agents or change the office of any paying agent. However, we will be required to maintain a paying agent in each place of payment for the debt securities of a particular series.

All moneys paid by us to a paying agent for payment on any debt security that remain unclaimed for a period ending the earlier of:

10 business days prior to the date the money would be turned over to the applicable state; or

at the end of two years after such payment was due,

will be repaid to us thereafter. The holder may look only to us for such payment.

No Protection in the Event of a Change of Control

Unless otherwise indicated in a prospectus supplement with respect to a particular series of debt securities, 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.

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Covenants

Unless otherwise indicated in a prospectus supplement with respect to a particular series of debt securities, the debt securities will not contain any financial or restrictive covenants.

Consolidation, Merger and Sale of Assets

Unless we indicate otherwise in a prospectus supplement with respect to a particular series of debt securities, we may not consolidate with or merge into any other person (other than one of our subsidiaries), in a transaction in which we are not the surviving corporation, or convey, transfer or lease our properties and assets substantially as an entirety to, any person (other than a subsidiary of Avinger, Inc.), unless:

the successor entity, if any, is a U.S. corporation, limited liability company, partnership, trust or other business entity;

the successor entity assumes our obligations on the debt securities and under the indentures;

immediately after giving effect to the transaction, no default or event of default shall have occurred and be continuing; and

certain other conditions specified in the indenture are met.

Events of Default

Unless we indicate otherwise in a prospectus supplement, the following will be events of default for any series of debt securities under the indentures:

- (1) we fail to pay principal of or any premium on any debt security of that series when due;
- (2) we fail to pay any interest on any debt security of that series for 30 days after it becomes due;
- (3) we fail to deposit any sinking fund payment when due;
- (4) we fail to perform any other covenant in the indenture and such failure continues for 90 days after we are given the notice required in the indentures; and
- (5) certain events involving our bankruptcy, insolvency or reorganization.

Additional or different events of default applicable to a series of debt securities may be described in a prospectus supplement. An event of default of one series of debt securities is not necessarily an event of default for any other series of debt securities.

The trustee may withhold notice to the holders of any default, except defaults in the payment of principal, premium, if any, interest, any sinking fund installment on, or with respect to any conversion right of, the debt securities of such series. However, the trustee must consider it to be in the interest of the holders of the debt securities of such series to withhold this notice.

Unless we indicate otherwise in a prospectus supplement, if an event of default, other than an event of default described in clause (5) above, shall occur and be continuing with respect to any series of debt securities, either the trustee or the holders of at least 25% in aggregate principal amount of the outstanding securities of that series may declare the principal amount and premium, if any, of the debt securities of that series, or if any debt securities of that series are original issue discount securities, such other amount as may be specified in the applicable prospectus supplement, in each case together with accrued and unpaid interest, if any, thereon, to be due and payable immediately.

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Unless we indicate otherwise in a prospectus supplement, if an event of default described in clause (5) above shall occur, the principal amount and premium, if any, of all the debt securities of that series, or if any debt securities of that series are original issue discount securities, such other amount as

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may be specified in the applicable prospectus supplement, in each case together with accrued and unpaid interest, if any, thereon, will automatically become immediately due and payable. Any payment by us on the subordinated debt securities following any such acceleration will be subject to the subordination provisions described below under "Subordinated debt securities."

Notwithstanding the foregoing, each indenture will provide that we may, at our option, elect that the sole remedy for an event of default relating to our failure to comply with our obligations described under the section entitled "Reports" below or our failure to comply with the requirements of Section 314(a)(1) of the Trust Indenture Act will for the first 360 days after the occurrence of such an event of default consist exclusively of the right to receive additional interest on the relevant series of debt securities at an annual rate equal to (i) 0.25% of the principal amount of such series of debt securities for the first 180 days after the occurrence of such event of default and (ii) 0.50% of the principal amount of such series of debt securities from the 181st day to, and including, the 360th day after the occurrence of such event of default, which we call "additional interest." If we so elect, the additional interest will accrue on all outstanding debt securities from and including the date on which such event of default first occurs until such violation is cured or waived and shall be payable on each relevant interest payment date to holders of record on the regular record date immediately preceding the interest payment date. On the 361st day after such event of default (if such violation is not cured or waived prior to such 361st day), the debt securities will be subject to acceleration as provided above. In the event we do not elect to pay additional interest upon any such event of default in accordance with this paragraph, the debt securities will be subject to acceleration as provided above.

