UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

(Mark One)

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

For the fiscal year ended December 31, 2019

OR

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

For the transition period from to

Commission File Number 001-38829

ShockWave Medical, Inc.

(Exact name of Registrant as specified in its Charter)

Delaware **(State or other jurisdiction of incorporation or organization)**	**27-0494101** **(I.R.S. Employer Identification No.)**
5403 Betsy Ross Drive **Santa Clara, CA** **(Address of principal executive offices)**	**95054** **(Zip Code)**

Registrant's telephone number, including area code: (510) 279-4262

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

Title of each class of securities	Trading symbol(s)	Name of each national exchange and principal U.S. market for the securities
ShockWave Medical Inc., common stock, par value $0.001 per share	SWAV	The Nasdaq Stock Market LLC (Nasdaq Global Select Market)

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

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

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

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

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

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

Large accelerated filer	☐	Accelerated filer	☐
Non-accelerated filer	☒	Smaller reporting company	☐
Emerging growth company	☒		

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

Indicate by check mark whether the Registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). YES ☐ NO ☒

As of June 28, 2019, the aggregate market value of shares held by non-affiliates of the registrant (based upon the closing sale prices of such shares on the Nasdaq Global Select Market on June 28, 2019) was approximately $1.0 billion. For purposes of calculating the aggregate market value of shares held by non-affiliates, we have assumed that all outstanding shares are held by non-affiliates, except for shares held by each of our executive officers, directors and 5% or greater stockholders. In the case of 5% or greater stockholders, we have not deemed such stockholders to be affiliates unless there are facts and circumstances which would indicate that such stockholders exercise any control over our company, or unless they hold 10% or more of our outstanding common stock. These assumptions should not be deemed to constitute an admission that all executive officers, directors and 5% or greater stockholders are, in fact, affiliates of our company, or that there are not other persons who may be deemed to be affiliates of our company. Further information concerning shareholdings of our officers, directors and principal stockholders is included or incorporated by reference in Part III, Item 12 of this Annual Report on Form 10-K.

The number of shares of Registrant's Common Stock outstanding as of March 5, 2020 was 31,765,657.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's Proxy Statement for its 2020 Annual Meeting of Stockholders are incorporated herein by reference in Part III of this Annual Report on Form 10-K to the extent stated herein. Such proxy statement will be filed with the Securities and Exchange Commission within 120 days of the registrant's fiscal year ended December 31, 2019.

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SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. In some cases, you can identify these statements by forward-looking words such as “may,” “might,” “will,” “should,” “expects,” “plans,” “anticipates,” “believes,” “estimates,” “predicts,” “potential” or “continue,” the negative of these terms and other comparable terminology. These forward-looking statements, which are subject to risks, uncertainties and assumptions about us, may include projections of our future financial performance, our anticipated growth strategies and anticipated trends in our business. Forward-looking statements contained in this Annual Report on Form 10-K include, but are not limited to statements about:

- our ability to design, develop, manufacture and market innovative products to treat patients with challenging medical conditions, particularly in peripheral artery disease, coronary artery disease and aortic stenosis;
- our expected future growth, including growth in international sales;
- the size and growth potential of the markets for our products, and our ability to serve those markets;
- the rate and degree of market acceptance of our products;
- coverage and reimbursement for procedures performed using our products;
- the performance of third parties in connection with the development of our products, including third-party suppliers;
- regulatory developments in the United States and foreign countries;
- our ability to obtain and maintain regulatory approval or clearance of our products on expected timelines;
- our plans to research, develop and commercialize our products and any other approved or cleared product;
- our ability to scale our organizational culture of cooperative product development and commercial execution;
- the development, regulatory approval, efficacy and commercialization of competing products;
- the loss of key scientific or management personnel;
- our expectations regarding the period during which we qualify as an emerging growth company under the JOBS Act;
- our ability to develop and maintain our corporate infrastructure, including our internal controls;
- our financial performance and capital requirements; and
- our expectations regarding our ability to obtain and maintain intellectual property protection for our products, as well as our ability to operate our business without infringing the intellectual property rights of others.

These statements are only predictions based on our current expectations and projections about future events. There are important factors that could cause our actual results, level of activity, performance or achievements to differ materially from the results, level of activity, performance or achievements expressed or implied by the forward-looking statements, including those factors discussed in the section titled “Risk Factors.” Although we believe the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee future results, level of activity, performance or achievements. We undertake no obligation to update any of these forward-looking statements after the date of this Annual Report on Form 10-K to conform our prior statements to actual results or revised expectations.

PART I

Item 1. Business.

Company Overview

We are a medical device company focused on developing and commercializing products intended to transform the way calcified cardiovascular disease is treated. We aim to establish a new standard of care for medical device treatment of atherosclerotic cardiovascular disease ("atherosclerosis") through our differentiated and proprietary local delivery of sonic pressure waves for the treatment of calcified plaque, which we refer to as intravascular lithotripsy ("IVL"). Our IVL system (our "IVL System"), which leverages our IVL technology (our "IVL Technology"), is a minimally invasive, easy-to-use and safe way to significantly improve patient outcomes.

Our Shockwave M5 IVL catheter ("M5 catheter") was CE-Marked in April 2018 and cleared by the U.S. Food and Drug Administration ("FDA") in July 2018 for use in our IVL System for the treatment of peripheral artery disease ("PAD").

Our Shockwave C2 IVL catheter ("C2 catheter"), which we are currently marketing in Europe, was CE-Marked in June 2018 for use in our IVL System for the treatment of coronary artery disease ("CAD"). In August 2019, we received the Breakthrough Device Designation from the FDA for our C2 catheters using our IVL System for the treatment of CAD.

The second version of our Shockwave S4 IVL catheter ("S4 catheter") was cleared by the FDA in August 2019. We commenced a full commercial launch of our S4 catheter in the second half of 2019 in select approved geographies.

We also have ongoing clinical programs across several products and indications, which, if successful, will allow us to expand commercialization of our products into new geographies and indications. Importantly, we are undertaking ongoing clinical trials of our C2 catheter intended to support a pre-market application ("PMA") in the United States and a Shonin submission in Japan for the treatment of CAD. In October 2018, we received staged Investigational Device Exemption ("IDE") approval for our DISRUPT CAD III global study, which began enrollment in 2019. This study is designed to support U.S. PMA approval for our C2 catheters. We anticipate having final data from these ongoing clinical trials intended to support a U.S. launch of our C2 catheter in the first half of 2021 and a Japan launch in the first half of 2022.

The Opportunity

Atherosclerosis is a common disease of aging in which arteries become narrowed ("stenotic") and the supply of oxygenated blood to the affected organ is reduced by the progressive growth of plaque. Atherosclerotic plaque is comprised of fibrous tissue, lipids (fat) and, when it progresses, calcium. This calcium is present both deep within the walls of the artery ("deep" or "medial" calcium) and close to the inner surface of the artery ("superficial" or "intimal" calcium).

The first two indications we are targeting with our IVL System are occlusive PAD, the narrowing or blockage of vessels that carry blood from the heart to the extremities, and CAD, the narrowing or blockage of the arteries that supply blood to the heart. In the future, we see significant opportunity in the potential treatment of aortic stenosis ("AS"), a condition in which the heart's aortic valve becomes increasingly calcified with age, causing it to narrow and obstruct blood flow from the heart.

The PAD population in the United States has been estimated to be at least eight million people, according to the National Institutes of Health. The global PAD device market size for treatment of occlusive disease is estimated at approximately $2.9 billion and is expected to grow approximately 3% annually due to the fundamental drivers of an aging population and increasing prevalence of diabetes. The "calcium" segment of the PAD market represents a significant percentage of the market, with 50% or more of the population having moderate-to-severe calcium in their vessels, according to our estimates. Current technologies are often not able to safely and effectively treat heavily calcified vessels. Accordingly, we believe our IVL System to treat PAD has a total addressable market opportunity of over $1.7 billion.

The global device market in coronary intervention for CAD is estimated to be nearly $10 billion, according to Millennium Research Group, Inc. ("MRG"). The most common treatment for patients is percutaneous coronary intervention ("PCI"). This involves a suite of devices to facilitate successful angioplasty and stenting, the most commonly used device being drug-eluting stents ("DES"). Moreover, there are nearly four million PCI procedures performed globally every year, and the number of PCI procedures is growing at a rate of more than 5% annually. We believe our IVL System can help grow this market through the improved treatment of patients undergoing PCI in whom the currently available solutions pose a higher degree of clinical risk, as well as through increased adoption of IVL by cardiologists compared to currently available

plaque modification devices. A study published in the American Journal of Cardiology in 2014 demonstrated that more than 30% of patients undergoing PCI have calcified lesions and this percentage is growing. Minimizing complications is particularly important in the coronary vessels, but current plaque modification devices carry meaningful safety risks and are inherently challenging to use, which is why these devices are used very sparingly for PCI procedures in patients with calcified coronary disease. Despite significant under-penetration of the market, these devices still represented a market of nearly $100 million in 2018 within the United States alone, according to MRG; we believe this market is significantly larger globally. Due to the increasing prevalence of calcified cardiovascular disease, the market growth for plaque modification devices exceeds that of PCI procedure growth. We believe the safety, ease of use and efficient impact on calcium of our IVL System will result in rapid adoption and market expansion in markets where our C^2 catheter is introduced. We believe there is an over $2 billion total addressable market opportunity for our IVL System to treat CAD.

The global market for aortic valve replacement ("AVR"), the main treatment for AS, is growing rapidly, and is dominated by the emergence of transcatheter AVR ("TAVR") devices. TAVR has rapidly developed into a multibillion-dollar market globally. According to an article published in the Journal of Thoracic Disease in 2017, the global market for TAVR is over 125,000 procedures performed worldwide in 2018 and is expected to grow to nearly 300,000 by 2025. We believe our IVL System may be able to improve the treatment of AS among patients in whom currently available solutions are inadequate. We are currently developing an IVL catheter which we believe can safely and effectively treat patients with AS. If successful, this represents a potential total addressable market of over $3 billion for our IVL System to treat AS.

Current Challenges

The primary approaches to treat vascular disease are angioplasty balloons ("balloons"), drug-coated balloons ("DCB"), bare metal stents and DES. These devices all work by using pressurized balloons to expand the diseased blood vessels. Calcified plaque creates challenges for these therapies in achieving optimal outcomes in treating PAD and CAD because the calcified vessels fail to expand under safe pressures. This, in turn, can lead to acute failure, damage to the blood vessel, which increases the rate of restenosis (re-occlusion of the vessel following endovascular treatment) or complications requiring adjunctive tools, future re-interventions or conversion to bypass surgery. These complications are significantly increased when treating calcified cardiovascular disease and include dissections, embolization, restenosis, vessel perforations and vessel recoil.

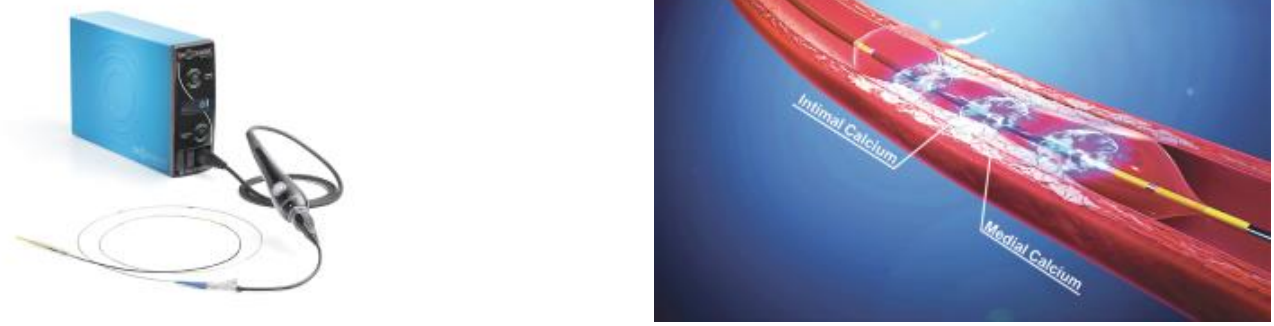
Plaque modification devices (including atherectomy and specialty balloons) have enhanced the treatment of some moderately calcified cardiovascular lesions by improving the ability of stent and balloon therapies to effectively expand in the vessel. Atherectomy devices are designed to break or remove superficial calcium by cutting or sanding the calcium in order to improve vessel expansion. Specialty balloon devices incorporate metallic elements like wires and cutting blades onto standard angioplasty balloons; these devices are intended to make discreet cuts in the plaque and surrounding tissue in order to improve vessel expansion. Despite improvements in plaque modification devices, significant limitations remain, including being difficult to use and creating complications and inconsistent efficacy. Further, because medial calcium is encased in the vessel wall, the existing plaque modification devices are unable to impact medial calcium without damaging the vessel. Combined, these limitations decrease the utilization of plaque modification devices for treating calcified cardiovascular disease, thereby reducing the clinical benefit of angioplasty and stent therapies compared to their use in non-calcified anatomies.

Calcified iliac and femoral arteries can hinder the delivery of large endovascular devices for other catheter-based procedures, including those that treat aortic aneurysms (endovascular aneurysm repair and thoracic endovascular aneurysm repair procedures), severe aortic stenosis treated with TAVR and cardiac support devices for high-risk PCI (e.g., Abiomed's Impella). The standard practice for these procedures is to gain vascular access in the femoral artery and insert large diameter sheaths that facilitate the delivery of the treatment devices to the aorta or the heart. However, when significant calcium is present in these arteries, it can prevent delivery of the devices, and thus may require more invasive treatments, increase complications or prevent the device from being used altogether. For example, in up to 20% of patients, the transfemoral approach through the iliac and femoral arteries is not viable for TAVR delivery or creates risk of vessel trauma due to the extent of vascular calcification, according to a 2018 study in the Journal of the American College of Cardiology.

Our Solution

We have adapted the use of lithotripsy to the cardiovascular field with the aim of creating what we believe can become the safest, most effective means of addressing the growing challenge of cardiovascular calcification. Lithotripsy has been used to successfully treat kidney stones (deposits of hardened calcium) for over 30 years. By integrating lithotripsy into a device that resembles a standard balloon catheter, physicians can prepare, deliver and treat calcified lesions using a familiar form factor, without disruption to their standard procedural workflow. Our differentiated IVL System works by delivering shockwaves through the entire depth of the artery wall, modifying calcium in the medial layer of the artery, not just in the intimal layer. The shockwaves crack this calcium and enable the stenotic artery to expand at low pressures, thereby minimizing complications inherent to traditional balloon dilations, such as dissections or tears. Preparing the vessel with IVL facilitates optimal outcomes with other therapies, including stents and drug-eluting technologies. Using IVL also avoids complications associated with atherectomy devices such as dissection, perforation and embolism. When followed by an anti-proliferative therapy such as a DCB or DES, the micro-fractures may enable better drug penetration into the arterial wall and improve drug uptake, thereby improving the effectiveness of the combination treatment.

Our IVL System



(Left) Our IVL System consisting of a generator, connector cable and IVL catheter. (Right) Our IVL System delivering lithotripsy directly to a calcified vessel

Our IVL System includes a generator, connector cable and a variety of IVL catheters designed to treat PAD and CAD. Our IVL System employs our IVL Technology to crack calcium through short, microsecond bursts of sonic pressure waves, which are generated within the IVL catheter, travel through the vessel and crack calcium with an effective pressure of up to 50 atmospheres (“atm”) (a unit of pressure) without harming the soft tissue. Our IVL catheters utilize multiple lithotripsy emitters that are integrated into a standard, semi-compliant balloon-catheter platform. The IVL catheter is advanced to the target lesion and the integrated balloon is inflated with fluid at a low pressure to make contact with the arterial wall. IVL is then activated through the generator with the touch of a button, creating a small bubble within the catheter balloon which rapidly expands and collapses. The rapid expansion and collapse of the bubble creates sonic pressure waves that travel through the vessel and crack the calcium, allowing the blood vessel to expand under low static pressure.

We believe there is a significant opportunity to apply our IVL Technology as a platform to treat a wide array of indications throughout the cardiovascular system. Ultimately, our plan is to have a family of IVL catheters that can treat calcium-related diseases across a wide variety of vasculatures and structures.

Our Products and Ongoing Development

The interchangeability of specific catheters enables delivery of IVL therapy of diseased vasculature throughout the body. Our IVL catheters are cleared or approved for use in a number of geographies. Development programs are underway to expand indications and geographies:

- M^5 catheters ("medium" vessel, five-emitters): for treating above-the-knee PAD in the United States and internationally.
- C^2 catheters (coronary arteries, two-emitters): for treating CAD in select international markets. We received IDE approval to conduct a pivotal global study, which is intended to support U.S. FDA and Japanese Shonin approval of the device. We commenced enrollment of the study in early 2019.
- S^4 catheters ("small" vessel, four-emitters): for treating PAD Below-the-Knee ("BTK") in the United States, Europe and other select international markets. We have 510(k) clearance and CE Mark and we are currently engaged in a limited market evaluation of the product to test its performance in the heavily calcified and challenging BTK environment.

Our IVL catheters resemble in form a standard balloon angioplasty catheter, the device most commonly used by interventionalists. This familiarity makes our IVL System easy to learn, adopt and use on a day-to-day basis.

A development program and initial clinical work are also currently underway to explore the ability of our IVL Technology to directly treat calcified aortic valves to safely reduce the symptoms of and potentially delay or negate valve replacement treatment for AS.

Since inception, we have focused on generating clinical data to demonstrate the safety and effectiveness of our IVL Technology. These initial studies have consistently delivered low rates of complications regardless of which vessel was being studied. In addition to gaining regulatory approvals or clearances, the data from our clinical studies strengthen our ability to drive adoption of IVL Technology across multiple therapies in existing and new market segments. Our past studies have demonstrated that our IVL Technology reduces residual stenosis and vascular complications in infrapopliteal and femoropopliteal PAD, with outstanding durability and sustained improvement in functional outcome in 115 patients. Our past studies have also guided optimal IVL procedure technique and informed the design of our IVL System and future products in development. In the treatment of CAD, our past studies have demonstrated both safety and effectiveness of our IVL System in heavily calcified coronary lesions prior to stenting in 180 patients. Feasibility studies have shown the potential of our transcatheter aortic valve lithotripsy system (our "TAVL System") to safely improve the aortic valve area and reduce transvalvular gradients in AS. We are currently enrolling patients in multiple studies to support applications for and clearances in a variety of indications and geographies, as well as a randomized trial to assess the combination of IVL with DCB for treating PAD.

We market our IVL System to hospitals whose interventional cardiologists, vascular surgeons and interventional radiologists treat patients with PAD and CAD. We have dedicated meaningful resources to establish direct sales capability in the United States, Germany, Austria and Switzerland, which we have complemented with distributors covering more than 35 countries. We are actively expanding our international field presence through new distributors, additional sales and clinical personnel, and are adding new U.S. sales territories.

For the treatment of CAD, our C^2 catheter has a CE Mark that indicates its use in calcified, stenotic de novo coronary arteries prior to stenting. For the treatment of PAD, our M^5 and S^4 catheters have a CE Mark and have FDA clearances that indicate their use in calcified, stenotic peripheral arteries in patients who are candidates for percutaneous therapy. Our products are not indicated for the treatment of cerebrovascular or carotid arteries; our M^5 and S^4 catheters are not indicated for the treatment of coronary arteries.

While we believe that, from a technological or medical perspective, there are no material disadvantages to the use of our products in comparison to other commercially available alternative products, our products are relatively new, we currently have limited commercialization, sales and marketing experience and our products compete against alternative products that are well-established and are widely accepted by physicians, patients and third-party payors. Many of our competitors are large, well-capitalized companies with significantly greater market share and resources than we have. Our success will depend in part on our ability to increase adoption of our products, expand existing relationships with our customers, obtain regulatory clearances or approvals for our planned or future products, maintain existing reimbursement and obtain reimbursement where it does not currently exist, and develop new products or add new features to our existing products.

Why ShockWave?

Safe – Simple – Effective.

- Treatment of both superficial and deep calcium.
- Improved safety through unique mechanism of action.
- Improved efficacy for angioplasty, stents and drug-eluting technologies.
- Seamless integration into interventional practice with exceptional ease-of-use.
- Expanded access to interventional techniques for patients.

Our Growth Strategy

Our mission is to provide safe, effective and easy-to-use treatments to optimize outcomes for calcified cardiovascular disease. We believe the following strategies will advance our mission and will contribute to our future success and growth.