In order to elect to pay the additional interest as the sole remedy during the first 360 days after the occurrence of any event of default relating to the failure to comply with the reporting obligations in accordance with the preceding paragraph, we must notify all holders of debt securities and the trustee and paying agent of such election prior to the close of business on the first business day following the date on which such event of default occurs. Upon our failure to timely give such notice or pay the additional interest, the debt securities will be immediately subject to acceleration as provided above.

After acceleration, the holders of a majority in aggregate principal amount of the outstanding securities of that series may, under certain circumstances, rescind and annul such acceleration if all events of default, other than the non-payment of accelerated principal, or other specified amounts or interest, have been cured or waived.

Other than the duty to act with the required care during an event of default, the trustee will not be obligated to exercise any of its rights or powers at the request of the holders unless the holders shall have offered to the trustee reasonable indemnity. Generally, the holders of a majority in aggregate 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.

A holder of debt securities of any series will not have any right to institute any proceeding under the indentures, or for the appointment of a receiver or a trustee, or for any other remedy under the indentures, unless:

- (1) the holder has previously given to the trustee written notice of a continuing event of default with respect to the debt securities of that series;
- (2) the holders of at least 25% in aggregate principal amount of the outstanding debt securities of that series have made a written request and have offered reasonable indemnity to the trustee to institute the proceeding; and
- (3) the trustee has failed to institute the proceeding and has not received direction inconsistent with the original request from the holders of a majority in aggregate principal amount of the outstanding debt securities of that series within 60 days after the original request.

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Holders may, however, sue to enforce the payment of principal, premium or interest on any debt security on or after the due date or to enforce the right, if any, to convert any debt security (if the debt security is convertible) without following the procedures listed in (1) through (3) above.

We will furnish the trustee an annual statement from our officers as to whether or not we are in default in the performance of the conditions and covenants under the indenture and, if so, specifying all known defaults.

Modification and Waiver

Unless we indicate otherwise in a prospectus supplement, the applicable trustee and we may make modifications and amendments to an indenture with the consent of the holders of a majority in aggregate principal amount of the outstanding securities of each series affected by the modification or amendment.

We may also make modifications and amendments to the indentures for the benefit of holders without their consent, for certain purposes including, but not limited to:

to evidence the succession of another person to Avinger, or successive successions, and the assumption by any such successor of the covenants of Avinger in the indentures in compliance with Article 8 of the indentures;

adding covenants;

adding events of default;

making certain changes to facilitate the issuance of the debt securities;

to add to, change or eliminate any of the provisions of the indentures or more series of securities, provided that any such addition, change or elimination (A) shall neither (i) apply to any 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 such security with respect to such provision or (B) shall become effective only when there is no such security outstanding;

securing the debt securities;

providing for guaranties of, or additional obligors on, the debt securities;

to establish the form or term of debt securities as permitted by Sections 2.1 and 3.1 of the indenture;

providing for a successor trustee or additional trustees;

conforming the indenture to the description of the securities set forth in this prospectus or the accompanying prospectus supplement;

curing any ambiguity, defect or inconsistency; provided that such action shall not adversely affect the interest of the holders in any material respect;

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permitting or facilitating the defeasance and discharge of the debt securities;

make such other provisions in regard to matters or questions arising under the indentures or under any supplemental indentures as our board of directors may deem necessary or desirable, and which does not in each case adversely affect the interests of the holders of the debt securities of a series; and

comply with requirements of the SEC in order to effect or maintain the qualifications of the indentures under the Trust Indenture Act of 1939, as amended (the "Trust Indenture Act").

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However, neither the trustee nor we may make any modification or amendment without the consent of the holder of each outstanding security of that series affected by the modification or amendment if such modification or amendment would:

change the stated maturity of the principal of, or any installment of principal or interest on, any debt security;

reduce the principal, premium, if any, or interest on any debt security or any amount payable upon redemption or repurchase, whether at our option or the option of any holder, or reduce the amount of any sinking fund payments;

reduce the principal of an original issue discount security or any other debt security payable on acceleration of maturity;

change the place of payment or the currency in which any debt security is payable;

impair the right to enforce any payment after the stated maturity or redemption date;

if subordinated debt securities, modify the subordination provisions in a materially adverse manner to the holders;

adversely affect the right to convert any debt security if the debt security is a convertible debt security; or

change the provisions in the indenture that relate to modifying or amending the indenture.

Satisfaction and Discharge; Defeasance

We may be discharged from our obligations on the debt securities, subject to limited exceptions, of any series that have matured or will mature or be redeemed within one year if we deposit enough money with the trustee to pay all the principal, interest and any premium due to the stated maturity date or redemption date of the debt securities.