- Address unmet clinical needs in multiple large markets.
- Advance our IVL System as a common treatment for calcified PAD and CAD.
- Grow our specialized sales force across indications and geographies to foster deep relationships with physicians and drive revenue growth.
- Execute on our clinical program to expand indications and build a robust body of clinical evidence.
- Leverage our IVL Technology to develop new products that satisfy significant unmet clinical needs.
- Drive profitability by scaling our business operations to achieve cost and production efficiencies.

Research and Development

We invest in research and development efforts that advance our IVL Technology with the goal to expand and improve upon our existing product offerings. Our research and development expenses totaled $22.7 million and $32.9 million for the years ended December 31, 2018 and December 31, 2019, respectively.

We believe our ability to rapidly develop innovative products is attributable to the dynamic product innovation process that we have implemented, the versatility and leveragability of our core technology and the management philosophy behind that process. We have recruited and retained engineers and scientists with significant experience in the development of medical devices. We have a pipeline of products in various stages of development that are expected to provide additional commercial opportunities. Our research and development efforts are based at our facility in Santa Clara, California.

Manufacturing

We completed the move of our production of our IVL catheters from our prior Fremont, California facility to our facilities in Santa Clara, California in the second half of 2019. We stock inventory of raw materials, components and finished goods at our facilities in Santa Clara and finished products with our direct sales representatives, who travel to our hospital customers' locations as part of their sales efforts. Our electronics (i.e., our generators and connector cables) are produced by original equipment manufacturing partners using our design specifications. We rely on a single or limited number of suppliers for certain raw materials and components, and we generally have no long-term supply arrangements with our suppliers, as we order on a purchase order basis. In the United States, we generally ship our IVL products from Santa Clara to our hospital customers in the United States on a consignment basis, but also may sell our IVL products directly to our hospital customers through our direct sales representatives, who deliver such products to hospital customers in the field. Internationally, we ship our IVL products from Santa Clara to either our third-party logistic provider located in the Netherlands who then ships directly to hospital customers and distributors pursuant to purchase orders or from Santa Clara directly to hospital customers and distributors pursuant to purchase orders. We also ship to some customers in Germany, Austria and Switzerland on a consignment basis from our third-party logistic provider located in the Netherlands. As of December 31, 2019, we had approximately 103 operations and manufacturing employees.

Our rigorous quality control management programs have earned us a number of quality-related manufacturing designations. Our manufacturing facilities are EN ISO 13485 compliant with ISO 13485:2016 edition certification achieved in 2017. In 2014, we achieved compliance with the applicable standards set forth in the European Union's Medical Device Directive (93/42/EEC) (the "MDD"). We use annual internal audits, combined with external audits by regulatory agencies, to help ensure strong quality control practices. An internal, on-going staff training and education program contributes to our quality assurance program and training is documented and considered part of the employee evaluation process.

Sales & Marketing

We market our products to hospitals whose interventional cardiologists, vascular surgeons and interventional radiologists treat patients with PAD and CAD. We have dedicated meaningful resources to establish a direct sales capability in the United States, Germany, Austria and Switzerland, which we have complemented with distributors covering 35 countries. We are actively expanding our international field presence through new distributors, additional sales and clinical personnel, and are adding new U.S. sales territories. We have the CE Mark in Europe and the 510(k) clearance in the United States for our IVL System using our peripheral catheters (our M^5 catheters and S^4 catheters) and CE Mark in Europe for our IVL System using our C^2 catheter.

Our sales representatives and sales managers generally have substantial and applicable medical device experience, specifically in the vascular space and market our products directly to interventional cardiologists, vascular surgeons and interventional radiologists who treat patients with PAD and CAD. We are focused on developing strong relationships with our physician and hospital customers in order to educate them on the use and benefits of our products. Similarly, our marketing team has a significant amount of domain expertise and a strong track record of success. Our global sales and marketing team totaled 83 professionals as of December 31, 2019.

In the United States, our IVL generators and connector cables are typically provided, on loan, to our hospital customers at no charge, while our disposable IVL catheters are provided on a consignment basis whereby title to such catheters passes to the hospital once they are used in a clinical procedure. Following such use, we charge the hospital a predetermined set fee for each IVL catheter, which fee may be determined based on the hospital's overall use of our IVL catheters.

In addition to our direct sales organizations, we sell to distributors in certain geographies outside the United States where we have determined that selling through third party distributors is the best way to optimize our opportunities and resources. We select distribution partners who have deep experience in our markets, have strong customer relationships and have a demonstrated track record of launching innovative products.

Our IVL System is simple, intuitive, easy to install and easy to use. This provides value to our customers, but also makes our sales model a source of competitive advantage. Lower service burden means we can develop a cost-efficient sales model by optimizing a mix of clinical specialists and salespeople. Moreover, our vascular IVL catheters have similar call points, meaning we can further leverage our field sales team.

Reimbursement

In the U.S., our products are generally purchased by hospitals, which in turn normally bill various third-party payors, including government programs, such as Medicare and Medicaid, and private health insurance plans, for the healthcare services required to treat each patient. The applicable third-party payors determine whether to provide coverage for a particular procedure or product, and, if so, the amount for which the provider will be reimbursed for treatment.

Outside the U.S., reimbursement levels vary significantly by country, and by region within some countries. Reimbursement is obtained from a variety of sources, including government-sponsored and private health insurance plans, and combinations of both.

Our ability to achieve market acceptance or significant sales volume will depend in large part on the availability of coverage and the level of reimbursement for procedures performed using our products under healthcare payment systems in the markets where we sell and distribute our products. We cannot assure you that government or private payors will continue to cover and reimburse the procedures performed using our products in whole or in part in the future or that payment rates will continue to be adequate.

In addition, we expect that we will continue to see pressure globally by third-party payors to manage the cost of healthcare. Cost management may come in a variety of forms, including rules and practices of third-party payors, judicial decisions, laws and regulations, group purchasing and managed care organizations, and medical device reimbursement policies. Cost management could potentially limit the amount which healthcare providers may be willing to pay for our products and impact demand for our products, product pricing, reimbursement and usage, and which, in turn, may adversely affect our product sales and results of operations.

Competition

The medical device industry is intensely competitive, subject to rapid change and significantly affected by new product introductions and other market activities of industry participants. We compete or plan to compete with manufacturers and distributors of cardiovascular medical devices. Our most notable competitors in the highly competitive cardiovascular field include Boston Scientific Corporation, Cardiovascular Systems, Inc., Medtronic plc and Philips N.V. Many of these competitors are large, well-capitalized companies with significantly greater market share and resources than we have. As a consequence, they are able to spend more on product development, marketing, sales and other product initiatives than we can. We also compete with smaller medical device companies that have single products or a limited range of products. Some of our competitors have:

- significantly greater name recognition;
- broader or deeper relations with healthcare professionals, customers and third-party payors;
- more established distribution networks;
- additional lines of products and the ability to offer rebates or bundle products to offer greater discounts or other incentives to gain a competitive advantage;
- greater experience in conducting research and development, manufacturing, clinical trials, marketing and obtaining regulatory clearance or approval for products; and
- greater financial and human resources for product development, sales and marketing and patent prosecution.

We believe that our proprietary IVL Technology, our focus on calcified cardiovascular disease and our organizational culture and strategy, will be important factors in our future success. We compete primarily on the basis that our products are designed to treat patients with calcified cardiovascular disease safely, easily and effectively, with improved outcomes and procedural cost savings. Our continued success depends on our ability to:

- develop innovative, proprietary products that can cost-effectively address significant clinical needs in a manner that is safe and effective for patients and easy to use for physicians;
- continue to innovate and develop scientifically advanced technology;
- obtain and maintain regulatory clearances or approvals;
- demonstrate efficacy in our sponsored and third-party clinical trials and studies;
- obtain and maintain adequate reimbursement for procedures using our products;
- apply technology across product lines and markets;
- attract and retain skilled research and development and sales personnel; and
- cost-effectively manufacture and successfully market and sell products.

Intellectual Property

Our success depends in part on our ability to obtain, maintain, protect and enforce our proprietary technology and intellectual property rights, in particular, our patent rights, preserve the confidentiality of our trade secrets, and operate without infringing the valid and enforceable patents and other proprietary rights of third parties. We rely on a combination of patent, trademark, trade secret, copyright and other intellectual property rights and measures to protect the intellectual property rights that we consider important to our business. We also rely on know-how and continuing technological innovation to develop and maintain our competitive position.

We seek to protect our proprietary rights through a variety of methods, including confidentiality agreements and proprietary information agreements with suppliers, employees, consultants and others who may have access to our proprietary information. However, trade secrets and proprietary information can be difficult to protect. While we have confidence in the measures we take to protect and preserve our trade secrets and proprietary information, such measures can be breached, and we may not have adequate remedies for any such breach. In addition, our trade secrets and proprietary information may otherwise become known or be independently discovered by competitors.

As of December 31, 2019, we owned 39 issued U.S. patents and 17 issued foreign patents, 17 pending U.S. non-provisional patent applications and 18 pending foreign patent applications (including four Patent Cooperation Treaty ("PCT") applications). This portfolio includes 17 issued U.S. patents, 24 issued foreign patents, 6 pending U.S. non-provisional patent applications and 8 pending foreign patent applications (including one PCT application) relating to our current IVL Technology.

U.S. Pat. Nos. 9,642,673, 8,956,371 and 8,728,091, which are three of our issued U.S. patents relating to our current IVL Technology, are the subject of IPR proceedings filed by Cardiovascular Systems, Inc., one of our competitors. For more information regarding these proceedings, please see the section titled "Part I, Item 3 of this Annual Report on Form 10-K."

Our issued patents, and any patents granted from any pending applications, are expected to expire between 2029 and 2039, without taking into account potential patent term extensions or adjustments. The term of individual patents depends upon the legal term for patents in the countries in which they are granted. In most countries, including the United States, the patent term is 20 years from the earliest claimed filing date of a non-provisional patent application in the applicable country. In the United States, a patent's term may, in certain cases, be lengthened by patent term adjustment, which compensates a patentee for administrative delays by the United States Patent and Trademark Office in examining and granting a patent, or may be shortened if a patent is terminally disclaimed over a commonly owned patent or a patent naming a common inventor and having an earlier expiration date. We cannot be sure that any patent applications we have filed, or may file in the future, will result in issued patents. We can give no assurance that any patents that have been issued or may be issued in the future will protect our current or future products, will provide us with any competitive advantage, and will not be challenged, invalidated, or circumvented.

For more information regarding the risks related to our intellectual property, including the above referenced IPRs, please see the section titled "Risk Factors—Risks Related to Our Intellectual Property."

Regulation

Our products are medical devices subject to extensive laws, rules regulations, as well as other federal and state regulatory bodies in each of the markets in which we sell or distribute our products. These laws, rules and regulations govern, among other things, product design and development, pre-clinical and clinical testing, manufacturing, packaging, labeling, storage, record keeping and reporting, clearance or approval, marketing, distribution, promotion, import and export, pricing and discounts, post-marketing surveillance and interactions with healthcare professionals. Failure to comply with applicable requirements may subject one or more of our products or us to a variety of sanctions, such as loss of product approvals/clearances/certifications, issuance of warning letters, import detentions, and civil monetary penalties or judicial sanctions, such as product seizures, injunctions and criminal prosecution.

United States

FDA's Premarket Clearance and Approval Requirements. Each medical device we seek to commercially distribute in the United States will require either a prior 510(k) clearance, unless it is exempt, or a premarket approval ("PMA") from the FDA. Medical devices are classified into one of three classes-Class I, Class II or Class III-depending on the degree of risk associated with each medical device and the extent of control needed to provide reasonable assurance of safety and effectiveness. Class I devices are deemed to be low risk and are subject to the general controls of the U.S. federal Food, Drug and Cosmetic Act (the "FD&C Act"), such as provisions that relate to adulteration; misbranding; registration and listing; notification, including repair, replacement, or refund; records and reports; and good manufacturing practices. Most Class I devices are classified as exempt from premarket notification under Section 510(k) of the FD&C Act, and therefore may be commercially distributed without obtaining 510(k) clearance from the FDA. Class II devices are subject to both general controls and special controls to provide reasonable assurance of safety and effectiveness. Special controls include performance standards, postmarket surveillance, patient registries, and guidance documents. A manufacturer may be required to submit to the FDA a premarket notification requesting permission to commercially distribute some Class II devices. Devices deemed by the FDA to pose the greatest risk, such as life-sustaining, life-supporting or implantable devices, or

devices deemed not substantially equivalent to a previously cleared 510(k) device, are placed in Class III. A Class III device cannot be marketed in the United States unless the FDA approves the device after submission of a PMA application. However, there are some Class III devices for which the FDA has not yet called for a PMA. For these devices, the manufacturer must submit a premarket notification and obtain 510(k) clearance in order to commercially distribute these devices. The FDA can also impose sales, marketing or other restrictions on devices in order to assure that they are used in a safe and effective manner.

510(k) Clearance Pathway. When a 510(k) clearance is required, we must submit a premarket notification to the FDA demonstrating that our proposed device is substantially equivalent to a predicate device, which is a previously cleared and legally marketed 510(k) device or a device that was in commercial distribution before May 28, 1976. By regulation, a premarket notification must be submitted to the FDA at least 90 days before we intend to market a device, and we must receive 510(k) clearance from the FDA before we actually market the device. The Medical Device User Fee Amendments ("MDUFA") performance goals for a traditional 510(k) clearance is 90 days. As a practical matter, however, clearance often takes longer, because the review clock is paused by the FDA to allow time to resolve any questions the FDA may have on the 510(k). To demonstrate substantial equivalence, the manufacturer must show that the proposed device has the same intended use as the predicate device, and it either has the same technological characteristics, or different technological characteristics and the information in the premarket notification demonstrates that the device is equally safe and effective and does not raise different questions of safety and effectiveness. The FDA may require further information, including clinical data, to make a determination regarding substantial equivalence. If the FDA determines that the device, or its intended use, is not substantially equivalent to a previously cleared device or use, the FDA will place the device into Class III.

There are three types of 510(k)s: traditional, special and abbreviated. Special 510(k)s are typically for devices that are modified and the results of change evaluation can be sufficiently reviewed in a summary or risk analysis format. Abbreviated 510(k)s are for devices that conform to special controls for the device type or to a recognized standard. The special and abbreviated 510(k)s are intended to streamline review, and the FDA intends to process special 510(k)s within 30 days of receipt.

Premarket Approval Pathway. A PMA application under section 515 of the FD&C Act must be submitted to the FDA for Class III devices that support or sustain human life, are of substantial importance in preventing impairment of human health, or which present a potential, unreasonable risk of illness or injury. The PMA application process is much more demanding than the 510(k) premarket notification process. A PMA is based on a determination by FDA that the PMA application contains sufficient valid scientific evidence to assure that the device is safe and effective for its intended use(s).

After a PMA application is submitted, the FDA has 45 days to determine whether the application is sufficiently complete to permit a substantive review and thus whether the FDA will file the application for review. The FDA has 180 days to review a filed PMA application, although the review of an application generally occurs over a significantly longer period of time and can take up to several years. During this review period, the FDA may request additional information or clarification of the information already provided. Also, an advisory panel of experts from outside the FDA may be convened to review and evaluate the application and provide recommendations to the FDA as to the approvability of the device. Although the FDA is not bound by the advisory panel decision, the panel's recommendations are important to the FDA's overall decision making process. In addition, the FDA may conduct a preapproval inspection of the manufacturing facility to ensure compliance with the Quality System Regulation ("QSR"). The FDA also may inspect one or more clinical sites to assure compliance with the FDA's regulations.

Upon completion of the PMA application review, the FDA may: (i) approve the PMA which authorizes commercial marketing with specific prescribing information for one or more indications, which can be more limited than those originally sought; (ii) issue an approvable letter which indicates the FDA's belief that the PMA application is approvable and states what additional information the FDA requires, or the post-approval commitments that must be agreed to prior to approval; (iii) issue a not approvable letter which outlines steps required for approval, but which are typically more onerous than those in an approvable letter, and may require additional clinical trials that are often expensive and time consuming and can delay approval for months or even years; or (iv) deny the application. If the FDA issues an approvable or not approvable letter, the applicant has 180 days to respond, after which the FDA's review clock is reset.

Clinical Trials. Clinical trials are almost always required to support a PMA and are sometimes required for 510(k) clearance. In the United States, for significant risk devices, these trials require submission of an application for an IDE to the FDA. The IDE application must be supported by appropriate data, such as animal and laboratory testing results, showing it is safe to test the device in humans and that the testing protocol is scientifically sound. The IDE must be approved in advance by the FDA for a specific number of patients at specified study sites. During the trial, the sponsor must comply with the

FDA's IDE requirements for investigator selection, trial monitoring, reporting, and recordkeeping. The investigators must obtain patient informed consent, rigorously follow the investigational plan and study protocol, control the disposition of investigational devices, and comply with all reporting and recordkeeping requirements. Clinical trials for significant risk devices may not begin until the IDE application is approved by the FDA and the appropriate institutional review boards, or IRBs, at the clinical trial sites. An IRB is an appropriately constituted group that has been formally designated to review and monitor medical research involving subjects and which has the authority to approve, require modifications in, or disapprove research to protect the rights, safety and welfare of human research subjects. A nonsignificant risk device does not require FDA approval of an IDE; however, the clinical trial must still be conducted in compliance with various requirements of FDA's IDE regulations and be approved by an IRB at the clinical trials sites. We, the FDA or the IRB at each site at which a clinical trial is being performed may withdraw approval of a clinical trial at any time for various reasons, including a belief that the risks to study subjects outweigh the benefits or a failure to comply with FDA or IRB requirements. Even if a trial is completed, the results of clinical testing may not demonstrate the safety and effectiveness of the device, may be equivocal or may otherwise not be sufficient to obtain approval or clearance of the product.

Sponsors of clinical trials of devices are required to register with clinicaltrials.gov, a public database of clinical trial information. Information related to the device, patient population, phase of investigation, study sites and investigators, and other aspects of the clinical trial is made public as part of the registration.

Ongoing Regulation by the FDA. Even after a device receives clearance or approval and is placed on the market, numerous regulatory requirements apply. These include:

- establishment registration and device listing;
- the QSR, which requires manufacturers, including third-party manufacturers, to follow stringent design, testing, control, documentation, and other quality assurance procedures during all aspects of the manufacturing process;
- labeling regulations and the FDA prohibitions against the promotion of products for un-cleared, unapproved or "off-label" uses, and other requirements related to promotional activities;
- medical device reporting regulations, which require that manufactures report to the FDA if their device may have caused or contributed to a death or serious injury or if their device malfunctioned and the device or a similar device marketed by the manufacturer would be likely to cause or contribute to a death or serious injury if the malfunction were to recur;
- corrections and removal reporting regulations, which require that manufactures report to the FDA field corrections or removals if undertaken to reduce a risk to health posed by a device or to remedy a violation of the FD&C Act that may present a risk to health; and
- post market surveillance regulations, which apply to certain Class II or Class III devices when necessary to protect the public health or to provide additional safety and effectiveness data for the device.

After a device receives 510(k) clearance, any modification that could significantly affect its safety or effectiveness, or that would constitute a major change in its intended use, will require a new 510(k) or possibly a PMA. The FDA requires each manufacturer to make this determination initially, but the FDA can review any such decision and can disagree with a manufacturer's determination. If the FDA disagrees with our determination not to seek a new 510(k) clearance, the FDA may retroactively require us to seek 510(k) clearance or possibly a PMA. The FDA could also require us to cease marketing and distribution and/or recall the modified device until 510(k) clearance or a PMA is obtained. Also, in these circumstances, we may be subject to significant regulatory fines and penalties.

Some changes to an approved PMA device, including changes in indications, labeling, or manufacturing processes or facilities, require submission and FDA approval of a new PMA application or PMA supplement, as appropriate, before the change can be implemented. Supplements to a PMA often require the submission of the same type of information required for an original PMA application, except that the supplement is generally limited to that information needed to support the proposed change from the device covered by the original PMA. The FDA uses the same procedures and actions in reviewing PMA supplements as it does in reviewing original PMA applications.

FDA regulations require us to register as a medical device manufacturer with the FDA. Additionally, the California Department of Health Services ("CDHS") requires us to register as a medical device manufacturer within the state. Because of this, the FDA and the CDHS inspect us on a routine basis for compliance with the QSR. These regulations require that we manufacture our products and maintain related documentation in a prescribed manner with respect to manufacturing, testing and control activities. We have undergone and expect to continue to undergo regular QSR inspections in connection with the manufacture of our products at our facilities. Further, the FDA requires us to comply with various FDA regulations regarding labeling. Failure by us or by our suppliers to comply with applicable regulatory requirements can result in enforcement action by the FDA or state authorities, which may include any of the following sanctions:

- warning or untitled letters, fines, injunctions, consent decrees and civil penalties;
- customer notifications, voluntary or mandatory recall or seizure of our products;
- operating restrictions, partial suspension or total shutdown of production;
- delay in processing submissions or applications for new products or modifications to existing products;
- withdrawing approvals/clearances that have already been granted; and
- criminal prosecution.