Each indenture contains a provision that permits us to elect either or both of the following:

we may elect to be discharged from all of our obligations, subject to limited exceptions, with respect to any series of debt securities then outstanding. If we make this election, the holders of the debt securities of the series will not be entitled to the benefits of the indenture, except for the rights of holders to receive payments on debt securities or the registration of transfer and exchange of debt securities and replacement of lost, stolen or mutilated debt securities.

we may elect to be released from our obligations under some or all of any financial or restrictive covenants applicable to the series of debt securities to which the election relates and from the consequences of an event of default resulting from a breach of those covenants.

To make either of the above elections, we must irrevocably deposit in trust with the trustee enough money to pay in full the principal, interest and premium on the debt securities. This amount may be made in cash and/or U.S. government obligations or, in the case of debt securities denominated in a currency other than U.S. dollars, cash in the currency in which such series of securities is denominated and/or foreign government obligations. As a condition to either of the above elections, for debt securities denominated in U.S. dollars we must deliver to the trustee an opinion of counsel that the holders of the debt securities will not recognize income, gain or loss for U.S. federal income tax purposes as a result of the action.

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

direct obligations of the government that issued or caused to be issued the currency in which such securities are denominated and for the payment of which obligations its full faith and credit is pledged, or, with respect to debt securities of any series which are denominated in Euros, direct obligations of certain members of the European Union for the payment of which obligations the full faith and credit of such members is pledged, which in each case 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 a government described in the bullet above the timely payment of which is unconditionally guaranteed as a full faith and credit obligation by such government, which are not callable or redeemable at the option of the issuer thereof.

Notices

Notices to holders will be given by mail to the addresses of the holders in the security register.

Governing Law

The indentures and the debt securities will be governed by, and construed under, the laws of the State of New York.

No Personal Liability of Directors, Officers, Employees and Stockholders

No incorporator, stockholder, employee, agent, officer, director or subsidiary of ours will have any liability for any obligations of ours, or because of the creation of any indebtedness under the debt securities, the indentures or supplemental indentures. The indentures provide that all such liability is expressly waived and released as a condition of, and as a consideration for, the execution of such indentures and the issuance of the debt securities.

Regarding the Trustee

The indentures limit the right of the trustee, should it become our creditor, to obtain payment of claims or secure its claims.

The trustee will be permitted to engage in certain other transactions with us. However, if the trustee acquires any conflicting interest, and there is a default under the debt securities of any series for which it is trustee, the trustee must eliminate the conflict or resign.

Subordinated Debt Securities

The following provisions will be applicable with respect to each series of subordinated debt securities, unless otherwise stated in the prospectus supplement relating to that series of subordinated debt securities.

The indebtedness evidenced by the subordinated debt securities of any series is subordinated, to the extent provided in the subordinated indenture and the applicable prospectus supplement, to the prior payment in full, in cash or other payment satisfactory to the holders of senior debt, of all senior debt, including any senior debt securities.

Upon any distribution of our assets upon any dissolution, winding up, liquidation or reorganization, whether voluntary or involuntary, marshalling of assets, assignment for the benefit of creditors, or in bankruptcy, insolvency, receivership or other similar proceedings, payments on the subordinated debt

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securities will be subordinated in right of payment to the prior payment in full in cash or other payment satisfactory to holders of senior debt of all senior debt.

In the event of any acceleration of the subordinated debt securities of any series because of an event of default with respect to the subordinated debt securities of that series, holders of any senior debt would be entitled to payment in full in cash or other payment satisfactory to holders of senior debt of all senior debt before the holders of subordinated debt securities are entitled to receive any payment or distribution.

In addition, the subordinated debt securities will be structurally subordinated to all indebtedness and other liabilities of our subsidiaries, including trade payables and lease obligations. This occurs because our right to receive any assets of our subsidiaries upon their liquidation or reorganization, and your right to participate in those assets, will be effectively subordinated to the claims of that subsidiary's creditors, including trade creditors, except to the extent that we are recognized as a creditor of such subsidiary. If we are recognized as a creditor of that subsidiary, our claims would still be subordinate to any security interest in the assets of the subsidiary and any indebtedness of the subsidiary senior to us.

We are required to promptly notify holders of senior debt or their representatives under the subordinated indenture if payment of the subordinated debt securities is accelerated because of an event of default.