Newly discovered or developed safety or effectiveness data may require changes to a product's labeling, including the addition of new warnings and contraindications, and also may require the implementation of other risk management measures. Also, new government requirements, including those resulting from new legislation, may be established, or the FDA's policies may change, which could delay or prevent regulatory clearance or approval of our products under development.

Anti-Kickback Statute. The U.S. federal Anti-Kickback Statute (the "Anti-Kickback Statute") prohibits, subject to certain safe harbors set forth in the Anti-Kickback Statute, persons or entities from knowingly and willfully soliciting, offering, receiving or paying any remuneration, directly or indirectly, overtly or covertly, in cash or in kind, in exchange for or to induce either the referral of an individual for the furnishing or arranging for a good or service, or for the purchasing, leasing, ordering, or arranging for or recommending any good, facility, service or item for which payment may be made in whole or in part under federal healthcare programs, such as the Medicare and Medicaid programs. The Anti-Kickback Statute is broad and prohibits many arrangements and practices that are lawful in businesses outside of the healthcare industry. The term "remuneration" expressly includes kickbacks, bribes, or rebates and also has been broadly interpreted to include anything of value, including, for example, gifts, discounts, the furnishing of supplies or equipment, credit arrangements, payments of cash, waivers of payments, ownership interests and providing anything at less than its fair market value. Additionally, the intent standard under the federal Anti-Kickback Statute was amended under the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act of 2010 ("Affordable Care Act"), to a stricter standard such that a person or entity no longer needs to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation. The Affordable Care Act provides that the government may assert that a claim including items or services resulting from a violation of the Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the federal civil False Claims Act which is discussed below. Penalties for violations of the anti-kickback statute include, but are not limited to, criminal, civil and/or administrative penalties, damages, fines, disgorgement, individual imprisonment, possible exclusion from Medicare, Medicaid and other federal healthcare programs, and the curtailment or restructuring of operations. Various states have adopted laws similar to the Anti-Kickback Statute, and some of these state laws may be broader in scope in that some of these state laws extend to all payors and may not contain safe harbors. In addition, many foreign jurisdictions in which we operate have similar laws and regulations.

Federal Civil False Claims Act. The U.S. federal civil False Claims Act prohibits, among other things, persons or entities from knowingly presenting or causing to be presented a false or fraudulent claim to, or the knowing use of false statements to obtain payment from or approval by, the federal government. Suits filed under the federal civil False Claims Act, known as "qui tam" actions, can be brought by any individual on behalf of the government. These individuals, sometimes known as "relators" or, more commonly, as "whistleblowers," may share in any amounts paid by the entity to the government in fines or settlement. The number of filings of qui tam actions has increased significantly in recent years, causing more healthcare companies to have to defend a case brought under the federal civil False Claim Act. If an entity is determined to have violated the federal civil False Claims Act, it may be required to pay up to three times the actual damages sustained by the government, plus civil penalties for each separate false claim. Various states have adopted laws similar to the federal civil False Claims Act, and many of these state laws are broader in scope and apply to all payors, and therefore, are not limited to only those claims submitted to the federal government.

Federal Civil Monetary Penalties Statute. The federal Civil Monetary Penalties Statute, among other things, imposes fines against any person who is determined to have presented, or caused to be presented, claims to a federal healthcare program that the person knows, or should know, is for an item or service that was not provided as claimed or is false or fraudulent.

Sunshine Act. The Affordable Care Act also included a provision, commonly referred to as the Sunshine Act, which requires that any manufacturer of a covered device that provides payment or other transfer of value to a physician or teaching hospital, or to a third party at the request of a physician or teaching hospital, must submit to CMS information about the payment or other transfer of value annually, with the reported information to be made public on a searchable website. Similar laws have been enacted in foreign jurisdictions, including France.

Health Insurance Portability and Accountability Act of 1996. The federal Health Insurance Portability and Accountability Act ("HIPAA") created several new federal crimes, including healthcare fraud and false statements relating to healthcare matters. The healthcare fraud statute prohibits knowingly and willfully executing a scheme to defraud any healthcare benefit program, including private third-party payors. The false statements statute prohibits knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false, fictitious or fraudulent statement in connection with the delivery of or payment for healthcare benefits, items or services. In addition, HIPAA and its implementing regulations established uniform standards for certain covered entities, which are healthcare providers, health plans and healthcare clearinghouses, as well as their business associates, governing the conduct of specified electronic healthcare transactions and protecting the security and privacy of protected health information.

The American Recovery and Reinvestment Act of 2009, commonly referred to as the economic stimulus package, included an expansion of HIPAA's privacy and security standards called the Health Information Technology for Economic and Clinical Health Act ("HITECH"). Among other things, HITECH created four new tiers of civil monetary penalties and gave state attorneys general new authority to file civil actions for damages or injunctions in federal courts to enforce the federal HIPAA laws and seek attorneys' fees and costs associated with pursuing federal civil actions.

We are also subject to other federal, state and local laws, and regulations relating to safe working conditions, laboratory, and manufacturing practices.

International

General. International sales of medical devices are subject to a variety of foreign government regulations, which may vary substantially from country to country. We expect this global regulatory environment will continue to be complex and evolving, which could impact the cost, the time needed to approve, and our ability to maintain existing approvals or obtain future approvals for our products, and require extensive compliance and monitoring obligations in the countries where we sell or distribute our products. In addition, our international operations, distribution and sales require us to comply with: the U.S. Foreign Corrupt Practices Act and similar anti-bribery laws in other jurisdictions; U.S. and foreign export control, trade embargo and custom laws, as well as foreign tax laws; employment, immigration and labor laws; local intellectual property laws, which may not protect intellectual property rights to the same extent as U.S. law; and privacy laws such as the European General Data Protection Regulation.

European Union. The European Union has adopted numerous directives and standards regulating the design, manufacture, clinical trials, labeling and adverse event reporting for medical devices. Our products are regulated in the European Union as medical devices per the MDD. Conformity with the MDD is indicated by the CE mark, which is issued by the applicable Notified Body following the successful satisfaction of a variety of requirements, which depend on the class of the product, but normally involve a combination of: (a) submission of a design dossier; (b) self-assessment by the manufacturer; (c) a third-party assessment, which generally consists of an audit of the manufacturer's quality system and manufacturing site or evidence of current, valid QMS certificate from a recognized Notified Body evidencing compliance with ISO 13485; and (d) review of the design dossier, which may include safety and technical information, by the Notified Body. The CE mark is contingent upon continued compliance with the applicable regulations, including compliance with ISO 13485 and applicable vigilance and post-market surveillance.

The new European Union Medical Devices Regulation (the "MDR"), which was published in May 2017 with a transition period of three years, replaces the MDD and will expand and modify the pre-market and post-market obligations of the MDD. Starting May 2020, the new MDR will apply and no new applications under the previous directives will be permitted. We are in the process of updating our technical documentation and other quality management system processes to meet the new MDR requirements. Under the new MDR requirements, CE certificates issued under the MDD prior to May 2020 will remain valid in accordance with their term, beyond the expiration of the transition period, however certain limitations set forth in the MDR, such as the need to use classifications that are different from the previous directives, would apply. We do not expect such limitations to have any material impact on our ability to supply our products to the countries covered by the MDR.

Regulatory Inspections

We are subject to periodic inspections by the FDA and other regulatory entities, such as a European Notified Body, related to the regulatory requirements that apply to medical devices designed and manufactured, and clinical trials sponsored, by us. When the FDA conducts an inspection, the inspectors will identify any deficiencies they believe exist in the form of a notice of inspectional observations, or Form FDA 483. If we receive a notice of inspectional observations or deficiencies from the FDA following an inspection, we would be required to respond in writing, and would be required to undertake corrective and/or preventive or other actions in order to address the FDA's or other regulators' concerns. Failure to address the FDA's concerns may result in the issuance of a warning letter or other enforcement or administrative actions.

Employees

As of December 31, 2019, we had 284 full-time employees worldwide. None of our employees are represented by a collective bargaining agreement and we have never experienced a work stoppage. We believe our employee relations are good.

Legal Proceedings

We may be subject to other legal proceedings and claims in the ordinary course of business. We have received, and may from time to time receive, letters from third parties alleging patent infringement, violation of employment practices or trademark infringement, and we may in the future participate in litigation to defend ourselves. We cannot predict the results of any such disputes, and despite the potential outcomes, the existence thereof may have an adverse material impact on us due to diversion of management time and attention as well as the financial costs related to resolving such disputes. For information with respect to Legal Proceedings, see Part I, Item 3 of this Annual Report on Form 10-K.

Corporate Information

We were incorporated in 2009 as a Delaware corporation under the name ShockWave Medical, Inc. Our principal executive offices are located at 5403 Betsy Ross Drive, Santa Clara, California 95054, and our telephone number is (510) 279-4262. Our website address is www.shockwavemedical.com. The information on, or that can be accessed through, our website is not part of this Annual Report on Form 10-K. We have included our website address as an inactive textual reference only.

We use "Shockwave," "Shockwave M5," "Shockwave C2," "Shockwave S4" and other marks as trademarks in the United States and other countries. This Annual Report on Form 10-K contains references to our trademarks and service marks and to those belonging to other entities. Solely for convenience, trademarks and trade names referred to in this Annual Report on Form 10-K, including logos, artwork and other visual displays, may appear without the ® or ™ symbols, but such references are not intended to indicate in any way that we will not assert, to the fullest extent under applicable law, our right or the rights of the applicable licensor to these trademarks and trade names. We do not intend our use or display of other entities' trade names, trademarks or service marks to imply a relationship with, or endorsement or sponsorship of us by, any other entity.

Implications of Being an Emerging Growth Company

We are an "emerging growth company," as defined in the Jumpstart Our Business Startups Act of 2012 (the "JOBS Act"). We will remain an emerging growth company until the earliest to occur of: the last day of the fiscal year in which we have more than $1.07 billion in annual revenue; the date on which we are deemed to be a large accelerated filer (this means the market value of shares of our common stock that are held by non-affiliates exceeds $700 million as of the end of the second quarter of that fiscal year); the issuance, in any three-year period, by us of more than $1 billion in non-convertible debt securities; and the last day of the fiscal year ending after the fifth anniversary of our initial public offering. Any reference herein to "emerging growth company" has the meaning ascribed to it in the JOBS Act.

An emerging growth company may take advantage of reduced reporting requirements that are otherwise applicable to public companies. These provisions include, but are not limited to:

- being permitted to present only two years of audited consolidated financial statements and only two years of related Management's Discussion and Analysis of Financial Condition and Results of Operations in the registration statement filed under the Securities Act of 1933 (the "Securities Act") for an IPO of common equity securities;
- not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2002, as amended;
- reduced disclosure obligations regarding executive compensation in our periodic reports, proxy statements and registration statements; and
- exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved.

The JOBS Act provides that an emerging growth company can take advantage of an extended transition period for complying with new or revised accounting standards. We have irrevocably elected not to avail ourselves of this exemption and, therefore, we will be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies.

Available Information

We make our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, and amendments to those reports, available free of charge at our website as soon as reasonably practicable after they have been filed with the SEC. Our website address is www.shockwavemedical.com. Information on our website is not part of this report. The SEC maintains a website that contains the materials we file with the SEC at www.sec.gov.

Item 1A. Risk Factors.

Our operating and financial results are subject to various risks and uncertainties. You should carefully consider the risks described below, as well as all of the other information contained in this Annual Report on Form 10-K, including our financial statements and related notes, before investing in our common stock. While we believe that the risks and uncertainties described below are the material risks currently facing us, additional risks that we do not yet know of or that we currently think are immaterial may also arise and materially affect our business.

Risks Related to Our Business and Products

We have a history of net losses, and we expect to continue to incur losses for the foreseeable future. If we ever achieve profitability, we may not be able to sustain it.

We have incurred losses since our inception and expect to continue to incur losses for the foreseeable future. For the years ended December 31, 2019 and 2018, we reported net losses of $51.1 million and $41.1 million, respectively. As a result of these losses, as of December 31, 2019, we had an accumulated deficit of approximately $178.0 million. We expect to continue to incur significant sales and marketing, research and development, regulatory and other expenses as we expand our marketing efforts to increase adoption of our products, expand existing relationships with our customers, obtain regulatory clearances or approvals for our planned or future products, conduct clinical trials on our existing and planned or future products and develop new products or add new features to our existing products. In addition, we expect our general and administrative expenses to increase due to the additional costs associated with being a public company. The net losses that we incur may fluctuate significantly from period to period. We will need to generate significant additional revenue in order to achieve and sustain profitability. Even if we achieve profitability, we cannot be sure that we will remain profitable for any substantial period of time.

We have limited commercialization experience.

We were incorporated in 2009 and began commercializing our Shockwave M5 IVL catheter ("M5 catheter") for treating peripheral artery disease ("PAD") in the United States and Europe in 2018 and our Shockwave C2 IVL catheter ("C2 catheter") for treating coronary artery disease ("CAD") in Europe in 2018. We initiated a limited launch of our S4 IVL catheter ("S4 catheter") in the first half of 2019 and commenced a full commercial launch in select approved geographies in the second half of 2019. Our C2 catheter has not yet been approved or cleared for the treatment of CAD in the United States. Our limited commercialization experience and limited number of approved or cleared products make it difficult to evaluate our current business and predict our future prospects.

These factors also make it difficult for us to forecast our future financial performance and growth, and such forecasts are subject to a number of uncertainties, including our ability to successfully complete our Disrupt PAD III, Disrupt CAD II, Disrupt CAD III, Disrupt CAD IV and transcatheter aortic valve replacement ("TAVR") feasibility clinical trials and obtain U.S. Food and Drug Administration ("FDA") pre-market approval for, and successfully commercialize, our C2 catheter for the treatment of CAD in the United States or future planned products in the United States or in key international markets. If our assumptions regarding the risks and uncertainties we face, which we use to plan our business, are incorrect or change due to circumstances in our business or our markets, or if we do not address these risks successfully, our operating and financial results could differ materially from our expectations and our business could suffer.

Our success depends in large part on our intravascular lithotripsy technology (our "IVL Technology"). If we are unable to successfully market and sell products incorporating our IVL Technology, our business prospects will be significantly harmed and we may be unable to achieve revenue growth.

Our future financial success will depend substantially on our ability to effectively and profitably market and sell our products incorporating our IVL Technology. The commercial success of our products and any of our planned or future products will depend on a number of factors, including the following:

- the actual and perceived effectiveness and reliability of our products, especially relative to alternative products;
- the prevalence and severity of any adverse patient events involving our products;
- the results of clinical trials relating to the use of our products;
- our ability to sustain meaningful clinical benefits for our patients;
- our ability to obtain regulatory approval to market our planned or future products for use in treating PAD, CAD and aortic stenosis ("AS") in the United States;
- the availability, relative cost and perceived advantages and disadvantages of alternative technologies or treatment methods for conditions treated by our products;
- the degree to which treatments using our products are covered and receive adequate reimbursement from third-party payors, including governmental and private insurers;
- the degree to which physicians adopt our products;
- our ability to obtain, maintain, protect and enforce our intellectual property rights in and to our IVL Technology and our products that incorporate our IVL Technology;
- our ability to treat medial calcium and sustain a meaningful clinical benefit better than our competitors and alternative treatments or therapies;
- achieving and maintaining compliance with all regulatory requirements applicable to our products;
- the extent to which we are successful in educating physicians about PAD, CAD and AS in general, and the benefits of our products in treating such conditions;
- the strength of our marketing and distribution infrastructure;
- the effectiveness of our and our distributors' marketing and sales efforts in the United States and abroad, including our efforts to build out our sales team;
- the level of education and awareness among physicians and hospitals concerning our products;
- our reputation among physicians and hospitals;

- our ability to continue to develop, validate and maintain a commercially viable manufacturing process that is compliant with current Good Manufacturing Practices ("cGMP") and the Quality System Regulation ("QSR"); and
- whether we are required by the FDA or comparable non-U.S. regulatory authorities to conduct additional clinical trials for future or current indications.

If we fail to successfully market and sell our products, we will not be able to achieve profitability, which will have a material adverse effect on our business, financial condition and results of operations. Our ability to grow our revenue in future periods will depend on our ability to successfully penetrate our target markets and increase sales of our products and any new product or product indications that we introduce, which will, in turn, depend in part on our success in growing our user base and driving increased use of our products. New products or product indications will also need to be approved or cleared by the FDA and comparable non-U.S. regulatory agencies to drive revenue growth. If we cannot achieve revenue growth, it could have a material adverse effect on our business, financial condition and results of operations.

We currently manufacture and sell products that are used in a limited number of procedures, which could negatively affect our operations and financial condition.

Currently, our commercialized products consist primarily of our IVL System using M5 catheters for the treatment of above-the-knee PAD in the United States and internationally, S4 catheters in the United States and C2 catheters for the treatment of CAD internationally. Therefore, we are dependent on widespread market adoption of these products and we will continue to be dependent on the success of these products for the foreseeable future. There can be no assurance that our products will gain a substantial degree of market acceptance among specialty physicians, patients or healthcare providers. Our failure to successfully increase sales of these products or any other event impeding our ability to sell these products would result in a material adverse effect on our business, financial condition and results of operations.

For our company to thrive, we must lead and benefit from a shift in thinking about the role of calcified lesions in our core disease areas.

A shift in thinking in the treatment of our core disease areas is needed for the successful market acceptance of our products. We will need to educate the medical community about the safety, efficacy, necessity and efficiency of our products. This will require educating them not only about the benefits of our technology, but also about the impact of calcified plaque on treatment choices and treatment outcomes. We believe that focusing on calcified plaque is a paradigm shift in the treatment of these diseases because other interventions have not specifically focused on this source of atherosclerosis. Additionally, we will need to convince the medical community that the additional cost and time of integrating the IVL procedure, designed to prepare the vessel for the subsequent stenting or angioplasty procedure, is worth the increased efficacy of the overall procedure and improvement in patient outcomes. The failure of our clinical, marketing and executive teams to drive this shift in thinking among doctors, patients, practitioners, third-party payors and regulators could adversely affect our ability to grow the business.

The continuing development of our products depends upon our maintaining strong working relationships with physicians.

The research, development, marketing and sale of our current products and potential new and improved products or future product indications for which we receive regulatory clearance or approval depend upon our maintaining working relationships with physicians. We rely on these professionals to provide us with considerable knowledge and experience regarding the development, marketing and sale of our products. Physicians assist us in clinical trials and in marketing, and as researchers, product consultants and public speakers. If we cannot maintain our strong working relationships with these professionals and continue to receive their advice and input, the development and marketing of our products could suffer, which could have a material adverse effect on our business, financial condition and results of operations. At the same time, the medical device industry's relationship with physicians is under increasing scrutiny by the U.S. Department of Health and Human Services Office of Inspector General (the "OIG"), the U.S. Department of Justice (the "DOJ"), the state attorney generals and other foreign and domestic government agencies. Our failure to comply with requirements governing the industry's relationships with physicians or an investigation into our compliance by the OIG, the DOJ, state attorney generals and other government agencies, could have a material adverse effect on our business, financial condition and results of operations. Additional information regarding the laws impacting our relationships with physicians and other healthcare professionals can be found below under "Risks Related to Government Regulation and Our Industry."

We currently have limited sales or marketing capabilities. If we are unable to establish effective sales and marketing capabilities or if we are unable to enter into agreements with third parties to commercialize our products, we may not be able to effectively generate product revenue, sustain revenue growth and compete effectively.

We currently have limited sales or marketing capabilities. Our sales were $42.9 million and $12.3 million for the years ended December 31, 2019 and 2018, respectively. We launched our M5 catheters for the treatment of PAD in the United States, Europe and select other countries in 2018, we launched our C2 catheters for the treatment of CAD in Europe in 2018, and we expect to launch our C2 catheters for the treatment of CAD in the United States in the first half of 2021, subject to FDA approval. We initiated a limited launch of our S4 catheter in the first half of 2019 and commenced a full commercial launch in select approved geographies in the second half of 2019. Building the requisite sales, marketing or distribution capabilities will be expensive and time-consuming and will require significant attention from our leadership team to manage. Any failure or delay in the development of our sales, marketing or distribution capabilities would adversely impact the commercialization of our products. The competition for talented individuals experienced in selling and marketing medical device products is intense, and we cannot assure you that we can assemble or maintain an effective team. Additionally, we may choose to collaborate, either globally or on a territory-by-territory basis, with third parties on the commercialization of our products. If we are unable to enter into such arrangements on acceptable terms or at all, we may not be able to successfully commercialize our products.

We may expend our limited resources to pursue a particular product or indication and fail to capitalize on products or indications that may be more profitable or for which there is a greater likelihood of success.

Because we have limited financial and managerial resources, we focus on specific products, indications and discovery programs. As a result, we may forgo or delay pursuit of other opportunities with others that could have had greater commercial potential. Our resource allocation decisions may cause us to fail to capitalize on viable commercial products or profitable market opportunities. Our spending on current and future research and development programs for specific indications may not yield any commercially viable products. If we do not accurately evaluate the commercial potential or target market for a particular potential product, we may relinquish valuable rights to that potential product through future collaborations, licenses and other similar arrangements in cases in which it would have been more advantageous for us to retain sole development and commercialization rights to such potential product.

In the future our products may become obsolete, which would negatively affect operations and financial condition.

The medical device industry is characterized by rapid and significant change. There can be no assurance that other companies will not succeed in developing or marketing devices and products that are more effective than our IVL System or that would render our IVL System obsolete or noncompetitive. Additionally, new surgical procedures, medications and other therapies could be developed that replace or reduce the importance of our products. Accordingly, our success will depend in part on our ability to respond quickly to medical and other changes through the development and introduction of new products. Product development involves a high degree of risk, and there can be no assurance that our new product development efforts will result in any commercially successful products.

The commercial success of our products will depend upon attaining significant market acceptance of these products among physicians, healthcare payors and the medical community.

Our success will depend, in part, on the acceptance of our products as safe, useful and, with respect to providers, cost effective. We cannot predict how quickly, if at all, physicians will accept our products or, if accepted, how frequently they will be used. Our products and planned or future products we may develop or market may never gain broad market acceptance among physicians and the medical community for some or all of our targeted indications. Healthcare providers must believe that our products offer benefits over alternative treatment methods. The degree of market acceptance of any of our products will depend on a number of factors, including:

- whether physicians and others in the medical community consider our products to be safe and cost-effective treatment methods;
- the potential and perceived advantages of our products over alternative treatment methods;
- the prevalence and severity of any side effects associated with using our products;
- product labeling or product insert requirements by the FDA or other regulatory authorities;
- limitations or warnings contained in the labeling cleared or approved by the FDA or other authorities;

- the cost of treatment in relation to alternative treatments methods;
- the convenience and ease of use of our products relative to alternative treatment methods;
- pricing pressure, including from group purchasing organizations ("GPOs"), seeking to obtain discounts on our products based on the collective buying power of the GPO members;
- a substantial shift in the number of PAD procedures that are performed in office-based labs ("OBLs") compared to those performed in a hospital as OBLs tend to have higher price sensitivity than hospitals;
- the availability of coverage and adequate reimbursement for procedures using our products from third-party payors, including government authorities;
- the willingness of patients to pay out-of-pocket in the absence of coverage and adequate reimbursement by third-party payors, including government authorities;
- our ability to provide incremental clinical and economic data that show the safety, clinical efficacy and cost effectiveness of, and patient benefits from, our products; and
- the effectiveness of our sales and marketing efforts for our products.

For example, in July 2018, we initiated and subsequently completed a voluntary recall of our S4 catheters after seeing a higher instance of leaks in the balloon, which prevented the balloon from staying inflated at four atmospheres ("atm") for the full course of lithotripsy application. Although there were no patient safety issues reported and no reports of adverse clinical events related to this issue, and the issue has been corrected, customer satisfaction problems early in a product's launch can have lasting negative impact on our ability to sell such product. We have also proceeded with a full commercial launch of our S4 catheter in select approved geographies in the second half of 2019. However, we cannot guarantee that issues with our S4 catheters will not resurface. Any future government or voluntary recalls of our S4 catheter could divert managerial and financial resources, harm our reputation and adversely affect our business.

In addition, if we do not educate physicians about PAD and the existence of our products, they may not gain market acceptance, as many physicians do not routinely screen for PAD while screening for CAD. Additionally, even if our products achieve market acceptance, they may not maintain that market acceptance over time if competing products or technologies, which are more cost effective or received more favorably, are introduced. Failure to achieve or maintain market acceptance and/or market share would limit our ability to generate revenue and would have a material adverse effect on our business, financial condition and results of operations.

The sizes of the markets for our current and future products have not been established with precision, and may be smaller than we estimate.

Our estimates of the annual total addressable markets for our current products and products under development are based on a number of internal and third-party estimates, including, without limitation, the number of patients with calcified cardiovascular disease and the assumed prices at which we can sell tests for markets that have not been established. While we believe our assumptions and the data underlying our estimates are reasonable, these assumptions and estimates may not be correct and the conditions supporting our assumptions or estimates may change at any time, thereby reducing the predictive accuracy of these underlying factors. In addition, our estimates of the sizes of the PAD and CAD patient population include patients who are asymptomatic or in the early stages of disease; these patients might never progress to more advanced disease stages and, accordingly, might never be likely candidates for treatment with our products. As a result, our estimates of the annual total addressable market for our current or future products may prove to be incorrect. If the actual number of patients who would benefit from our products, the price at which we can sell future products, or the annual total addressable market for our products is smaller than we have estimated, it may impair our sales growth and have an adverse impact on our business.

We have limited commercial manufacturing experience and may experience development or manufacturing problems or delays in producing our products and planned or future products that could limit the potential growth of our revenue or increase our losses.

We have limited experience in commercially manufacturing our products and no experience manufacturing these products in the volume that we anticipate will be required if we achieve planned levels of commercial sales. The forecasts of demand we use to determine order quantities and lead times for components purchased from outside suppliers may be incorrect. Our failure to obtain required components or sub-assemblies when needed and at a reasonable cost would adversely affect our business. As a result, we may not be able to develop and implement efficient, low-cost manufacturing capabilities and processes that will enable us to manufacture our existing, planned or future products in significant volumes, while meeting the legal, regulatory, quality, price, durability, engineering, design and production standards required to market our products successfully.

We may encounter unforeseen situations in the manufacturing and assembly of our products that would result in delays or shortfalls in our production. For example, our production processes and assembly methods may have to change in order to accommodate any significant future expansion of our manufacturing capacity, which may increase our manufacturing costs, delay production of our products, reduce our product margin and adversely impact our business. Conversely, if demand for our products shifts such that a manufacturing facility is operated below its capacity for an extended period, we may adjust our manufacturing operations to reduce fixed costs, which could lead to uncertainty and delays in manufacturing times and quality during any transition period.

Since we produce all of our IVL catheters at one facility, any contamination of the controlled environment, equipment malfunction or failure to strictly follow procedures can significantly reduce our yield. A drop in yield can increase our cost to manufacture our products or, in more severe cases, require us to halt the manufacture of our products until the problem is resolved. Identifying and resolving the cause of a drop in yield can require substantial time and resources.

If our manufacturing activities are adversely impacted or if we are otherwise unable to keep up with demand for our products by successfully manufacturing, assembling, testing and shipping our products in a timely manner, our revenue could be impaired, market acceptance for our products could be adversely affected and our customers might instead purchase our competitors' products, which would have a material adverse effect on our business, financial condition and results of operations.

We may be unable to compete successfully with larger companies in our highly competitive industry.

There are numerous approved products for treating vascular diseases in the indications in which we have received clearance or approval and those that we are pursuing or may pursue in the future. Many of these cleared or approved products are well-established and are widely accepted by physicians, patients and third-party payors. Third-party payors may encourage the use of competitors' products. In addition, many companies are developing products, and we cannot predict what the standard of care will be in the future.

The medical device industry is intensely competitive, subject to rapid change and significantly affected by new product introductions and other market activities of industry participants. We compete or plan to compete with manufacturers and distributors of cardiovascular medical devices. Our most notable competitors in the highly competitive cardiovascular field include Boston Scientific Corporation, Cardiovascular Systems, Inc., Medtronic plc and Philips. Many of these competitors are large, well-capitalized companies with significantly greater market share and resources than we have. As a consequence, they are able to spend more on product development, marketing, sales and other product initiatives than we can. We also compete with smaller medical device companies that have single products or a limited range of products. Some of our competitors have:

- significantly greater name recognition;
- broader or deeper relations with healthcare professionals, customers and third-party payors;
- more established distribution networks;
- additional lines of products and the ability to offer rebates or bundle products to offer greater discounts or other incentives to gain a competitive advantage;
- greater experience in conducting research and development, manufacturing, clinical trials, marketing and obtaining regulatory clearance or approval for products; and
- greater financial and human resources for product development, sales and marketing and patent litigation.

We believe that our proprietary IVL Technology, our focus on calcified cardiovascular disease and our organizational culture and strategy, will be important factors in our future success. We compete primarily on the basis that our products treat patients with calcified cardiovascular disease safely and effectively, with improved outcomes and procedural cost savings. Our continued success depends on our ability to:

- develop innovative, proprietary products that can cost-effectively address significant clinical needs;
- continue to innovate and develop scientifically advanced technology;
- obtain and maintain regulatory clearances or approvals;
- demonstrate efficacy in our sponsored and third-party clinical trials and studies;
- apply our technology across product lines and markets;
- attract and retain skilled research and development and sales personnel; and
- cost-effectively manufacture and successfully market and sell products.

In addition, competitors with greater financial resources than ours could acquire other companies to gain enhanced name recognition and market share, as well as new technologies or products that could effectively compete with our existing products, which may cause our revenue to decline and would harm our business.

Our competitors also compete with us in recruiting and retaining qualified scientific, management and commercial personnel, as well as in acquiring technologies complementary to, or necessary for, our products. Because of the complex and technical nature of our products and the dynamic market in which we compete, any failure to attract and retain a sufficient number of qualified employees could materially harm our ability to develop and commercialize our products, which would have a material adverse effect on our business, financial condition and results of operations.

Our operating results may fluctuate significantly, which makes our future operating results difficult to predict and could cause our operating results to fall below expectations or any guidance we may provide.

Our quarterly and annual operating results may fluctuate significantly, which makes it difficult for us to predict our future operating results. These fluctuations may occur due to a variety of factors, many of which are outside of our control, including, but not limited to:

- the level of demand for our products and any approved products, which may vary significantly;
- expenditures that we may incur to acquire, develop or commercialize additional products and technologies;
- the timing and cost of obtaining regulatory approvals or clearances for planned or future products or indications;
- the rate at which we grow our sales force and the speed at which newly hired salespeople become effective, and the cost and level of investment therein;
- the degree of competition in our industry and any change in the competitive landscape of our industry, including consolidation among our competitors or future partners;
- coverage and reimbursement policies with respect to our products, if approved, and potential future products that compete with our products;
- the timing and success or failure of preclinical studies or clinical trials for our products or any future products we develop or competing products;
- the timing of customer orders or medical procedures using our products and the number of available selling days in any quarterly period, which can be impacted by holidays, the mix of products sold and the geographic mix of where products are sold;
- seasonality, including the seasonal slowing of demand for our products we have experienced in the fourth quarter and summer months based on the elective nature of procedures performed using our products, and which we expect to become more pronounced in the future as our business grows;
- the timing and cost of, and level of investment in, research, development, regulatory approval and commercialization activities relating to our products, which may change from time to time;

- the cost of manufacturing our products, which may vary depending on the quantity of production and the terms of our agreements with third-party suppliers and manufacturers; and
- future accounting pronouncements or changes in our accounting policies.

The cumulative effects of these factors could result in large fluctuations and unpredictability in our quarterly and annual operating results. As a result, comparing our operating results on a period-to-period basis may not be meaningful. Investors should not rely on our past results as an indication of our future performance.

This variability and unpredictability could also result in our failing to meet the expectations of industry or financial analysts or investors for any period. If our revenue or operating results fall below the expectations of analysts or investors or below any forecasts we may provide to the market, it could have a material adverse effect on our business, financial condition and results or operations.

Reimbursement may not be available for the procedures that utilize our products, which could diminish our sales or affect our ability to sell our products profitably.

In both U.S. and non-U.S. markets, our ability to successfully commercialize and achieve market acceptance of our products depends, in significant part, on the availability of adequate financial coverage and reimbursement from third-party payors, including governmental payors (such as the Medicare and Medicaid programs in the United States), managed care organizations and private health insurers. Third-party payors decide which treatments they will cover and establish reimbursement rates for those treatments. Third-party payors in the United States generally do not provide reimbursement for our products. Rather, we expect certain components of our IVL System to continue to be purchased by hospitals and other providers who will then seek reimbursement from third-party payors for the procedures performed using our products. While third-party payors currently cover and provide reimbursement for procedures using our currently cleared or approved products, we can give no assurance that these third-party payors will continue to provide coverage and adequate reimbursement for the procedures using our products, to permit hospitals and doctors to offer procedures using our products to patients requiring treatment, or that current reimbursement levels for procedures using our products will continue. Third-party payors are increasingly examining the cost effectiveness of products, in addition to their safety and efficacy, when making coverage and payment decisions. Furthermore, although we believe there is potential to improve on the current reimbursement profile for our devices in the future, the overall amount of reimbursement available for PAD and CAD procedures could remain at current levels or decrease in the future. Additionally, we cannot be sure that the PAD and CAD procedure reimbursement amounts will not reduce or otherwise negatively affect the demand for our marketed products. Failure by hospitals and other users of our products to obtain coverage and adequate reimbursement for the procedures using our products would cause our business to suffer.

Third-party payors have also instituted initiatives to limit the growth of healthcare costs using, for example, price regulation or controls and competitive pricing programs. Some third-party payors also require demonstrated superiority, on the basis of randomized clinical trials, or pre-approval of coverage, for new or innovative devices or procedures before they will reimburse healthcare providers who use such devices or procedures. Additionally, no uniform policy for coverage and reimbursement exists in the United States, and coverage and reimbursement can differ significantly from payor to payor. Third-party payors often rely upon Medicare coverage policy and payment limitations in setting their own reimbursement rates, but also have their own methods and approval process apart from Medicare determinations. It is uncertain whether our current products or any planned or future products will be viewed as sufficiently cost effective to warrant coverage and adequate reimbursement levels for procedures using such marketed products.

If our products are not approved for planned or new indications, our commercial opportunity will be limited.

We currently market and sell our M5 and S4 catheters for the treatment of calcified plaque in patients with PAD in the United States and international markets and our C2 catheters for the treatment of calcified plaque in patients with CAD in Europe. However, our strategy is to market and sell our products for the treatment of CAD in the United States, upon approval or clearance from the FDA, and also to pursue additional vascular indications for our products. Conducting clinical studies to obtain data for new or additional indications may require substantial additional funding. We cannot assure you that we will be able to successfully obtain clearance or approval for any of these additional product indications.

Even if we obtain clearance or approval to market our products for additional indications in the United States or internationally, we cannot assure you that any such indications will be successfully commercialized, widely accepted in the marketplace or more effective than other commercially available alternatives. If we are unable to successfully develop our products for new or additional indications, our commercial opportunity will be limited, which would have a material adverse effect on our business, financial condition and results of operations.

We have limited data and experience regarding the safety and efficacy of our products. Results of earlier studies may not be predictive of future clinical trial results, and planned studies may not establish an adequate safety or efficacy profile for such products and other planned or future products, which would affect market acceptance of these products.

Because our IVL Technology is relatively new in the treatment of PAD and CAD, we have performed clinical trials only with limited patient populations. The long-term effects of using our products in a large number of patients have not been studied and the results of short-term clinical use of such products do not necessarily predict long-term clinical benefits or reveal long-term adverse effects. The results of preclinical studies and clinical trials of our products conducted to date and ongoing or future studies and trials of our current, planned or future products may not be predictive of the results of later clinical trials, and interim results of a clinical trial do not necessarily predict final results. Our interpretation of data and results from our clinical trials do not ensure that we will achieve similar results in future clinical trials in other patient populations. In addition, preclinical and clinical data are often susceptible to various interpretations and analyses, and many companies that have believed their products performed satisfactorily in preclinical studies and earlier clinical trials have nonetheless failed to replicate results in later clinical trials and subsequently failed to obtain marketing approval. Products in later stages of clinical trials may fail to show the desired safety and efficacy despite having progressed through nonclinical studies and earlier clinical trials.

If our clinical trials are unsuccessful or significantly delayed, or if we do not complete our clinical trials, our business may be harmed.

Clinical development is a long, expensive and uncertain process and is subject to delays and the risk that products may ultimately prove unsafe or ineffective in treating the indications for which they are designed. Completion of clinical trials may take several years or more. Clinical trials can be delayed for a variety of reasons, including delays in obtaining regulatory approval to commence a trial, in reaching an agreement on acceptable clinical trial terms with prospective sites, in obtaining institutional review board approval at each site, in recruiting patients to participate in a trial or in obtaining sufficient supplies of clinical trial materials.

We cannot provide any assurance that we will successfully, or in a timely manner, enroll our clinical trials, that our clinical trials will meet their primary endpoints or that such trials or their results will be accepted by the FDA or foreign regulatory authorities.

We may experience numerous unforeseen events during, or because of, the clinical trial process that could delay or prevent us from receiving regulatory clearance or approval for new products or modifications of existing products, including new indications for existing products, including:

- enrollment in our clinical trials may be slower than we anticipate, or we may experience high screen failure rates in our clinical trials, resulting in significant delays;
- our clinical trials may produce negative or inconclusive results, and we may decide, or regulators may require us, to conduct additional clinical and/or preclinical testing which may be expensive and time-consuming;
- trial results may not meet the level of statistical significance required by the FDA or other regulatory authorities;
- the FDA or similar foreign regulatory authorities may find the product is not sufficiently safe for investigational use in humans;
- the FDA or similar foreign regulatory authorities may interpret data from preclinical testing and clinical trials in different ways than we do;
- there may be delays or failure in obtaining approval of our clinical trial protocols from the FDA or other regulatory authorities;
- there may be delays in obtaining institutional review board approvals or governmental approvals to conduct clinical trials at prospective sites;
- the FDA or similar foreign regulatory authorities may find our or our suppliers' manufacturing processes or facilities unsatisfactory;
- the FDA or similar foreign regulatory authorities may change their review policies or adopt new regulations that may negatively affect or delay our ability to bring a product to market or receive approvals or clearances to treat new indications;
- we may have trouble in managing multiple clinical sites;

- we may have trouble finding patients to enroll in our trials;
- we may experience delays in agreeing on acceptable terms with third-party research organizations and trial sites that may help us conduct the clinical trials; and
- we, or regulators, may suspend or terminate our clinical trials because the participating patients are being exposed to unacceptable health risks.

Failures or perceived failures in our clinical trials will delay and may prevent our product development and regulatory approval process, damage our business prospects and negatively affect our reputation and competitive position.

Clinical trials may be delayed, suspended or terminated for many reasons, which will increase our expenses and delay the time it takes to develop new products or seek new indications.

We may experience delays in our ongoing or future preclinical studies or clinical trials, and we do not know whether future preclinical studies or clinical trials will begin on time, need to be redesigned, enroll an adequate number of patients on time or be completed on schedule, if at all. The commencement and completion of clinical trials for future products or indications may be delayed, suspended or terminated as a result of many factors, including:

- the FDA or other regulators disagreeing as to the design, protocol or implementation of our clinical trials;
- the delay or refusal of regulators or institutional review boards ("IRBs") to authorize us to commence a clinical trial at a prospective trial site;
- changes in regulatory requirements, policies and guidelines;
- delays or failure to reach agreement on acceptable terms with prospective clinical research organizations ("CROs") and clinical trial sites, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and trial sites;
- delays in patient enrollment and variability in the number and types of patients available for clinical trials;
- the inability to enroll a sufficient number of patients in trials to observe statistically significant treatment effects in the trial;
- having clinical sites deviate from the trial protocol or dropping out of a trial;
- negative or inconclusive results from ongoing preclinical studies or clinical trials, which may require us to conduct additional preclinical studies or clinical trials or to abandon projects that we expect to be promising;
- safety or tolerability concerns that could cause us to suspend or terminate a trial if we find that the participants are being exposed to unacceptable health risks;
- reports from preclinical or clinical testing of other similar therapies that raise safety or efficacy concerns;
- regulators or IRBs requiring that we or our investigators suspend or terminate clinical research for various reasons, including noncompliance with regulatory requirements or safety concerns, among others;
- lower than anticipated retention rates of patients and volunteers in clinical trials;
- our CROs or clinical trial sites failing to comply with regulatory requirements or meet their contractual obligations to us in a timely manner, or at all, deviating from the protocol or dropping out of a trial;
- delays relating to adding new clinical trial sites;
- difficulty in maintaining contact with patients after treatment, resulting in incomplete data;
- the quality of the products falling below acceptable standards;
- the inability to manufacture sufficient quantities of our products to commence or complete clinical trials; and
- exceeding budgeted costs due to difficulty in accurately predicting costs associated with clinical trials.