Under the subordinated indenture, we may also not make payment on the subordinated debt securities if:

a default in our obligations to pay principal, premium, if any, interest or other amounts on our senior debt occurs and the default continues beyond any applicable grace period, which we refer to as a payment default; or

any other default occurs and is continuing with respect to designated senior debt that permits holders of designated senior debt to accelerate its maturity, which we refer to as a non-payment default, and the trustee receives a payment blockage notice from us or some other person permitted to give the notice under the subordinated indenture.

We will resume payments on the subordinated debt securities:

in case of a payment default, when the default is cured or waived or ceases to exist, and

in case of a nonpayment default, the earlier of when the default is cured or waived or ceases to exist or 179 days after the receipt of the payment blockage notice.

No new payment blockage period may commence on the basis of a nonpayment default unless 365 days have elapsed from the effectiveness of the immediately prior payment blockage notice. No nonpayment default that existed or was continuing on the date of delivery of any payment blockage notice to the trustee shall be the basis for a subsequent payment blockage notice.

As a result of these subordination provisions, in the event of our bankruptcy, dissolution or reorganization, holders of senior debt may receive more, ratably, and holders of the subordinated debt securities may receive less, ratably, than our other creditors. The subordination provisions will not prevent the occurrence of any event of default under the subordinated indenture.

The subordination provisions will not apply to payments from money or government obligations held in trust by the trustee for the payment of principal, interest and premium, if any, on subordinated debt securities pursuant to the provisions described under the section entitled "Satisfaction and discharge; defeasance," if the subordination provisions were not violated at the time the money or government obligations were deposited into trust.

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If the trustee or any holder receives any payment that should not have been made to them in contravention of subordination provisions before all senior debt is paid in full in cash or other payment satisfactory to holders of senior debt, then such payment will be held in trust for the holders of senior debt.

Senior debt securities will constitute senior debt under the subordinated indenture.

Additional or different subordination provisions may be described in a prospectus supplement relating to a particular series of debt securities.

Definitions

"Designated senior debt" means our obligations under any particular senior debt in which the instrument creating or evidencing the same or the assumption or guarantee thereof, or related agreements or documents to which we are a party, expressly provides that such indebtedness shall be designated senior debt for purposes of the subordinated indenture. The instrument, agreement or other document evidencing any designated senior debt may place limitations and conditions on the right of such senior debt to exercise the rights of designated senior debt.

"Indebtedness" means the following, whether absolute or contingent, secured or unsecured, due or to become due, outstanding on the date of the indenture for such series of securities or thereafter created, incurred or assumed:

our indebtedness evidenced by a credit or loan agreement, note, bond, debenture or other written obligation;

all of our obligations for money borrowed;

all of our obligations evidenced by a note or similar instrument given in connection with the acquisition of any businesses, properties or assets of any kind,

our obligations:

as lessee under leases required to be capitalized on the balance sheet of the lessee under generally accepted accounting principles, or

as lessee under leases for facilities, capital equipment or related assets, whether or not capitalized, entered into or leased for financing purposes;

all of our obligations under interest rate and currency swaps, caps, floors, collars, hedge agreements, forward contracts or similar agreements or arrangements;

all of our obligations with respect to letters of credit, bankers' acceptances and similar facilities, including reimbursement obligations with respect to the foregoing;

all of our obligations issued or assumed as the deferred purchase price of property or services, but excluding trade accounts payable and accrued liabilities arising in the ordinary course of business;

all obligations of the type referred to in the above clauses of another person, the payment of which, in either case, we have assumed or guaranteed, for which we are responsible or liable, directly or indirectly, jointly or severally, as obligor, guarantor or otherwise, or which are secured by a lien on our property; and

renewals, extensions, modifications, replacements, restatements and refundings of, or any indebtedness or obligation issued in exchange for, any such indebtedness or obligation described in the above clauses of this definition.

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"Senior debt" means the principal of, premium, if any, and interest, including all interest accruing subsequent to the commencement of any bankruptcy or similar proceeding, whether or not a claim for post-petition interest is allowable as a claim in any such proceeding, and rent payable on or in connection with, and all fees and other amounts payable in connection with, our indebtedness. However, senior debt shall not include:

any debt or obligation if its terms or the terms of the instrument under which or pursuant to which it is issued expressly provide that it shall not be senior in right of payment to the subordinated debt securities or expressly provide that such indebtedness is on the same basis or "junior" to the subordinated debt securities; or

debt to any of our subsidiaries, a majority of the voting stock of which is owned, directly or indirectly, by us.