We could also encounter delays if a clinical trial is suspended or terminated by us, by the IRBs or the Ethics Committees of institutions at which such trials are being conducted, by the Data Safety Monitoring Board for such trial or by the FDA or other regulatory authorities. Such authorities may suspend or terminate a clinical trial due to a number of factors, including failure to conduct the clinical trial in accordance with regulatory requirements, including the FDA's current Good Clinical Practice ("GCP"), regulations, or our clinical protocols, inspection of the clinical trial operations or trial site by the FDA resulting in the imposition of a clinical hold, unforeseen safety issues or adverse side effects, failure to demonstrate safety and effectiveness, changes in governmental regulations or administrative actions or lack of adequate funding to continue the clinical trial. In addition, we may encounter delays if the FDA concludes that our financial relationships with investigators result in a perceived or actual conflict of interest that may have affected the interpretation of a study, the integrity of the data generated at the applicable clinical trial site or the utility of the clinical trial itself. Principal investigators for our clinical trials may serve as scientific advisors or consultants to us from time to time and receive cash compensation and/or stock options in connection with such services. If these relationships and any related compensation to or ownership interest by the clinical investigator carrying out the study result in perceived or actual conflicts of interest, or if the FDA concludes that the financial relationship may have affected interpretation of the study, the integrity of the data generated at the applicable clinical trial site may be questioned and the utility of the clinical trial itself may be jeopardized, which could result in the delay or rejection by the FDA. Any such delay or rejection could prevent us from commercializing any of our products currently in development.

If we experience delays in the commencement or completion of any clinical trial of our products, or if any of our clinical trials are terminated, the commercial prospects of our products may be harmed, and our ability to generate revenue from sales may be delayed or materially diminished.

We do not know whether any of our future preclinical studies or clinical trials will begin as planned, will need to be restructured or will be completed on schedule, or at all. Any delays in completing our clinical trials will increase our costs, slow down our product development and approval process and jeopardize our ability to commence sales and generate associated revenue. Any of these occurrences may significantly harm our business, financial condition and prospects. In addition, many of the factors that cause, or lead to, a delay in the commencement or completion of clinical trials may also ultimately lead to the denial, suspension or revocation of expanded regulatory clearance or approval of our products. Significant preclinical study or clinical trial delays also could shorten any periods during which we may have the exclusive right to commercialize our products or allow our competitors to bring products to market before we do and impair our ability to successfully commercialize our products.

We may be required to suspend or discontinue clinical trials due to side effects or other safety risks that could preclude approval of our products.

Our clinical trials may be suspended at any time for a number of reasons. We may voluntarily suspend or terminate our clinical trials if at any time we believe that they present an unacceptable risk to participants. In addition, regulatory agencies may order the temporary or permanent discontinuation of our clinical trials at any time if they believe that the clinical trials are not being conducted in accordance with applicable regulatory requirements or that they present an unacceptable safety risk to participants.

Our ability to market our current products is limited to the treatment of PAD in the United States and certain countries outside of the United States and limited to the treatment of CAD in certain countries outside of the United States. If we want to market our products for further uses in the United States, we will need to file for FDA clearances or approvals and may need to conduct trials in addition to our existing trials to support expanded use, which would be expensive and time-consuming and may not be successful. The use, misuse or off-label use of our products may also result in injuries that lead to product liability suits, which could be costly to our business.

Our current products are cleared in the United States solely for the treatment of PAD and in certain non-U.S. jurisdictions solely for the treatment of PAD and CAD. This prohibits our ability to market or advertise our products for any other indication, which restricts our ability to sell these products and could affect our growth. Additionally, our products are contra-indicated for use in the carotid or cerebrovascular arteries. Our promotional materials and training methods must comply with FDA and other applicable laws and regulations, including the prohibition on the promotion of a medical device for a use that has not been cleared or approved by the FDA.

Use of a device outside of its cleared or approved indication is known as "off-label" use. We cannot prevent a physician from using our products for off-label use, as the FDA does not restrict or regulate a physician's choice of treatment within the practice of medicine. However, we are not allowed to actively promote or advertise our products for off-label uses. In addition, we cannot make comparative claims regarding the use of our products against any alternative treatments without conducting head-to-head comparative clinical studies, which would be expensive and time-consuming. If the FDA determines that our promotional, reimbursement or training materials for sales representatives or physicians constitute promotion of an off-label use, the FDA could request that we modify our training, promotional or reimbursement materials and/or subject us to regulatory or enforcement actions, including the issuance of an untitled letter, a warning letter, injunction, seizure, disgorgement of profits, significant penalties, including civil fines and criminal penalties. Other federal, state or foreign governmental authorities also might take action if they consider our promotion, reimbursement or training materials to constitute promotion of an off-label use, which could result in significant fines or penalties under other statutory authorities, such as laws prohibiting false claims for reimbursement. Although we train our sales force not to promote our products for off-label uses, and our instructions for use in all markets specify that our products are not intended for use outside of those indications cleared or approved for use, the FDA or another regulatory agency could conclude that we have engaged in off-label promotion. For example, the government may take the position that off-label promotion resulted in inappropriate reimbursement for an off-label use in violation of the federal civil False Claims Act for which it might impose significant civil fines and even pursue criminal action. In those possible events, our reputation could be damaged and adoption of the products would be impaired.

We currently require limited training in the use of our products incorporating our IVL Technology because we market primarily to physicians who are experienced in the interventional techniques required to use our devices. If demand for our products continues to grow, less experienced physicians will likely use our products, potentially leading to more injury and an increased risk of product liability claims. The use or misuse of our products may in the future result in complications, including damage to the treated artery, infection, internal bleeding and limb loss, potentially leading to product liability claims.

We will require substantial additional capital to finance our planned operations, which may not be available to us on acceptable terms or at all. Our failure to obtain additional financing when needed on acceptable terms, or at all, could force us to delay, limit, reduce or eliminate our product development programs, commercialization efforts or other operations.

Since inception, we have incurred significant net losses and expect to continue to incur net losses for the foreseeable future. Since our inception, our operations have been financed primarily by net proceeds from the sale of our equity securities and, to a lesser extent, product revenue. As of December 31, 2019, we had $195.3 million in cash, cash equivalents and short-term investments, and an accumulated deficit of $178.0 million. Based on our current planned operations, we expect our cash, cash equivalents and short-term investments will enable us to fund our operating expenses for at least the next 12 months. We have based this estimate on assumptions that may prove to be wrong, and we could use our capital resources sooner than we currently expect.

We have a number of ongoing clinical trials, and expect to continue to make substantial investments in these trials and in additional clinical trials that are designed to provide clinical evidence of the safety and efficacy of our products. We intend to continue to make significant investments in our sales and marketing organization by increasing the number of U.S. sales representatives and expanding our international marketing programs to help facilitate further adoption among existing hospital accounts as well as broaden awareness of our products to new hospitals. We also expect to continue to make investments in research and development, regulatory affairs and clinical studies to develop future generations of our products, support regulatory submissions and demonstrate the clinical efficacy of our products. Moreover, we expect to incur additional expenses associated with operating as a public company, including legal, accounting, insurance, exchange listing and SEC compliance, investor relations and other expenses. Because of these and other factors, we expect to continue to incur substantial net losses and negative cash flows from operations for the foreseeable future. Our future capital requirements will depend on many factors, including:

- the cost, timing and results of our clinical trials and regulatory reviews;
- the cost and timing of establishing sales, marketing and distribution capabilities;
- the terms and timing of any other collaborative, licensing and other arrangements that we may establish;
- the timing, receipt and amount of sales from our current and potential products;
- the degree of success we experience in commercializing our products;

- the emergence of competing or complementary technologies;
- the cost of preparing, filing, prosecuting, maintaining, defending and enforcing any patent claims and other intellectual property rights; and
- the extent to which we acquire or invest in businesses, products or technologies, although we currently have no commitments or agreements relating to any of these types of transactions.

We will require additional financing to fund working capital and pay our obligations. We may seek to raise any necessary additional capital through a combination of public or private equity offerings and/or debt financings. There can be no assurance that we will be successful in acquiring additional funding at levels sufficient to fund our operations or on terms favorable to us. If adequate funds are not available on acceptable terms when needed, we may be required to significantly reduce operating expenses, which may have a material adverse effect on our business and/or results of operations and financial condition. If we do raise additional capital through public or private equity or convertible debt offerings, the ownership interest of our existing stockholders will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect our stockholders' rights. If we raise additional capital through debt financing, we may be subject to covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends. Additional capital may not be available on reasonable terms, or at all.

The terms of the Loan and Security Agreement require us to meet certain operating and financial covenants and place restrictions on our operating and financial flexibility. If we raise additional capital through debt financing, the terms of any new debt could further restrict our ability to operate our business.

Our Loan and Security Agreement with Silicon Valley Bank (the "Loan and Security Agreement"), entered into in February 2018, provided for a $2.0 million revolving line of credit and a $15.0 million term loan. In connection with the Loan and Security Agreement, Silicon Valley Bank was concurrently issued a common stock warrant that entitles Silicon Valley Bank to purchase up to 34,440 shares of our common stock with an exercise price of $4.026 per share, with a term of ten years. In April 2019, all of these common stock warrants were net exercised into 29,887 shares of common stock.

On February 11, 2020, we entered into the First Amendment (the "Amendment") to the Loan and Security Agreement, to refinance our existing term loan. The Amendment provided us with a supplemental term loan in the amount of $16.5 million. We used $13.2 million of the proceeds from the supplemental term loan to repay in full all amounts due under the existing term loan and to pay related expenses. In addition, the Amendment terminated the Company's revolving line of credit.

The supplemental term loan is secured by all of the Company's assets, excluding intellectual property and certain other assets. Subject to the terms of the Amendment, the supplemental term loan can be repaid at any time, subject to certain penalty payments, prior to the December 1, 2023 maturity date, at which time all amounts borrowed will be due and payable. The supplemental term loan is subject to customary affirmative and restrictive covenants, including with respect to our ability to enter into fundamental transactions, incur additional indebtedness, grant liens, pay any dividend or make any distributions to our holders, make investments, merge or consolidate with any other person or engage in transactions with our affiliates, but is not subject to any financial covenants. If we fail to comply with the covenants or payments in connection with the supplemental term loan, Silicon Valley Bank could declare an event of default, which would give it the right to terminate its commitment to provide additional loans and declare all borrowings outstanding, together with accrued and unpaid interest and fees, to be immediately due and payable. In addition, Silicon Valley Bank would have the right to proceed against the assets we provided as collateral pursuant to the loan.

The foregoing may restrict our current and future operations, particularly our ability to respond to certain changes in our business or industry, or take future actions. See the section titled "Management's Discussion and Analysis of Financial Condition and Results of Operations—Liquidity and Capital Resources—Debt obligations."

We are highly dependent on our senior management team and key personnel, and our business could be harmed if we are unable to attract and retain personnel necessary for our success.

We are highly dependent on our senior management and other key personnel. Our success will depend on our ability to retain senior management and to attract and retain qualified personnel in the future, including sales and marketing professionals, scientists, clinical specialists, engineers and other highly skilled personnel and to integrate current and additional personnel in all departments. The loss of members of our senior management, sales and marketing professionals, scientists, clinical and regulatory specialists and engineers could result in delays in product development and harm our business. If we are not successful in attracting and retaining highly qualified personnel, it would have a material adverse effect on our business, financial condition and results of operations.

Competition for skilled personnel in our market is intense and may limit our ability to hire and retain highly qualified personnel on acceptable terms, or at all. To induce valuable employees to remain at our company, in addition to salary and cash incentives, we have issued stock options that vest over time. The value to employees of stock options that vest over time may be significantly affected by movements in our stock price that are beyond our control, and may at any time be insufficient to counteract more lucrative offers from other companies. Despite our efforts to retain valuable employees, members of our management, scientific and development teams may terminate their employment with us on short notice. Our employment arrangements with our employees provide for at-will employment, which means that any of our employees could leave our employment at any time, with or without notice. We also do not maintain "key man" insurance policies on the lives of these individuals or the lives of any of our other employees.

We have increased the size of our organization and expect to further increase it in the future, and we may experience difficulties in managing this growth. If we are unable to manage the anticipated growth of our business, our future revenue and operating results may be adversely affected.

As of December 31, 2019, we had 289 full-time employees worldwide. We have significantly expanded the size of our organization over the past three years, particularly in the number of sales and marketing personnel, and expect to do so in the future. As our sales and marketing strategies develop and as we transition into operating as a public company, we expect to need additional managerial, operational, sales, marketing, financial and other personnel. Future growth would impose significant added responsibilities on members of management, including:

- identifying, recruiting, integrating, maintaining and motivating additional employees;
- managing our internal development efforts effectively, while complying with our contractual obligations to contractors and other third parties; and
- improving our operational, financial and management controls, reporting systems and procedures.

Our future financial performance and our ability to successfully market and sell our products will depend, in part, on our ability to effectively manage any future growth, and our management may also have to divert a disproportionate amount of attention away from day-to-day activities in order to devote a substantial amount of time to managing these growth activities.

We expect to grow our sales force in anticipation of additional product approvals or clearances and increased entry into new markets. The growth we may experience in the future may provide challenges to our organization, requiring us to also rapidly expand other aspects of our business, including our manufacturing operations. Rapid expansion in personnel may result in less experienced people producing and selling our products, which could result in unanticipated costs and disruptions to our operations. If we are not able to effectively expand our organization by hiring new employees and expanding our groups of consultants and contractors, we may not be able to successfully implement the tasks necessary to further develop and commercialize our products and, accordingly, may not achieve our research, sales and marketing goals, which would have a material adverse effect on our business, financial condition and results of operations.

If we fail to grow our sales and marketing capabilities and develop widespread brand awareness cost effectively, our growth will be impeded and our business may suffer.

We are actively expanding our international field presence through new distributors, additional sales and clinical personnel and are adding new U.S. sales territories. We plan to continue to expand and optimize our sales infrastructure in order to grow our customer base and our business. Identifying and recruiting qualified personnel and training them on the use of our products, on applicable federal and state laws and regulations and on our internal policies and procedures, require significant time, expense and attention. It can take significant time before our sales representatives are fully trained and productive. Our business may be harmed if our efforts to expand and train our sales force do not generate a corresponding increase in revenue. In particular, if we are unable to hire, develop and retain talented sales personnel or if new sales personnel are unable to achieve desired productivity levels in a reasonable period of time, we may not be able to realize the expected benefits of this investment or increase our revenue.

Our ability to increase our customer base and achieve broader market acceptance of our products will depend to a significant extent on our ability to expand our marketing operations. We plan to dedicate significant financial and other resources to our marketing programs. Our business would be harmed if our marketing efforts and expenditures do not generate an increase in revenue.

In addition, we believe that developing and maintaining awareness of our brand in a cost-effective manner is critical to achieving broad acceptance of our products and attracting new customers. Brand promotion activities may not generate customer awareness or increase revenue and, even if they do, any increase in revenue may not offset the costs and expenses we incur in building our brand. If we fail to successfully promote, maintain and protect our brand, we may fail to attract or retain the customers necessary to realize a sufficient return on our brand-building efforts, or to achieve the widespread brand awareness that is critical for broad customer adoption of our technology.

We intend to expand sales of our products internationally in the future, but we may experience difficulties in obtaining regulatory clearance or approval or in successfully marketing our products internationally even if approved. A variety of risks associated with marketing our products internationally could materially adversely affect our business.

While most of our revenue has been in the United States, our current products are cleared in certain international markets for the treatment of PAD and CAD, and international sales comprised 47% of our revenue for the year ended December 31, 2019. We intend to increase our sales outside the United States, and our C^2 catheters are currently only available outside the United States. Sales of our products outside of the United States are and will be subject to foreign regulatory requirements governing clinical trials and marketing approval. We will incur substantial expenses in connection with our international expansion. Additional risks related to operating in foreign countries include:

- differing regulatory requirements in foreign countries;
- differing reimbursement regimes in foreign countries, including price controls;
- unexpected changes in tariffs, trade barriers, price and exchange controls and other regulatory requirements;
- economic weakness, including inflation, or political instability in particular foreign economies and markets;
- compliance with tax, employment, immigration and labor laws for employees living or traveling abroad;
- foreign taxes, including withholding of payroll taxes;
- foreign currency fluctuations, which could result in increased operating expenses, reduced revenue and other obligations incident to doing business in another country;
- difficulties staffing and managing foreign operations;
- workforce uncertainty in countries where labor unrest is more common than in the United States;
- potential liability under the U.S. Foreign Corrupt Practices Act of 1977, as amended (the “FCPA”), or comparable foreign regulations;
- challenges enforcing our contractual and intellectual property rights, especially in those foreign countries that do not respect and protect intellectual property rights to the same extent as the United States;
- product shortages resulting from any events affecting raw material or finished good supply or distribution or manufacturing capabilities abroad; and
- business interruptions resulting from geopolitical actions, including war and terrorism.

These and other risks associated with our international operations may materially adversely affect our ability to attain or maintain profitable operations, which would have a material adverse effect on our business, financial condition and results of operations.

In addition, there can be no guarantee that we will receive approval to sell our products in every international market we target, nor can there be any guarantee that any sales would result even if such approval is received. Even if the FDA grants marketing approval for a product, comparable regulatory authorities of foreign countries must also approve the manufacturing or marketing of the product in those countries. Approval in the United States, or in any other jurisdiction, does not ensure approval in other jurisdictions. Obtaining foreign approvals could result in significant delays, difficulties and costs for us and require additional trials and additional expenses. Regulatory requirements can vary widely from country to country and could delay the introduction of our products in those countries. Clinical trials conducted in one country may not be accepted by other countries, and regulatory approval in one country does not mean that regulatory approval will be obtained in any other country. If we fail to comply with these regulatory requirements or to obtain and maintain required approvals, our target market will be reduced and our ability to generate revenue will be diminished. Our inability to successfully enter all our desired international markets and manage business on a global scale could negatively affect our business, financial results and results of operations.

Our future growth may depend, in part, on our ability to operate in foreign markets, where we would be subject to additional regulatory burdens and other risks and uncertainties.

Our future growth may depend, in part, on our ability to develop and commercialize our planned and future products in foreign markets. We are not permitted to market or promote any of our planned or future products before we receive regulatory approval from applicable regulatory authorities in foreign markets, and we may never receive such regulatory approvals for any of our planned or future products. To obtain separate regulatory approval in many other countries we must comply with numerous and varying regulatory requirements regarding safety and efficacy and governing, among other things, clinical trials, commercial sales, pricing and distribution of our planned or future products. If we obtain regulatory approval of our products and ultimately commercialize our planned or future products in foreign markets, we would be subject to additional risks and uncertainties, including:

- different regulatory requirements for approval of medical devices in foreign countries;
- reduced protection for intellectual property rights;
- the existence of additional third-party patent rights of potential relevance to our business;
- unexpected changes in tariffs, trade barriers and regulatory requirements;
- economic weakness, including inflation or political instability in particular foreign economies and markets;
- compliance with tax, employment, immigration and labor laws for employees living or traveling abroad;
- foreign currency fluctuations, which could result in increased operating expenses, reduced revenue and other obligations incident to doing business in another country;
- foreign reimbursement, pricing and insurance regimes;
- workforce uncertainty in countries where labor unrest is common;
- production shortages resulting from any events affecting raw material supply or manufacturing capabilities abroad; and
- business interruptions resulting from geopolitical actions, including war and terrorism, or natural disasters, including earthquakes, typhoons, floods and fires.

We face additional credit and compliance risks related to our international sales using foreign distributors.

We partner with distributors for our products in select geographies outside of the United States. Specifically, as of December 31, 2019 we have sold to distributors located in Europe, Canada, Asia, South Africa, South America, Middle East, Australia and New Zealand. For the year ended December 31, 2019, approximately 47% of our sales were outside of the United States. We may not be able to collect all of the funds owed to us by our foreign distributors. Some foreign distributors may experience financial difficulties, including bankruptcy, which may hinder our collection of accounts receivable. Where we extend credit terms to distributors, we periodically review the collectability and creditworthiness when determining the payment terms for such distributors. If our uncollectible accounts exceed our expectations, this could adversely impact our operating results. In addition, failure by our foreign distributors to comply with the FCPA, the United Kingdom Bribery Act 2010 (the “U.K. Bribery Act”) or similar laws, insurance requirements or other contract terms could have a negative impact on our business. Failure to manage the risks related to our foreign distributors would have a material adverse effect on our business, financial condition and results of operations.