"Subsidiary" means a corporation more than 50% of the outstanding voting stock of which is owned, directly or indirectly, by us or by one or more of our other subsidiaries or by a combination of us and our other subsidiaries. For purposes of this definition, "voting stock" means stock or other similar interests which ordinarily has or have voting power for the election of directors, or persons performing similar functions, whether at all times or only so long as no senior class of stock or other interests has or have such voting power by reason of any contingency.

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DESCRIPTION OF SUBSCRIPTION RIGHTS

We may issue subscription rights to purchase our common stock, preferred stock or debt securities. These subscription rights may be offered independently or together with any other security offered hereby and may or may not be transferable by the stockholder receiving the subscription rights in such offering. In connection with any offering of subscription rights, we may enter into a standby arrangement with one or more underwriters or other purchasers pursuant to which the underwriters or other purchasers may be required to purchase any securities remaining unsubscribed for after such offering.

The prospectus supplement relating to any subscription rights we offer, if any, will, to the extent applicable, include specific terms relating to the offering, including some or all of the following:

the price, if any, for the subscription rights;

the exercise price payable for our common stock, preferred stock or debt securities upon the exercise of the subscription rights;

the number of subscription rights to be issued to each stockholder;

the number and terms of our common stock, preferred stock or debt securities which may be purchased per each subscription right;

the extent to which the subscription rights are transferable;

any other terms of the subscription rights, including the terms, procedures and limitations relating to the exchange and exercise of the subscription rights;

the date on which the right to exercise the subscription rights shall commence, and the date on which the subscription rights shall expire;

the extent to which the subscription rights may include an over-subscription privilege with respect to unsubscribed securities or an over-allotment privilege to the extent the securities are fully subscribed; and

if applicable, the material terms of any standby underwriting or purchase arrangement which may be entered into by Avinger in connection with the offering of subscription rights.

The descriptions of the subscription rights in this prospectus and in any prospectus supplement are summaries of the material provisions of the applicable subscription right agreements. These descriptions do not restate those subscription right agreements in their entirety and may not contain all the information that you may find useful. We urge you to read the applicable subscription right agreements because they, and not the summaries, define your rights as holders of the subscription rights. For more information, please review the forms of the relevant subscription right agreements, which will be filed with the SEC promptly after the offering of subscription rights and will be available as described in the section titled "Where You Can Find More Information."

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DESCRIPTION OF UNITS

We may issue units comprised of one or more of the other classes of securities described in this prospectus 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 units may be issued under unit agreements to be entered into between us and a unit agent, as detailed in the prospectus supplement relating to the units being offered. The prospectus supplement will describe:

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

a description of the terms of any unit agreement governing the units;

a description of the provisions for the payment, settlement, transfer or exchange of the units;

a discussion of material federal income tax considerations, if applicable; and

whether the units if issued as a separate security will be issued in fully registered or global form.

The descriptions of the units in this prospectus and in any prospectus supplement are summaries of the material provisions of the applicable unit agreements. These descriptions do not restate those unit agreements in their entirety and may not contain all the information that you may find useful. We urge you to read the applicable unit agreements because they, and not the summaries, define your rights as holders of the units. For more information, please review the forms of the relevant unit agreements, which will be filed with the SEC promptly after the offering of units and will be available as described in the section titled "Where You Can Find More Information."

Table of Contents**SELLING SECURITY HOLDERS**

This prospectus also relates to the possible resale by certain of our stockholders, who we refer to in this prospectus as the "selling stockholders," of up to 348,262 shares of our common stock that were issued and outstanding prior to the original date of filing of the registration statement of which this prospectus forms a part. The shares of common stock which may be offered by the selling stockholders were purchased pursuant to the Securities Purchase Agreement dated September 22, 2015 between us and CRG Partners III L.P. and certain of its affiliated funds, collectively referred to as "CRG." When we refer to the "selling stockholders" in this prospectus, we mean the persons listed in the table below, as well as their donees, pledgees, assignees, transferees, distributees, or other successors in interest. No selling stockholder has had any material relationship with us or any of our affiliates within the past three years, other than as lenders pursuant to the Term Loan Agreement dated September 22, 2015 by and among us, certain of our subsidiaries from time to time party thereto as guarantors and CRG as lenders, under which we may borrow up to \$50 million from CRG.