Governmental export or import controls could limit our ability to compete in foreign markets and subject us to liability if we violate them.

Our products may be subject to U.S. export controls. Governmental regulation of the import or export of our products, or our failure to obtain any required import or export authorization for our products, when applicable, could harm our international sales and adversely affect our revenue. Compliance with applicable regulatory requirements regarding the export of our products may create delays in the introduction of our products in international markets or, in some cases, prevent the export of our products to some countries altogether. Furthermore, U.S. export control laws and economic sanctions prohibit the shipment of certain products and services to countries, governments and persons targeted by U.S. sanctions. If we fail to comply with export and import regulations and such economic sanctions, we may be fined or other penalties could be imposed, including a denial of certain export privileges. Moreover, any new export or import restrictions, new legislation or shifting approaches in the enforcement or scope of existing regulations, or in the countries, persons or technologies targeted by such regulations, could result in decreased use of our products by, or in our decreased ability to export our products to existing or potential customers with international operations. Any decreased use of our products or limitation on our ability to export or sell access to our products would likely materially and adversely affect our business, financial condition and results of operations.

Technological change may adversely affect sales of our products and may cause our products to become obsolete.

The medical device market is characterized by extensive research and development and rapid technological change. Technological progress or new developments in our industry could adversely affect sales of our products. Our products could be rendered obsolete because of future innovations by our competitors or others in the treatment of vascular diseases, which would have a material adverse effect on our business, financial condition and results of operations.

Consolidation in the medical device industry could have an adverse effect on our revenue and results of operations.

Many medical device companies are consolidating to create new companies with greater market power. As the medical device industry consolidates, competition to provide goods and services to industry participants will become more intense. These industry participants may try to use their market power to negotiate price concessions or reductions for our products. If we reduce our prices because of consolidation in the healthcare industry, our revenue would decrease, which could have a material adverse effect on our business, financial condition and results of operations.

If product liability lawsuits are brought against us, we may incur substantial liabilities and may be required to limit or halt the marketing and sale of our products. The expense and potential unavailability of insurance coverage for liabilities resulting from our products could harm us and our ability to sell our products.

We face an inherent risk of product liability as a result of the marketing and sale of our products. For example, we may be sued if our products cause or are perceived to cause injury or are found to be otherwise unsuitable during manufacturing, marketing or sale. Any such product liability claim may include allegations of defects in manufacturing, defects in design, a failure to warn of dangers inherent in the product, negligence, strict liability or a breach of warranties. In addition, we may be subject to claims against us even if the apparent injury is due to the actions of others or the pre-existing health of the patient. For example, we rely on physicians in connection with the use of our products on patients. If these physicians are not properly trained or are negligent, the capabilities of our products may be diminished or the patient may suffer critical injury. We may also be subject to claims that are caused by the activities of our suppliers, such as those who provide us with components and sub-assemblies.

If we cannot successfully defend ourselves against product liability claims, we may incur substantial liabilities or be required to limit or halt commercialization of our products. Even successful defense would require significant financial and management resources. Regardless of the merits or eventual outcome, liability claims may result in:

- decreased demand for our products;
- injury to our reputation;
- initiation of investigations by regulators;
- costs to defend the related litigation;
- a diversion of management’s time and our resources;
- substantial monetary awards to trial participants or patients;
- product recalls, withdrawals or labeling, marketing or promotional restrictions;
- loss of revenue;
- exhaustion of any available insurance and our capital resources; and
- the inability to market and sell our products.

We believe we have adequate product liability insurance, but it may not prove to be adequate to cover all liabilities that we may incur. Insurance coverage is increasingly expensive. We may not be able to maintain or obtain insurance at a reasonable cost or in an amount adequate to satisfy any liability that may arise. Our insurance policy contains various exclusions, and we may be subject to a product liability claim for which we have no coverage. The potential inability to obtain sufficient product liability insurance at an acceptable cost to protect against product liability claims could prevent or inhibit the marketing and sale of products we develop. We may have to pay any amounts awarded by a court or negotiated in a settlement that exceed our coverage limitations or that are not covered by our insurance, and we may not have, or be able to obtain, sufficient capital to pay such amounts, which would have a material adverse effect on our business, financial condition and results of operations. In addition, any product liability claims brought against us, with or without merit, could increase our product liability insurance rates or prevent us from securing continuing coverage, harm our reputation in the industry, significantly increase our expenses and reduce product sales.

Some of our customers and prospective customers may also have difficulty in procuring or maintaining liability insurance to cover their operations and use of our products. Medical malpractice carriers are withdrawing coverage in certain states or substantially increasing premiums. If this trend continues or worsens, our customers may discontinue using our products and potential customers may opt against purchasing our products due to the cost or inability to procure insurance coverage.

Litigation and other legal proceedings may adversely affect our business.

From time to time we may become involved in legal proceedings relating to patent and other intellectual property matters, product liability claims, employee claims, tort or contract claims, federal regulatory investigations, securities class action and other legal proceedings or investigations, which could have an adverse impact on our reputation, business and financial condition and divert the attention of our management from the operation of our business. Litigation is inherently unpredictable and can result in excessive or unanticipated verdicts and/or injunctive relief that affect how we operate our business. We could incur judgments or enter into settlements of claims for monetary damages or for agreements to change the way we operate our business, or both. There may be an increase in the scope of these matters or there may be additional lawsuits, claims, proceedings or investigations in the future, which could have a material adverse effect on our business, financial condition and results of operations. Adverse publicity about regulatory or legal action against us could damage our reputation and brand image, undermine our customers' confidence and reduce long-term demand for our products, even if the regulatory or legal action is unfounded or not material to our operations.

If we experience significant disruptions in our information technology systems, our business may be adversely affected.

We depend on our information technology systems for the efficient functioning of our business, including the manufacture, distribution and maintenance of our products, as well as for accounting, data storage, compliance, purchasing and inventory management. Our information technology systems may be subject to computer viruses, ransomware or other malware, attacks by computer hackers, failures during the process of upgrading or replacing software, databases or components thereof, power outages, damage or interruption from fires or other natural disasters, hardware failures, telecommunication failures and user errors, among other malfunctions. We could be subject to an unintentional event that involves a third party gaining unauthorized access to our systems, which could disrupt our operations, corrupt our data or result in release of our confidential information. We address these data security concerns in more detail below. Technological interruptions would disrupt our operations, including our ability to timely ship and track product orders, project inventory requirements, manage our supply chain and otherwise adequately service our customers or disrupt our customers' ability use our products for treatments. In the event we experience significant disruptions, we may be unable to repair our systems in an efficient and timely manner. Accordingly, such events may disrupt or reduce the efficiency of our entire operation and have a material adverse effect on our business, financial condition and results of operations. Currently, we carry business interruption coverage to mitigate certain potential losses but this insurance is limited in amount, and we cannot be certain that such potential losses will not exceed our policy limits. We are increasingly dependent on complex information technology to manage our infrastructure. Our information systems require an ongoing commitment of significant resources to maintain, protect and enhance our existing systems. Failure to maintain or protect our information systems and data integrity effectively could have a material adverse effect on our business, financial condition and results of operations.

If we experience security or data privacy breaches or other unauthorized or improper access to, use of, or destruction of our proprietary or confidential data, employee data or personal data, or if customers, patients and other partners are reluctant to use our devices because of concerns about the privacy or security of their data, we may face additional costs, loss of revenue, significant liabilities, harm to our brand, decreased use of our platform and business disruption.

In connection with various facets of our business, we collect and use a variety of personal data, such as name, mailing address, email addresses, mobile phone number, location information and clinical trial information. Any failure to prevent or mitigate security breaches or improper access to, use of, or disclosure of our data or consumers' personal data could result in significant liability under state (e.g., state breach notification laws, the California Consumer Privacy Act ("CCPA"), which became effective in January 2020), federal (e.g., the Health Insurance Portability and Accountability Act ("HIPAA") and the Health Information Technology for Economic and Clinical Health Act ("HITECH Act")) and international law (e.g., the European Union's General Data Protection Regulation ("GDPR")). Such an incident may also cause a material loss of revenue from the potential adverse impact to our reputation and brand, affect our ability to retain or attract new users and potentially disrupt our business. We may also rely on third-party service providers to host or otherwise process some of our data and that of users, and any failure by such third party to prevent or mitigate security breaches or improper access to or disclosure of such information could have similarly adverse consequences for us.

Because the techniques used to obtain unauthorized access, disable or degrade service or sabotage systems change frequently and often are not recognized until launched against a target, we and our service providers may be unable to anticipate these techniques or to implement adequate preventative measures. Our servers and platforms may be vulnerable to computer viruses or physical or electronic break-ins that our security measures may not detect. Individuals able to circumvent our security measures may misappropriate our confidential or proprietary information, disrupt our operations, damage our computers or otherwise damage our reputation and business. We may need to expend significant resources and make significant capital investment to protect against security breaches or to mitigate the impact of any such breaches. If we are unable to prevent or mitigate the impact of such security breaches, our ability to attract and retain new customers, patients and other partners could be harmed, and we could be exposed to litigation and governmental investigations, which could lead to a potential disruption to our business.

If we fail to identify, acquire and develop other products, we may be unable to grow our business.

As a significant part of our growth strategy, we intend to develop and commercialize additional products through our research and development program or by licensing or acquiring additional products and technologies from third parties. The success of this strategy depends upon our ability to identify, select and acquire the right to products and technologies on terms that are acceptable to us.

Any product we identify, license or acquire may require additional development efforts prior to commercial sale, including extensive clinical testing and approval or clearance by the FDA and applicable foreign regulatory authorities. All products are prone to the risks of failure inherent in medical device product development, including the possibility that the product will not be shown to be sufficiently safe and effective for approval or clearance by regulatory authorities. In addition, we cannot assure you that any such products that are approved or cleared will be manufactured or produced economically, successfully commercialized or widely accepted in the marketplace.

Proposing, negotiating and implementing an economically viable product or technology acquisition or license is a lengthy and complex process. Other companies, including those with substantially greater financial, marketing and sales resources, may compete with us for the acquisition or license of approved or cleared products. We may not be able to acquire or license the rights to additional approved or cleared products on terms that we find acceptable, or at all.

If we are unable to develop suitable potential products through internal research programs or by obtaining rights from third parties, it could have a material adverse effect on our business, financial condition and results of operations.

We may acquire other businesses which could require significant management attention, disrupt our business, dilute stockholder value and adversely affect our results of operations.

As part of our business strategy, we may in the future make acquisitions or investments in complementary companies, products or technologies that we believe fit within our business model and can address the needs of our customers and potential customers. In the future, we may not be able to acquire and integrate other companies, products or technologies in a successful manner. We may not be able to find suitable acquisition candidates, and we may not be able to complete such acquisitions on favorable terms, if at all. In addition, the pursuit of potential acquisitions may divert the attention of management and cause us to incur additional expenses in identifying, investigating and pursuing suitable acquisitions, whether or not they are consummated. If we do complete acquisitions, we may not ultimately strengthen our competitive position or achieve our goals, including increases in revenue, and any acquisitions we complete could be viewed negatively by our customers, investors and industry analysts.

Future acquisitions may reduce our cash available for operations and other uses and could result in amortization expense related to identifiable assets acquired. We may have to pay cash, incur debt or issue equity securities to pay for any such acquisition, each of which could adversely affect our financial condition or the value of our common stock. The sale or issuance of equity to finance any such acquisitions would result in dilution to our stockholders. The incurrence of indebtedness to finance any such acquisition would result in fixed obligations and could also include covenants or other restrictions that could impede our ability to manage our operations. In addition, our future results of operations may be adversely affected by the dilutive effect of an acquisition, performance earn-outs or contingent bonuses associated with an acquisition. Furthermore, acquisitions may require large, one-time charges and can result in increased debt or contingent liabilities, adverse tax consequences, additional stock-based compensation expenses and the recording and subsequent amortization of amounts related to certain purchased intangible assets, any of which items could negatively affect our future results of operations. We may also incur goodwill impairment charges in the future if we do not realize the expected value of any such acquisitions.

Also, the anticipated benefit of any strategic alliance, joint venture or acquisition may not materialize, or such strategic alliance, joint venture or acquisition may be prohibited. In February 2018, we entered into the Loan and Security Agreement. The Loan and Security Agreement restricts our ability to pursue certain mergers, acquisitions, amalgamations or consolidations that we may believe to be in our best interest. Additionally, future acquisitions or dispositions could result in potentially dilutive issuances of our equity securities, the incurrence of debt, contingent liabilities or amortization expenses or write-offs of goodwill, any of which could harm our financial condition. We cannot predict the number, timing or size of future joint ventures or acquisitions, or the effect that any such transactions might have on our operating results.

Economic conditions may adversely affect our business.

Adverse worldwide economic conditions may negatively impact our business. A significant change in the liquidity or financial condition of our customers could cause unfavorable trends in their purchases and also in our receivable collections, and additional allowances may be required, which could adversely affect our business, financial condition and results of operations. Adverse worldwide economic conditions may also adversely impact our suppliers' ability to provide us with materials and components, which could have a material adverse effect on our business, financial condition and results of operations.

Disasters and other business disruptions could seriously harm our future revenue and financial condition and increase our costs and expenses.

Our operations and one or more markets in which we operate, could be subject to earthquakes, fires, medical epidemics and pandemics (including expectations about them), power shortages, telecommunications failures, water shortages, floods, hurricanes, typhoons, shifting climate patterns, extreme weather conditions, and other natural or man-made disasters or business interruptions, for which we are predominantly self-insured. As well, we rely on: (i) third-party manufacturers to produce various components that are integrated into our products; (ii) third-party distributors to distribute our products; and (iii) hospitals to purchase our products. Our ability to obtain supplies of components and to distribute and sell our finished products could be disrupted if the operations of these suppliers, distributors, or hospitals were materially affected by any such natural or man-made disaster or other business interruption.

The recent outbreak of the SARS-COV-2 virus (coronavirus) is creating uncertainty in the markets, our operations, our supply chain and the general public, given that none of the duration, scope or impact of the outbreak can be predicted. A broad, sustained outbreak of COVID-19 would negatively impact our results if: (i) our supply of product components or ability to distribute our products, is materially reduced despite our efforts to manage potential supply-chain disruption; (ii) an outbreak materially impacts our headquarters and manufacturing operations for a sustained period of time; (iii) hospitals are required to allocate resources to care of patients with COVID-19 and defer treatment of procedures utilizing our products; and/or (iv) patients elect to defer treatment for procedures utilizing our products due to real or perceived concerns about the potential spread of coronavirus in hospital settings. The related financial impact of the coronavirus, however, cannot be reasonably estimated at this time.

In addition, our corporate headquarters and manufacturing facilities are located in Santa Clara, California, near major earthquake faults and fire zones, and the ultimate impact on us of being located near major earthquake faults and fire zones and being consolidated in a certain geographical area is unknown at this time.

The occurrence of any of these natural or man-made disasters or other business disruptions could seriously harm our operations and financial condition and increase our costs and expenses.

Risks Related to Government Regulation and Our Industry

If we fail to comply with U.S. federal and state fraud and abuse and other healthcare laws and regulations, including those relating to kickbacks and false claims for reimbursement, we could face substantial penalties and our business operations and financial condition could be adversely affected.

Healthcare providers and third-party payors play a primary role in the distribution, recommendation, ordering and purchasing of any medical device for which we have or obtain marketing clearance or approval. Through our arrangements with principal investigators, healthcare professionals, third-party payors and customers, we are exposed to broadly applicable anti-fraud and abuse, anti-kickback, false claims and other healthcare laws and regulations that may constrain our business, our arrangements and relationships with customers, and how we market, sell and distribute our marketed medical devices. We have a compliance program, Code of Conduct and associated policies and procedures, but it is not always possible to identify and deter misconduct by our employees and other third parties, and the precautions we take to detect and prevent noncompliance may not be effective in protecting us from governmental investigations for failure to comply with applicable fraud and abuse or other healthcare laws and regulations.

In the United States, we are subject to various state and federal anti-fraud and abuse laws, including, without limitation, the federal healthcare Anti-Kickback Statute ("Anti-Kickback Statute") and federal civil False Claims Act. There are similar laws in other countries. Our relationships and our distributors' relationships with physicians, other health care professionals and hospitals are subject to scrutiny under these laws.

Healthcare fraud and abuse laws and related regulations are complex, and even minor irregularities can potentially give rise to claims that a statute or prohibition has been violated. The laws that may affect our ability to operate include:

- the Anti-Kickback Statute, which prohibits, among other things, knowingly and willingly soliciting, offering, receiving or paying remuneration, directly or indirectly, overtly or covertly, in cash or in kind, to induce or reward either the referral of an individual, or the purchase, order or recommendation of, items or services for which payment may be made, in whole or in part, under a federal healthcare program, such as the Medicare and Medicaid programs. The term "remuneration" has been broadly interpreted to include anything of value, and the government can establish a violation of the Anti-Kickback Statute without proving that a person or entity had actual knowledge of the law or a specific intent to violate. In addition, the government may assert that a claim, including items or services resulting from a violation of the Anti-Kickback Statute, constitutes a false or fraudulent claim for purposes of the federal civil False Claims Act. The Anti-Kickback Statute is subject to evolving interpretations and has been applied by government enforcement officials to a number of common business arrangements in the medical device industry. There are a number of statutory exceptions and regulatory safe harbors protecting certain business arrangements from prosecution under the Anti-Kickback Statute; however, those exceptions and safe harbors are drawn narrowly, and there may be limited or no exception or safe harbor for many common business activities, such as reimbursement support programs, educational and research grants or charitable donations. Practices that involve remuneration to those who prescribe, purchase or recommend medical devices, including discounts, providing items or services for free or engaging such individuals as consultants, advisors or speakers, may be subject to scrutiny if they do not fit squarely within an exception or safe harbor and would be subject to a facts and circumstances analysis to determine compliance with the Anti-Kickback Statute. Our practices, such as the loan, consignment, or purchase of certain components of our IVL System to customers, may not in all cases meet all of the criteria for statutory exception or regulatory safe harbor protection from anti-kickback liability. In October 2019, the federal government published two proposed regulations that would create new safe harbors for (among other things) certain value-based arrangements and patient engagement tools, and modify and clarify the scope of existing safe harbors for warranties and personal service agreements; even if it is finalized, the impact of the proposed regulation on our operations is not yet clear.
- federal civil and criminal false claims laws, including the federal civil False Claims Act, and civil monetary penalties laws, which prohibits, among other things, persons or entities from knowingly presenting, or causing to be presented, a false or fraudulent claim for payment of government funds and knowingly making, using or causing to be made or used, a false record or statement to get a false claim paid or to avoid, decrease or conceal an obligation to pay money to the federal government. A claim including items or services resulting from a violation of the Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the federal civil False Claims Act. Actions under the federal civil False Claims Act may be brought by the government or as a *qui tam* action by a private individual in the name of the government. These individuals, sometimes known as "relators" or, more commonly, as "whistleblowers," may share in any amounts paid by the entity to the government in fines or settlement. Many pharmaceutical and medical device manufacturers have been

investigated and have reached substantial financial settlements with the federal government under the federal civil False Claims Act for a variety of alleged improper activities, including causing false claims to be submitted as a result of the marketing of their products for unapproved and thus non-reimbursable uses and interactions with prescribers and other customers, including those that may have affected their billing or coding practices and submission of claims to the federal government. Federal civil False Claims Act liability is potentially significant in the healthcare industry because the statute provides for treble damages and mandatory monetary penalties for each false or fraudulent claim or statement. Because of the potential for large monetary exposure, healthcare and medical device companies often resolve allegations without admissions of liability for significant and material amounts to avoid the uncertainty of treble damages and per claim penalties that may be awarded in litigation proceedings.