The following table details the name of each selling stockholder, the number of shares of common stock held by the selling stockholder, and the number of shares that may be offered by the selling stockholder for resale under this prospectus. The following table has been prepared on the assumption that all shares offered for resale by the selling stockholders under this prospectus will be sold to parties unaffiliated with the selling stockholders.

| Name of Selling Stockholder(1) | Prior to the Offering | | Number of Shares of Common Stock Being Registered for Resale | After the Offering | |
|--|---|---|--|---|---|
| | Number of Shares of Common Stock Beneficially Owned | Percent of Shares of Common Stock Outstanding | | Shares of Common Stock Beneficially Owned | Percent of Shares of Common Stock Outstanding |
| CRG Partners III, L.P. | 40,527 | * | 40,527 | * | |
| CRG Partners III Parallel Fund "A" L.P. | 8,939 | * | 8,939 | * | |
| CRG Partners III Parallel Fund B (Cayman) L.P. | 208,794 | 1.7 | 208,794 | * | |
| CRG Partners III (Cayman) L.P. | 90,002 | * | 90,002 | * | |
| Total shares of common stock to be registered for selling stockholders | 348,262 | 2.8 | 348,262 | | * |

*

Less than 1%.

Capital Royalty L.P. is the investment manager to each of CRG Partners III, L.P., CRG Partners III Parallel Fund "A" L.P. and CRG Partners III Parallel Fund B (Cayman) L.P.

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PLAN OF DISTRIBUTION

We or the selling stockholders may sell the securities offered through this prospectus (1) to or through underwriters or dealers, (2) directly to purchasers, including our affiliates, (3) through agents, including ordinary brokerage transactions, block trades, placements, "at the market" transactions, put or call transactions or in any other way not involving market makers or established trading markets or (4) through a combination of any these methods. The securities may be distributed at a fixed price or prices, which may be changed, market prices prevailing at the time of sale, prices related to the prevailing market prices, or negotiated prices. Any prospectus supplement will include, to the extent applicable, the following information:

the terms of the offering;

the names of any underwriters or agents;

the name or names of any managing underwriter or underwriters;

the purchase price of the securities;

the net proceeds from the sale of the securities;

any delayed delivery arrangements;

any underwriting discounts, commissions and other items constituting underwriters' compensation;

any initial public offering price;

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

any commissions paid to agents.

We may engage in at the market offerings into an existing trading market in accordance with Rule 415(a)(4). Any at the market offering will be through an underwriter or underwriters acting as principal or agent for us.

We may issue to the holders of our common stock, on a pro rata basis for no consideration, subscription rights to purchase shares of our common stock or preferred stock. These subscription rights may or may not be transferable by stockholders. The applicable prospectus supplement will describe the specific terms of any offering of our common or preferred stock through the issuance of subscription rights, including the terms of the subscription rights offering, the terms, procedures and limitations relating to the exchange and exercise of the subscription rights and, if applicable, the material terms of any standby underwriting or purchase arrangement entered into by us in connection with the offering of common or preferred stock through the issuance of subscription rights.

Sale through Underwriters or Dealers

If underwriters are used in the sale, the underwriters will acquire the securities for their own account, including through underwriting, purchase, security lending or repurchase agreements with us. The underwriters may resell the securities from time to time in one or more transactions, including negotiated transactions. Underwriters may sell the securities in order to facilitate transactions in any of our other securities (described in this prospectus or otherwise), including other public or private transactions and short sales. Underwriters may offer

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securities to the public either through underwriting syndicates represented by one or more managing underwriters or directly by one or more firms acting as underwriters. Unless otherwise indicated in the prospectus supplement, the obligations of the underwriters to purchase the securities will be subject to certain conditions, and the underwriters will be obligated to purchase all the offered securities if they purchase any of them. The underwriters may change from time to time any initial public offering price and any discounts or concessions allowed or

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reallowed or paid to dealers. The prospectus supplement will include the names of the principal underwriters, the respective amount of securities underwritten, the nature of the obligation of the underwriters to take the securities and the nature of any material relationship between an underwriter and us or the selling stockholders, as applicable.

Some or all of the securities that we offer through this prospectus may be new issues of securities with no established trading market. Any underwriters to whom we sell securities for public offering and sale may make a market in those securities, but they will not be obligated to do so and they may discontinue any market making at any time without notice. Accordingly, we cannot assure you of the liquidity of, or continued trading markets for, any securities offered pursuant to this prospectus.

If dealers are used in the sale of securities offered through this prospectus, we or the selling stockholders will sell the securities to them as principals. They may then resell those securities to the public at varying prices determined by the dealers at the time of resale. The prospectus supplement will include the names of the dealers and the terms of the transaction.

Direct Sales and Sales through Agents

We or the selling stockholders may sell the securities offered through this prospectus directly. In this case, no underwriters or agents would be involved. In addition, any shares that qualify for sale by the selling stockholders pursuant to Rule 144 under the Securities Act may be sold under Rule 144 rather than pursuant to this prospectus.

Securities may also be sold through agents designated from time to time. Any required prospectus supplement will name any agent involved in the offer or sale of the offered securities and will describe any commissions payable to the agent by us or the selling stockholders. Unless otherwise indicated in such prospectus supplement, any agent will agree to use its reasonable best efforts to solicit purchases for the period of its appointment.

We or the selling stockholders may sell the securities directly to institutional investors or others who may be deemed to be underwriters within the meaning of the Securities Act with respect to any sale of those securities. The terms of any such sales will be described in any required prospectus supplement.

Delayed Delivery Contracts

If the prospectus supplement indicates, we may authorize agents, underwriters or dealers to solicit offers from certain types of institutions to purchase securities at the public offering price under delayed delivery contracts. These contracts would provide for payment and delivery on a specified date in the future. The contracts would be subject only to those conditions described in the prospectus supplement. The applicable prospectus supplement will describe the commission payable for solicitation of those contracts.

Market Making, Stabilization and Other Transactions

Unless the applicable prospectus supplement states otherwise, each series of offered securities by us will be a new issue and will have no established trading market. We may elect to list any series of offered securities on an exchange. Any underwriters that we use in the sale of such offered securities may make a market in such securities, but may discontinue such market making at any time without notice. Accordingly, we cannot assure you that the securities will have a liquid trading market.

Any underwriter may also engage in stabilizing transactions, syndicate covering transactions and penalty bids in accordance with Rule 104 under the Exchange Act. Stabilizing transactions involve bids to purchase the underlying security in the open market for the purpose of pegging, fixing or maintaining the price of the securities. Syndicate covering transactions involve purchases of the

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securities in the open market after the distribution has been completed in order to cover syndicate short positions.

Penalty bids permit the underwriters to reclaim a selling concession from a syndicate member when the securities originally sold by the syndicate member are purchased in a syndicate covering transaction to cover syndicate short positions. Stabilizing transactions, syndicate covering transactions and penalty bids may cause the price of the securities to be higher than it would be in the absence of the transactions. The underwriters may, if they commence these transactions, discontinue them at any time.

Derivative Transactions and Hedging

We, the underwriters or other agents may engage in derivative transactions involving the securities. These derivatives may consist of short sale transactions and other hedging activities. The underwriters or agents may acquire a long or short position in the securities, hold or resell securities acquired and purchase options or futures on the securities and other derivative instruments with returns linked to or related to changes in the price of the securities. In order to facilitate these derivative transactions, we may enter into security lending or repurchase agreements with the underwriters or agents. The underwriters or agents may effect the derivative transactions through sales of the securities to the public, including short sales, or by lending the securities in order to facilitate short sale transactions by others. The underwriters or agents may also use the securities purchased or borrowed from us or others (or, in the case of derivatives, securities received from us in settlement of those derivatives) to directly or indirectly settle sales of the securities or close out any related open borrowings of the securities.

Electronic Auctions

We or the selling stockholders may also make sales through the Internet or through other electronic means. Since we or the selling stockholders may from time to time elect to offer securities directly to the public, with or without the involvement of agents, underwriters or dealers, utilizing the Internet or other forms of electronic bidding or ordering systems for the pricing and allocation of such securities, you should pay particular attention to the description of that system we will provide in a prospectus supplement.

Such electronic system may allow bidders to directly participate, through electronic access to an auction site, by submitting conditional offers to buy that are subject to acceptance by us, and which may directly affect the price or other terms and conditions at which such securities are sold. These bidding or ordering systems may present to each bidder, on a so-called "real-time" basis, relevant information to assist in making a bid, such as the clearing spread at which the offering would be sold, based on the bids submitted, and whether a bidder's individual bids would be accepted, prorated or rejected. For example, in the case of a debt security, the clearing spread could be indicated as a number of "basis points" above an index treasury note. Of course, many pricing methods can and may also be used.

Upon completion of such an electronic auction process, securities will be allocated based on prices bid, terms of bid or other factors. The final offering price at which securities would be sold and the allocation of securities among bidders would be based in whole or in part on the results of the Internet or other electronic bidding process or auction.

General Information

Agents, underwriters and dealers may be entitled, under agreements entered into with us or the selling stockholders, to indemnification by us or the selling stockholders against certain liabilities, including liabilities under the Securities Act. Agents, underwriters and dealers may engage in transactions with or perform services for us in the ordinary course of their businesses.