- HIPAA, which imposes criminal and civil liability for, among other actions, knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program, including private third-party payors, or knowingly and willfully falsifying, concealing or covering up a material fact or making a materially false, fictitious or fraudulent statement or representation, or making or using any false writing or document knowing the same to contain any materially false, fictitious or fraudulent statement or entry in connection with the delivery of or payment for healthcare benefits, items or services;
- HIPAA, as amended by HITECH Act, and their implementing regulations, also impose obligations, including mandatory contractual terms, on covered entities subject to the rule, such as health plans, healthcare clearinghouses and certain healthcare providers, as well as their business associates that perform certain services for them or on their behalf involving the use or disclosure of individually identifiable health information with respect to safeguarding the privacy, security and transmission of individually identifiable health information. We believe we are not a covered entity for purposes of HIPAA, and we believe that we generally do not conduct our business in a manner that would cause us to be a business associate under HIPAA;
- the federal Physician Payments Sunshine Act, also known as Open Payments, which requires manufacturers of drugs, devices, biologics and medical supplies for which payment is available under Medicare, Medicaid or the Children's Health Insurance Program to report annually, with certain exceptions to the CMS, information related to payments or other "transfers of value" made to physicians and teaching hospitals, and requires applicable manufacturers and group purchasing organizations to report annually to CMS ownership and investment interests held by physicians and their immediate family members. Beginning in 2022, applicable manufacturers also will be required to report information regarding payments and transfers of value provided to physician assistants, nurse practitioners, clinical nurse specialists, certified nurse anesthetists and certified nurse-midwives; and
- analogous state and foreign law equivalents of each of the above federal laws, such as anti-kickback and false claims laws which may apply to items or services reimbursed by any third-party payor, including commercial insurers; state laws that require medical device companies to comply with the industry's voluntary compliance guidelines and the applicable compliance guidance promulgated by the federal government or otherwise restrict payments that may be made to healthcare providers and other potential referral sources; state beneficiary inducement laws, which are state laws that require medical device manufacturers to report information related to payments and other transfers of value to physicians and other healthcare providers or marketing expenditures; and state and foreign laws governing the privacy and security of health information in certain circumstances, many of which differ from each other in significant ways and may not have the same effect, thus complicating compliance efforts.

State and federal regulatory and enforcement agencies continue to actively investigate violations of healthcare laws and regulations, and the U.S. Congress continues to strengthen the arsenal of enforcement tools. Most recently, the Bipartisan Budget Act of 2018 ("BBA") increased the criminal and civil penalties that can be imposed for violating certain federal health care laws, including the Anti-Kickback Statute. Enforcement agencies also continue to pursue novel theories of liability under these laws. In particular, government agencies recently have increased regulatory scrutiny and enforcement activity with respect to manufacturer reimbursement support activities and patient support programs, including bringing criminal charges or civil enforcement actions under the Anti-Kickback Statute, federal civil False Claims Act and HIPAA's healthcare fraud and privacy provisions.

Because of the breadth of these laws and the narrowness of the statutory exceptions and regulatory safe harbors available under such laws, it is possible that some of our business activities, including certain sales and marketing practices of our marketed IVL System, including the IVL generator, connector cable and catheter, and financial arrangements with physicians, other healthcare providers, and other customers, could be subject to challenge under one or more such laws. For example, in the United States, in many instances we generally loan for free to customers both the reusable IVL generator and

connector cable so long as the customer is purchasing our single-use catheters. Customers also have the option to purchase the IVL generator and connector cable either at the initiation of the relationship or following the consignment period. Additionally, we consign catheters to our customers, free of charge, until a catheter is used at which time the customer is billed for the catheter. The Anti-Kickback Statute includes, among others, space and equipment rental safe harbors. These safe harbors require, among other things, that the aggregate payment between the parties is set in advance and consistent with fair market value. As the IVL generator and connector cable are provided for free, and no payment is made for storage of our catheters at customers' facilities, these arrangements will likely not satisfy these or other safe harbors or statutory exceptions. Therefore, if these arrangements were investigated, they would be subject to a facts and circumstances analysis to determine whether they include prohibited remuneration under the Anti-Kickback Statute. If an arrangement were deemed to violate the Anti-Kickback Statute, it may also subject us to violations under other fraud and abuse laws such as the federal civil False Claims Act and civil monetary penalties laws. Moreover, such arrangements could be found to violate comparable state fraud and abuse laws.

Achieving and sustaining compliance with applicable federal and state anti-fraud and abuse laws may prove costly. If we or our employees are found to have violated any of the above laws we may be subjected to substantial criminal, civil and administrative penalties, including imprisonment, exclusion from participation in federal healthcare programs, such as Medicare and Medicaid, and significant fines, monetary penalties, forfeiture, disgorgement and damages, contractual damages, reputational harm, administrative burdens, diminished profits and future earnings and the curtailment or restructuring of our operations, any of which could adversely affect our ability to operate our business and our financial results. Any action or investigation against us for the violation of these healthcare fraud and abuse laws, even if successfully defended, could result in significant legal expenses and could divert our management's attention from the operation of our business. Companies settling federal civil False Claims Act, Anti-Kickback Statute or civil monetary penalties law cases also may be required to enter into a Corporate Integrity Agreement with the OIG in order to avoid exclusion from participation (i.e., loss of coverage for their products) in federal healthcare programs such as Medicare and Medicaid. Corporate Integrity Agreements typically impose substantial costs on companies to ensure compliance. Defending against any such actions can be costly, time-consuming and may require significant personnel resources, and may have a material adverse effect on our business, financial condition and results of operations.

We are subject to numerous laws and regulations related to anti-bribery and anti-corruption laws, such as the FCPA and the U.K. Bribery Act, in which violations of these laws could result in substantial penalties and prosecution.

For our sales and operations outside the United States, we are similarly subject to various heavily-enforced anti-bribery and anti-corruption laws, such as the FCPA, U.K. Bribery Act and similar laws around the world. These laws generally prohibit U.S. companies and their employees and intermediaries from offering, promising, authorizing or making improper payments to foreign government officials for the purpose of obtaining or retaining business or gaining any advantage. We face significant risks if we, which includes our third-party business partners and intermediaries, fail to comply with the FCPA or other anti-corruption and anti-bribery laws.

We leverage various third parties to conduct our business and sell our products abroad, including to government owned universities and hospitals. We, our distributors and our other third-party intermediaries may have direct or indirect interactions with officials and employees of government agencies or state-owned or affiliated entities (such as in the context of obtaining government approvals, registrations or licenses or sales to government owned or controlled healthcare facilities, universities, institutes, clinics, etc.) and may be held liable for the corrupt or other illegal activities of these third-party business partners and intermediaries, our employees, representatives, contractors, partners and agents, even if we do not explicitly authorize such activities. In many foreign countries, particularly in countries with developing economies, it may be a local custom that businesses engage in practices that are prohibited by the FCPA or other applicable laws and regulations. To that end, while we have adopted and implemented internal control policies and procedures and employee training and compliance programs to deter prohibited practices, such compliance measures ultimately may not be effective in prohibiting our employees, contractors, business partners, intermediaries or agents from violating or circumventing our policies and/or the law.

Responding to any enforcement action or related investigation may result in a materially significant diversion of management's attention and resources and significant defense costs and other professional fees. Any violation of the FCPA or other applicable anti-bribery, anti-corruption or anti-money laundering laws could result in whistleblower complaints, adverse media coverage, investigations, loss of export privileges, severe criminal or civil sanctions and, in the case of the FCPA, suspension or debarment from U.S. government contracts, which could have a material and adverse effect on our business, financial condition and results of operations.

Regulatory compliance is expensive, complex and uncertain, and a failure to comply could lead to enforcement actions against us and other negative consequences for our business.

The FDA and similar agencies regulate our products as medical devices. Complying with these regulations is costly, time-consuming, complex and uncertain. For instance, before a new medical device, or a new intended use for, an existing device can be marketed in the United States, a company must first submit and receive either 510(k) clearance or approval of a PMA from the FDA, unless an exemption applies. FDA regulations and regulations of similar agencies are wide-ranging and include, among other things, oversight of:

- product design, development, manufacturing (including suppliers) and testing;
- laboratory, preclinical and clinical studies;
- product safety and effectiveness;
- product labeling;
- product storage and shipping;
- record keeping;
- pre-market clearance or approval;
- marketing, advertising and promotion;
- product sales and distribution;
- product changes;
- product recalls; and
- post-market surveillance and reporting of deaths or serious injuries and certain malfunctions.

Our current products are subject to extensive regulation by the FDA and non-U.S. regulatory agencies. Further, all of our potential products and improvements of our current products will be subject to extensive regulation and will likely require permission from regulatory agencies and ethics boards to conduct clinical trials and clearance or approval from the FDA and non-U.S. regulatory agencies prior to commercial sale and distribution. Failure to comply with applicable U.S. requirements regarding, for example, promoting, manufacturing or labeling our products, may subject us to a variety of administrative or judicial actions and sanctions, such as Form 483 observations, warning letters, untitled letters, product recalls, product seizures, total or partial suspension of production or distribution, injunctions, fines, civil penalties and criminal prosecution.

The FDA can also refuse to clear or approve pending applications. Any enforcement action by the FDA and other comparable non-U.S. regulatory agencies could have a material adverse effect on our business, financial condition and results of operations.

Our failure to comply with applicable regulatory requirements could result in enforcement action by the FDA or state agencies, which may include any of the following actions:

- untitled letters, warning letters, fines, injunctions, consent decrees and civil penalties;
- unanticipated expenditures to address or defend such actions;
- customer notifications for repair, replacement or refunds;
- recall, detention or seizure of our products;
- operating restrictions or partial suspension or total shutdown of production;
- refusing or delaying our requests for 510(k) clearance or PMA approval of new products or modified products;
- operating restrictions;
- withdrawing 510(k) clearances or PMA approvals that have already been granted;
- refusal to grant export approval for our products; or
- criminal prosecution.

If any of these events were to occur, it would have a material and adverse effect on our business, financial condition and results of operations.

We may not be able to obtain the necessary clearances or approvals or may be unduly delayed in doing so, which could harm our business. Furthermore, even if we are granted regulatory clearances or approvals, they may include significant limitations on the indicated uses for the product, which may limit the market for the product. Although we have obtained 510(k) clearance to market our M5 and S4 catheters, our clearance can be revoked if safety or efficacy problems develop.

The FDA also regulates the advertising and promotion of our products to ensure that the claims we make are consistent with our regulatory clearances and approvals, that there are adequate and reasonable data to substantiate the claims and that our promotional labeling and advertising is neither false nor misleading in any respect. If the FDA determines that any of our advertising or promotional claims are misleading, not substantiated or not permissible, we may be subject to enforcement actions, including warning letters, and we may be required to revise our promotional claims and make other corrections or restitutions.

Our medical device operations are subject to pervasive and continuing FDA regulatory requirements.

Medical devices regulated by the FDA are subject to "general controls" which include: registration with the FDA; listing commercially distributed products with the FDA; complying with cGMPs under QSR; filing reports with the FDA of and keeping records relative to certain types of adverse events associated with devices under the medical device reporting regulation; assuring that device labeling complies with device labeling requirements; reporting certain device field removals and corrections to the FDA; and obtaining pre-market notification 510(k) clearance for devices prior to marketing. Some devices known as "510(k)-exempt" devices can be marketed without prior marketing-clearance or approval from the FDA. In addition to the "general controls," some Class II medical devices are also subject to "special controls," including adherence to a particular guidance document and compliance with the performance standard. Instead of obtaining 510(k) clearance, most Class III devices are subject to PMA. Our C2 catheters for the treatment of CAD is designated as a Class III product and will follow the PMA process. As a Company, we do not have prior experience in obtaining PMA approval.

The medical device industry is now experiencing greater scrutiny and regulation by federal, state and foreign governmental authorities. Companies in our industry are subject to more frequent and more intensive reviews and investigations, often involving the marketing, business practices and product quality management. Such reviews and investigations may result in civil and criminal proceedings; the imposition of substantial fines and penalties; the receipt of warning letters, untitled letters, demands for recalls or the seizure of our products; the requirement to enter into corporate integrity agreements, stipulated judgments or other administrative remedies; and result in our incurring substantial unanticipated costs and the diversion of key personnel and management's attention from their regular duties, any of which may have a material and adverse effect on our business, financial condition and results of operations, and may result in greater and continuing governmental scrutiny of our business in the future.

Additionally, federal, state and foreign governments and entities have enacted laws and issued regulations and other standards requiring increased visibility and transparency of our interactions with healthcare providers. For example, Open Payments requires us to annually report to CMS payments and other transfers of value to all U.S. physicians and U.S. teaching hospitals, with the reported information made publicly available on a searchable website. Failure to comply with these legal and regulatory requirements could impact our business, and we have had and will continue to spend substantial time and financial resources to develop and implement enhanced structures, policies, systems and processes to comply with these legal and regulatory requirements, which may also impact our business and which could have a material adverse effect on our business, financial condition and results of operations.

Product clearances and approvals can often be denied or significantly delayed.

Under FDA regulations, unless exempt, a new medical device may only be commercially distributed after it has received 510(k) clearance, is authorized through the *de novo* classification process or is the subject of an approved PMA. The FDA will clear marketing of a medical device through the 510(k) process if it is demonstrated that the new product is substantially equivalent to another legally marketed product not subject to a PMA. Sometimes, a 510(k) clearance must be supported by preclinical and clinical data.

The PMA process typically is more costly, lengthy and stringent than the 510(k) process. Unlike a 510(k) review, which determines "substantial equivalence," a PMA requires that the applicant demonstrate reasonable assurance that the device is safe and effective by producing valid scientific evidence, including data from preclinical studies and human clinical

trials. Therefore, to obtain regulatory clearance or approvals, we typically must, among other requirements, provide the FDA and similar foreign regulatory authorities with preclinical and clinical data that demonstrate to their satisfaction that our products satisfy the criteria for approval. Preclinical testing and clinical trials must comply with the regulations of the FDA and other government authorities in the United States and similar agencies in other countries.

We may be required to obtain PMAs, PMA supplements or additional 510(k) pre-market clearances to market modifications to our existing products. The FDA requires device manufacturers to make and document a determination of whether a modification requires approval or clearance; however, the FDA can review a manufacturer's decision. The FDA may not agree with our decisions not to seek approvals or clearances for particular device modifications. If the FDA requires us to obtain PMAs, PMA supplements or pre-market clearances for any modification to a previously cleared or approved device, we may be required to cease manufacturing and marketing of the modified device and perhaps also to recall such modified device until we obtain FDA clearance or approval. We may also be subject to significant regulatory fines or penalties.

The FDA may not approve our current or future PMA applications or supplements or clear our 510(k) applications on a timely basis or at all. Such delays or refusals could have a material adverse effect on our business, financial condition and results of operations.

The FDA may also change its clearance and approval policies, adopt additional regulations or revise existing regulations, or take other actions which may prevent or delay approval or clearance of our products under development or impact our ability to modify our currently approved or cleared products on a timely basis. Any of these actions could have a material adverse effect on our business, financial condition and results of operations.

International regulatory approval processes may take more or less time than the FDA clearance or approval process. If we fail to comply with applicable FDA and comparable non-U.S. regulatory requirements, we may not receive regulatory clearances or approvals or may be subject to FDA or comparable non-U.S. enforcement actions. We may be unable to obtain future regulatory clearance or approval in a timely manner, or at all, especially if existing regulations are changed or new regulations are adopted. For example, the FDA clearance or approval process can take longer than anticipated due to requests for additional clinical data and changes in regulatory requirements. A failure or delay in obtaining necessary regulatory clearances or approvals would materially adversely affect our business, financial condition and results of operations.

Although we have obtained regulatory clearance for our M5 and S4 catheters for the treatment of PAD in the United States, and our M5 and S4 catheters for the treatment of PAD and our C2 catheter for the treatment of CAD in certain non-U.S. jurisdictions, they will remain subject to extensive regulatory scrutiny.

Although our M5 and S4 catheters for the treatment of PAD have obtained regulatory clearance in the United States, and our M5 and S4 catheters for the treatment of PAD and C2 catheters for the treatment of CAD in certain non-U.S. jurisdictions have obtained applicable regulatory approvals, they will be subject to ongoing regulatory requirements for manufacturing, labeling, packaging, storage, advertising, promotion, sampling, record-keeping, conduct of post-marketing studies and submission of safety, effectiveness and other post-market information, including both federal and state requirements in the United States and requirements of comparable non-U.S. regulatory authorities.

Our manufacturing facility is required to comply with extensive requirements imposed by the FDA and comparable foreign regulatory authorities, including ensuring that quality control and manufacturing procedures conform to the QSR or similar regulations set by foreign regulatory authorities. As such, we will be subject to continual review and inspections to assess compliance with the QSR and adherence to commitments made in any 510(k) or PMA application. Accordingly, we continue to expend time, money and effort in all areas of regulatory compliance, including manufacturing, production and quality control.

Any regulatory clearances or approvals that we have received for our products will be subject to limitations on the cleared or approved indicated uses for which the product may be marketed and promoted, will be subject to the conditions of approval, or will contain requirements for potentially costly post-marketing testing. We are required to report certain adverse events and production problems, if any, to the FDA and comparable foreign regulatory authorities. Any new legislation addressing product safety issues could result in increased costs to assure compliance. The FDA and other agencies, including the DOJ, closely regulate and monitor the post-clearance or approval marketing and promotion of products to ensure that they are marketed and distributed only for the cleared or approved indications and in accordance with the provisions of the cleared or approved labeling. We have to comply with requirements concerning advertising and promotion for our products.

Promotional communications with respect to devices are subject to a variety of legal and regulatory restrictions and must be consistent with the information in the products' cleared or approved labeling. As such, we may not promote our products for indications or uses for which they do not have clearance or approval. For certain changes, to a cleared or approved product, including certain changes to product labeling, the holder of a cleared 510(k) or approved PMA application may be required to submit a new application and obtain clearance or approval. We train our marketing and sales force against promoting our products for uses outside of the cleared or approved indications for use, known as "off-label uses." However, physicians may use our products for off-label purposes and are allowed to do so when in the physician's independent professional medical judgment he or she deems it appropriate. If the FDA determines that our promotional materials or training constitute promotion of an off-label or other improper use, or that our internal policies and procedures are inadequate to prevent such off-label uses, it could subject us to regulatory or enforcement actions as discussed below.

If a regulatory agency discovers previously unknown problems with a product, such as adverse events of unanticipated severity or frequency, or problems with our facility where the product is manufactured or disagrees with the promotion, marketing or labeling of a product, such regulatory agency may impose restrictions on that product or us, including requiring withdrawal of the product from the market. If we fail to comply with applicable regulatory requirements, a regulatory agency or enforcement authority may, among other things:

- subject our facility to an adverse inspectional finding or Form 483, or other compliance or enforcement notice, communication or correspondence;
- issue warning or untitled letters that would result in adverse publicity or may require corrective advertising;
- impose civil or criminal penalties;
- suspend or withdraw regulatory clearances or approvals;
- refuse to clear or approve pending applications or supplements to approved applications submitted by us;
- impose restrictions on our operations, including closing our sub-assembly suppliers' facilities;
- seize or detain products; or
- require a product recall.

In addition, violations of the Federal Food, Drug and Cosmetic Act ("FD&C Act"), relating to the promotion of approved products may lead to investigations alleging violations of federal and state healthcare fraud and abuse and other laws, as well as state consumer protection laws.

Any government investigation of alleged violations of law could require us to expend significant time and resources in response, and could generate negative publicity. Any failure to comply with ongoing regulatory requirements may significantly and adversely affect our ability to commercialize and generate revenue from our products. If regulatory sanctions are applied or if regulatory clearance or approval is withdrawn, it would have a material adverse effect on our business, financial condition and results of operations.

Even though we have received breakthrough device designation for our C² catheter for lithotripsy-enabled, low pressure dilatation of calcified, stenotic de novo coronary arteries prior to stenting, such designation may not expedite the development or review of the C² catheter and does not provide assurance ultimately of PMA submission or approval by FDA.

The Breakthrough Devices Program is a voluntary program intended to expedite the review, development, assessment and review of certain medical devices that provide for more effective treatment or diagnosis of life-threatening or irreversibly debilitating human diseases or conditions for which no approved or cleared treatment exists or that offer significant advantages over existing approved or cleared alternatives. All submissions for devices designated as Breakthrough Devices will receive priority review, meaning that the review of the submission is placed at the top of the appropriate review queue and receives additional review resources, as needed.

Although breakthrough designation or access to any other expedited program may expedite the development or approval process, it does not change the standards for approval. Although we obtained breakthrough device designation for the C² catheter for the CAD indication, we may not experience faster development timelines or achieve faster review or approval compared to conventional FDA procedures. For example, the time required to identify and resolve issues relating to manufacturing and controls, the acquisition of a sufficient supply of our product for clinical trial purposes or the need to conduct additional nonclinical or clinical studies may delay approval by the FDA, even if the product qualifies for

breakthrough designation or access to any other expedited program. Access to an expedited program may also be withdrawn by the FDA if it believes that the designation is no longer supported by data from our clinical development program. Additionally, qualification for any expedited review procedure does not ensure that we will ultimately obtain regulatory approval for such product.

Our products may be subject to recalls after receiving FDA or foreign approval or clearance, which could divert managerial and financial resources, harm our reputation and adversely affect our business.