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LEGAL MATTERS

The validity of the securities offered by this prospectus will be passed upon by Wilson Sonsini Goodrich & Rosati, P.C., Palo Alto, California. Certain members of, and investment partnerships comprised of members of, and persons associated with, Wilson Sonsini Goodrich & Rosati, P.C., own an aggregate of 4,921 shares of our common stock.

EXPERTS

Ernst & Young LLP, independent registered public accounting firm, has audited our financial statements included in our Annual Report on Form 10-K for the year ended December 31, 2014, as set forth in their report which is incorporated by reference in this prospectus and elsewhere in the registration statement. Our financial statements are incorporated by reference in reliance on Ernst & Young LLP's report, given on their authority as experts in accounting and auditing.

WHERE YOU CAN FIND MORE INFORMATION

We file annual, quarterly and other 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, NE, Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for further information on the Public Reference Room. Our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, and Current Reports on Form 8-K, including any amendments to those reports, and other information that we file with or furnish to the SEC pursuant to Section 13(a) or 15(d) of the Exchange Act can also be accessed free of charge through the Internet. These filings will be available as soon as reasonably practicable after we electronically file such material with, or furnish it to, the SEC.

We have filed with the SEC a registration statement under the Securities Act of 1933 relating to the offering of these securities. The registration statement, including the attached exhibits, contains additional relevant information about us and the securities. This prospectus does not contain all of the information set forth in the registration statement. You can obtain a copy of the registration statement, at prescribed rates, from the SEC at the address listed above. The registration statement and the documents referred to below under "Information Incorporated by Reference" are also available on our Internet website, www.avinger.com. We have not incorporated by reference into this prospectus the information on our website, and you should not consider it to be a part of this prospectus.

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INFORMATION INCORPORATED BY REFERENCE

The SEC allows us to incorporate by reference into this prospectus certain information we file with it, which means that we can disclose important information by referring you to those documents. The information incorporated by reference is considered to be a part of this prospectus, and information that we file later with the SEC will automatically update and supersede information contained in this prospectus and any accompanying prospectus supplement. We incorporate by reference the documents listed below that we have previously filed with the SEC (excluding any portions of any Form 8-K that are not deemed "filed" pursuant to the General Instructions of Form 8-K):

our Annual Report on Form 10-K for the fiscal year ended December 31, 2014, filed with the SEC on March 27, 2015;

our Quarterly Reports on Form 10-Q for the fiscal quarters ended March 31, 2015 (filed with the SEC on May 13, 2015), June 30, 2015 (filed with the SEC on August 12, 2015) and September 30, 2015 (filed with the SEC on November 12, 2015);

our Current Reports on Form 8-K filed with the SEC on February 6, 2015, May 20, 2015, September 23, 2015 and December 23, 2015; and

the description of our common stock contained in our Registration Statement on Form 8-A as filed with the SEC on January 27, 2015 pursuant to Section 12(b) of the Exchange Act.

We also incorporate by reference into this prospectus additional documents (other than current reports furnished under Item 2.02 or Item 7.01 of Form 8-K and exhibits on such form that are related to such items) that we may file with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act prior to the completion or termination of the offering, including all such documents we may file with the SEC after the date of the initial registration statement and prior to the effectiveness of the registration statement, but excluding any information deemed furnished and not filed with the SEC. Any statements contained in a previously filed document incorporated by reference into this prospectus is deemed to be modified or superseded for purposes of this prospectus to the extent that a statement contained in this prospectus, or in a subsequently filed document also incorporated by reference herein, modifies or supersedes that statement.

This prospectus may contain information that updates, modifies or is contrary to information in one or more of the documents incorporated by reference in this prospectus. You should rely only on the information incorporated by reference or provided in this prospectus. Neither we nor the selling stockholders have authorized anyone else to provide you with different information. You should not assume that the information in this prospectus is accurate as of any date other than the date of this prospectus or the date of the documents incorporated by reference in this prospectus.

We will provide to each person, including any beneficial owner, to whom this prospectus is delivered, upon written or oral request, at no cost to the requester, a copy of any and all of the information that is incorporated by reference in this prospectus.

Requests for such documents should be directed to:

Avinger, Inc.
400 Chesapeake Drive
Redwood City, CA 94063
Attention: Secretary

You may also access the documents incorporated by reference in this prospectus through our website at www.avinger.com. Except for the specific incorporated documents listed above, no information available on or through our website shall be deemed to be incorporated in this prospectus or the registration statement of which it forms a part.

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Shares

Common Stock

PROSPECTUS SUPPLEMENT

**Canaccord Genuity
Cowen and Company
BTIG
Stephens Inc.**

, 2016