The FDA and similar foreign governmental authorities have the authority to require the recall of our products because of any failure to comply with applicable laws and regulations, or defects in design or manufacture. A government mandated or voluntary product recall by us could occur because of, for example, component failures, device malfunctions or other adverse events, such as serious injuries or deaths, or quality-related issues, such as manufacturing errors or design or labeling defects. Any future recalls of our products could divert managerial and financial resources, harm our reputation and adversely affect our business.

If we initiate a correction or removal for one of our devices to reduce a risk to health posed by the device, we would be required to submit a publicly available Correction and Removal report to the FDA and, in many cases, similar reports to other regulatory agencies. This report could be classified by the FDA as a device recall which could lead to increased scrutiny by the FDA, other international regulatory agencies and our customers regarding the quality and safety of our devices. Furthermore, the submission of these reports has been and could be used by competitors against us in competitive situations and cause customers to delay purchase decisions or cancel orders and would harm our reputation. In July 2018, we initiated and subsequently completed a voluntary recall of our S^4 catheters after seeing a higher instance of leaks in the balloon, which prevented the balloon from staying inflated at four atm for the full course of lithotripsy application. While there were no patient safety issues reported and no reports of adverse clinical events related to this issue and the issue has been corrected, we believe it was prudent to suspend utilization of the device and recall the product while we determined the cause of the leak.

In addition, we are subject to medical device reporting regulations that require us to report to the FDA or similar foreign governmental authorities if one of our products may have caused or contributed to a death or serious injury or if we become aware that it has malfunctioned in a way that would likely cause or contribute to a death or serious injury if the malfunction recurred. Failures to properly identify reportable events or to file timely reports, as well as failure to address each of the observations to the FDA's satisfaction, can subject us to sanctions and penalties, including warning letters and recalls. Physicians, hospitals and other healthcare providers may make similar reports to regulatory authorities. Any such reports may trigger an investigation by the FDA or similar foreign regulatory bodies, which could divert managerial and financial resources, harm our reputation and have a material adverse effect on our business, financial condition and results of operations.

If we or our suppliers fail to comply with the FDA's Quality System Regulation or any applicable state equivalent, our operations could be interrupted and our potential product sales and operating results could suffer.

Our manufacturing processes and those of our third-party suppliers are required to comply with the FDA's QSR, which covers the design controls, document controls, purchasing controls, identification and traceability, production and process controls, acceptance activities, nonconforming product requirements, corrective and preventive action requirements, labeling and packaging controls, handling, storage, distribution and installation requirements, complaint handling, records requirements, servicing requirements and statistical techniques potentially applicable to the production of our medical devices. We and our suppliers are also subject to the regulations of foreign jurisdictions regarding the manufacturing process where we market products overseas. In addition, we must engage in extensive recordkeeping and reporting and must make available our manufacturing facilities and records for periodic announced or unannounced inspections by governmental agencies, including the FDA, state authorities and comparable agencies in other countries. If we experience an unsuccessful Quality System inspection, our operations could be disrupted and our manufacturing could be interrupted. Failure to take adequate corrective action in response to an adverse Quality System inspection could result in, among other things, a shut-down of our manufacturing operations, significant fines, suspension of marketing clearances and approvals, seizures or recalls of our device, operating restrictions and criminal prosecutions, any of which would cause our business to suffer. Furthermore, our key component suppliers may not currently be or may not continue to be in compliance with applicable regulatory requirements, which may result in manufacturing delays for our product and cause our revenue to decline.

We have registered with the FDA as a medical device manufacturer and have obtained a manufacturing license from the California Department of Health Services ("CDHS"). We anticipate that we and certain of our third-party component suppliers will be subject to FDA and CDHS inspections.

We completed the move of our production of our IVL catheters from our prior Fremont, California facility to our facility in Santa Clara, California in the second half of 2019. We produce all of our IVL catheters in-house at our facility in Santa Clara, California, which, together with our research and development, controlled environment room and office space, currently totals 35,000 square feet. Our Santa Clara facility has been inspected by the FDA and by the British Standards Institution ("BSI"). We can provide no assurance that we will continue to remain in compliance with QSR. If our facilities are found to be in noncompliance or fail to take satisfactory corrective action in response to adverse QSR inspectional findings, the FDA could take legal or regulatory enforcement actions against us and/or our products, including but not limited to the cessation of sales or the recall of distributed products, which could impair our ability to produce our products in a cost-effective and timely manner in order to meet our customers' demands. We may also be required to bear other costs or take other actions that may have a negative impact on our future sales and our ability to generate profits. Taking corrective action may be expensive, time-consuming and a distraction for management, and if we experience a shutdown or delay at our manufacturing facilities, we may be unable to produce our products, which would harm our business.

Current regulations depend heavily on administrative interpretation. If the FDA does not believe that we are in compliance with applicable FDA regulations, the agency could take legal or regulatory enforcement actions against us and/or our products. We are also subject to periodic inspections by the FDA and other governmental regulatory agencies, as well as certain third-party regulatory groups. Future interpretations made by the FDA or other regulatory bodies made during the course of these inspections may vary from current interpretations and may adversely affect our business and prospects. The FDA's and other comparable non-U.S. regulatory agencies' statutes, regulations or policies may change, and additional government regulation or statutes may be enacted, which could increase post-approval regulatory requirements, or delay, suspend or prevent marketing of any cleared or approved products or necessitate the recall of distributed products. We cannot predict the likelihood, nature or extent of adverse governmental regulation that might arise from future legislative or administrative action, either in the United States or abroad.

The medical device industry has been under heightened FDA scrutiny as the subject of government investigations and enforcement actions. If our operations and activities are found to be in violation of any FDA laws or any other governmental regulations that apply to us, we may be subject to penalties, including civil and criminal penalties, damages, fines and other legal and/or agency enforcement actions. Any penalties, damages, fines or curtailment or restructuring of our operations or activities could adversely affect our ability to operate our business and our financial results. The risk of us being found in violation of FDA laws is increased by the fact that many of these laws are broad and their provisions are open to a variety of interpretations. Any action against us for violation of these laws, even if we successfully defend ourselves against that action and its underlying allegations, could cause us to incur significant legal expenses and divert management's attention from the operation of our business. Where there is a dispute with a federal or state governmental agency that cannot be resolved to the mutual satisfaction of all relevant parties, we may determine that the costs, both real and contingent, are not justified by the commercial returns to us from maintaining the dispute or the product.

Various claims, design features or performance characteristics of our medical devices that we may regard as permitted by the FDA without marketing clearance or approval, may be challenged by the FDA or state or foreign regulators. The FDA or state or foreign regulatory authorities may find that certain claims, design features or performance characteristics, in order to be made or included in the products, may have to be supported by further studies and marketing clearances or approvals, which could be lengthy, costly and possibly unobtainable.

If any of our products cause or contribute to a death or a serious injury or malfunction in certain ways, we will be required to report under applicable medical device reporting regulations, which can result in voluntary corrective actions or agency enforcement actions.

Under FDA medical device reporting regulations ("MDR regulations"), medical device manufacturers are required to report to the FDA information that a device has or may have caused or contributed to a death or serious injury or has malfunctioned in a way that would likely cause or contribute to death or serious injury if the malfunction of the device or one of our similar devices were to recur. If we fail to report events required to be reported to the FDA within the required timeframes, or at all, the FDA could take enforcement action and impose sanctions against us. Any such adverse event involving our products also could result in future voluntary corrective actions, such as recalls or customer notifications, or agency action, such as inspection or enforcement action. Any corrective action, whether voluntary or involuntary, as well as

defending ourselves in a lawsuit, would require our time and capital, distract management from operating our business and may harm our reputation and have a material adverse effect on our business, financial condition and results of operations.

Healthcare reform initiatives and other administrative and legislative proposals may adversely affect our business, financial condition, results of operations and cash flows in our key markets.

There have been and continue to be proposals by the federal government, state governments, regulators and third-party payors to control or manage the increased costs of healthcare and, more generally, to reform the U.S. healthcare system. Certain of these proposals could limit the prices we are able to charge for our products or the coverage and reimbursement available for our products and could limit the acceptance and availability of our products. The adoption of proposals to control costs could have a material adverse effect on our business, financial condition and results of operations.

For example, in the United States, in March 2010, the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act of 2010, together, the Affordable Care Act ("ACA") was enacted. The ACA is a sweeping measure intended to expand healthcare coverage within the United States, primarily through the imposition of health insurance mandates on employers and individuals, the provision of subsidies to eligible individuals enrolled in plans offered on the health insurance exchanges and the expansion of the Medicaid program. The ACA has impacted existing government healthcare programs and has resulted in the development of new programs.

Certain provisions of the ACA have been subject to judicial challenges, as well as efforts to repeal or replace them or to alter their interpretation and implementation. For example, since January 2017, President Trump has signed Executive Orders and other directives designed to delay the implementation of certain provisions of the ACA or otherwise circumvent some of the requirements for health insurance mandated by the ACA. While Congress has not passed comprehensive repeal legislation, bills affecting the implementation of certain taxes under the ACA have been signed into law, including the Tax Cuts and Jobs Act, enacted on December 22, 2017 ("TCJA"), which includes a provision repealing, effective January 1, 2019, the tax-based shared responsibility payment imposed by the ACA on certain individuals who fail to maintain qualifying health coverage for all or part of a year that is commonly referred to as the "individual mandate." Further, the BBA, among other things, amended the ACA, effective January 1, 2019, to close the coverage gap in most Medicare drug plans, commonly referred to as the "donut hole." In December 2018, a United States District Court Judge for the Northern District of Texas ruled (i) that the "individual mandate" was unconstitutional as a result of the associated tax penalty being repealed by Congress as part of the TCJA; and (ii) the individual mandate is not severable from the rest of the ACA, and as a result the entire ACA is invalid. On December 18, 2019, the U.S. Court of Appeals for the Fifth Circuit affirmed the district court's decision that the individual mandate is unconstitutional, but remanded the case to the district court to reconsider the severability question. It is unclear how the ultimate decision in this case, or other efforts to repeal, replace, or invalidate the ACA or its implementing regulations, or portions thereof, will affect the ACA or our business.

In addition, other legislative changes have been proposed and adopted since the ACA was enacted. On August 2, 2011, the Budget Control Act of 2011 was signed into law, which, among other things, includes reductions to Medicare payments to providers of, on average, 2% per fiscal year, which went into effect on April 1, 2013 and, due to subsequent legislative amendments to the statute, including the BBA, will remain in effect through 2029 unless additional Congressional action is taken. On January 2, 2013, the American Taxpayer Relief Act of 2012 was signed into law, which, among other things, reduced Medicare payments to several providers, including hospitals, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years.

We cannot assure you that the ACA, as currently enacted or as amended in the future, will not harm our business and financial results, and we cannot predict how future federal or state legislative or administrative changes relating to healthcare reform will affect our business.

There likely will continue to be legislative and regulatory proposals at the federal and state levels directed at containing or lowering the cost of healthcare. We cannot predict the initiatives that may be adopted in the future or their full impact. The continuing efforts of the government, insurance companies, managed care organizations and other payors of healthcare services to contain or reduce costs of healthcare may harm:

- our ability to set a price that we believe is fair for our products;
- our ability to generate revenue and achieve or maintain profitability; and
- the availability of capital.

Further, recently there has been heightened governmental scrutiny over the manner in which manufacturers set prices for their marketed products, which has resulted in several U.S. Congressional inquiries and proposed and enacted federal legislation designed to bring transparency to product pricing and reduce the cost of products and services under government healthcare programs. While some of these measures may require additional authorization to become effective, Congress and the Trump administration have each indicated that it will continue to seek new legislative and/or administrative measures to control product costs. Additionally, individual states in the United States have also increasingly passed legislation and implemented regulations designed to control product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures. Moreover, regional healthcare authorities and individual hospitals are increasingly using bidding procedures to determine what products to purchase and which suppliers will be included in their healthcare programs. Adoption of price controls and other cost-containment measures, and adoption of more restrictive policies in jurisdictions with existing controls and measures may prevent or limit our ability to generate revenue and attain profitability.

Various new healthcare reform proposals are emerging at the federal and state level. Any new federal and state healthcare initiatives that may be adopted could limit the amounts that federal and state governments will pay for healthcare products and services, and could have a material adverse effect on our business, financial condition and results of operations.

Material modifications to our products may require new 510(k) clearances or pre-market approvals or may require us to recall or cease marketing our products until clearances or approvals are obtained.

Modifications that could significantly affect the safety and effectiveness of our approved or cleared products, such as changes to the intended use or technological characteristics of our products, will require new 510(k) clearances or PMAs or require us to recall or cease marketing the modified devices until these clearances or approvals are obtained. Based on FDA published guidelines, the FDA requires device manufacturers to initially make and document a determination of whether or not a modification requires a new approval, supplemental approval or clearance; however, the FDA can review a manufacturer's decision. Any modification to an FDA-cleared device that could significantly affect its safety or efficacy or that would constitute a major change in its intended use would require a new 510(k) clearance or possibly a PMA. For Class III products, changes that affect safety and effectiveness will require the submission and approval of a PMA supplement. We may not be able to obtain additional 510(k) clearances or PMAs for new products or for modifications to, or additional indications for, our products in a timely fashion, or at all. Delays in obtaining required future clearances or approvals would adversely affect our ability to introduce new or enhanced products in a timely manner, which in turn would harm our future growth. We have made modifications to our products in the past and expect to make additional modifications in the future that we believe do not or will not require additional clearances or approvals. If the FDA disagrees and requires new clearances or approvals for these modifications, we may be required to recall and to stop selling or marketing such products as modified, which could harm our operating results and require us to redesign such products. In these circumstances, we may be subject to significant enforcement actions.

Our employees, independent contractors, consultants, commercial partners, distributors and vendors may engage in misconduct or other improper activities, including noncompliance with regulatory standards and requirements.

We are exposed to the risk that our employees, independent contractors, consultants, commercial partners, distributors and vendors may engage in fraudulent or illegal activity. Misconduct by these parties could include intentional, reckless and/or negligent conduct or disclosure of unauthorized activities to us that violates: (i) the laws of the FDA and other similar foreign regulatory bodies, including those laws requiring the reporting of true, complete and accurate information to such regulators; (ii) manufacturing standards; (iii) healthcare fraud and abuse laws in the United States and similar foreign fraudulent misconduct laws; or (iv) laws that require the true, complete and accurate reporting of financial information or data. These laws may impact, among other things, future sales, marketing and education programs. In particular, the promotion, sales and marketing of healthcare items and services, as well as certain business arrangements in the healthcare industry, are subject to extensive laws designed to prevent fraud, kickbacks, self-dealing and other abusive practices. These laws and regulations may restrict or prohibit a wide range of pricing, discounting, marketing and promotion, structuring and commissions, certain customer incentive programs and other business arrangements generally. Activities subject to these laws also involve the improper use of information obtained in the course of patient recruitment for clinical trials.

We have adopted a code of business conduct and ethics, but it is not always possible to identify and deter misconduct by our employees and other third parties, and the precautions we take to detect and prevent these activities may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to be in compliance with such laws or regulations. If any such actions are instituted against us and we are not successful in defending ourselves or asserting our rights, those actions could result in the

imposition of significant fines or other sanctions, including the imposition of civil, criminal and administrative penalties, damages, monetary fines, disgorgement, individual imprisonment, additional integrity reporting and oversight obligations, possible exclusion from participation in Medicare, Medicaid and other federal healthcare programs, contractual damages, reputational harm, diminished profits and future earnings and curtailment of operations, any of which could adversely affect our ability to operate our business and our results of operations. Whether or not we are successful in defending against any such actions or investigations, we could incur substantial costs, including legal fees, and divert the attention of management in defending ourselves against any of these claims or investigations, which could have a material adverse effect on our business, financial condition and results of operations.

Environmental and health safety laws may result in liabilities, expenses and restrictions on our operations. Failure to comply with environmental laws and regulations could subject us to significant liability.

Federal, state, local and foreign laws regarding environmental protection, hazardous substances and human health and safety may adversely affect our business. Our research and development and manufacturing operations involve the use of hazardous substances and are subject to a variety of federal, state, local and foreign environmental laws and regulations relating to the storage, use, discharge, disposal and remediation of, as well as human exposure to, hazardous substances and the sale, labeling, collection, recycling, treatment and disposal of products containing hazardous substances. These operations are permitted by regulatory authorities, and the resultant waste materials are disposed of in material compliance with environmental laws and regulations. Using hazardous substances in our operations exposes us to the risk of accidental injury, contamination or other liability from the use, storage, importation, handling or disposal of hazardous materials. If our or our suppliers' operations result in the contamination of the environment or expose individuals to hazardous substances, we could be liable for damages and fines, and any liability could significantly exceed our insurance coverage and have a material adverse effect on our on our business, financial condition and results of operations. Liability under environmental laws and regulations can be joint and several and without regard to fault or negligence. Compliance with environmental laws and regulations may be expensive, and non-compliance could result in substantial liabilities, fines and penalties, personal injury and third-party property damage claims and substantial investigation and remediation costs. Environmental laws and regulations could become more stringent over time, imposing greater compliance costs and increasing risks and penalties associated with violations. We cannot assure you that violations of these laws and regulations will not occur in the future or have not occurred in the past as a result of human error, accidents, equipment failure or other causes. The expense associated with environmental regulation and remediation could harm our business, financial condition and results of operation.

We face risks related to our collection and use of data, which could result in investigations, inquiries, litigation, fines, legislative and regulatory action and negative press about our privacy and data protection practices.

Our business processes personal data, including some data related to health. When conducting clinical trials, we face risks associated with collecting trial participants' data, especially health data, in a manner consistent with applicable laws and regulations, such as the Common Rule, GCP guidelines, or FDA human subject protection regulations. We also face risks inherent in handling large volumes of data and in protecting the security of such data. We could be subject to attacks on our systems by outside parties or fraudulent or inappropriate behavior by our service providers or employees. Third parties may also gain access to users' accounts using stolen or inferred credentials, computer malware, viruses, spamming, phishing attacks or other means, and may use such access to obtain users' personal data or prevent use of their accounts. Data breaches could result in a violation of applicable U.S. and international privacy, data protection and other laws, and subject us to individual or consumer class action litigation and governmental investigations and proceedings by federal, state and local regulatory entities in the United States and by international regulatory entities, resulting in exposure to material civil and/or criminal liability. Further, our general liability insurance and corporate risk program may not cover all potential claims to which we are exposed and may not be adequate to indemnify us for all liability that may be imposed.

This risk is enhanced in certain jurisdictions and, as we expand our operations domestically and internationally, we may be subject to additional laws in other jurisdictions. Any failure, or perceived failure, by us to comply with privacy and data protection laws, rules and regulations could result in proceedings or actions against us by governmental entities or others. These proceedings or actions may subject us to significant penalties and negative publicity, require us to change our business practices, increase our costs and severely disrupt our business. For example, in the United States, California recently adopted the CCPA, which will come into effect beginning in January 2020 and will, among other things, require new disclosures to California consumers and afford such consumers new abilities to opt out of certain sales of personal information, in addition to severely limiting our ability to use their information. It remains unclear how various provisions of the CCPA will be interpreted and enforced. The effects of the CCPA are potentially significant, and may require us to modify our data processing practices and policies and to incur substantial costs and expenses in an effort to comply. In addition, the GDPR, which became effective in May 2018, applies extraterritorially and imposes several stringent requirements for

controllers and processors of personal data, including, for example, higher standards for obtaining consent from individuals to process their personal data, more robust disclosures to individuals and a strengthened individual data rights regime, shortened timelines for data breach notifications, limitations on retention of information, increased requirements pertaining to special categories of personal data and pseudonymized (i.e., key-coded) data and additional obligations when we contract third-party processors in connection with the processing of the personal data. The GDPR provides that European Union ("EU") member states may make their own laws and regulations limiting the (i) processing of personal data, including special categories of data (e.g., racial or ethnic origin, political opinions, religious or philosophical beliefs) and (ii) profiling and automated individual decision-making of individuals, which could limit our ability to use and share personal data or other data and could cause our costs to increase, harming our business and financial condition. Non-compliance with GDPR is subject to significant penalties, including fines of up to €20 million or 4% of total worldwide revenue. The interpretations of the GDPR by local data protection authorities in EU member states, along with the complexity of the new data protection regime itself, will leave the interpretation and enforcement of the law unclear in the near term, with potential inconsistencies across the EU member states. The implementation and enforcement of the GDPR may subject us to enforcement risk and requirements to change certain of our data collection, processing and other policies and practices. We could incur significant costs investigating and defending such claims and, if we are found liable, significant damages. If any of these events were to occur, our business and financial results could be adversely affected. Other jurisdictions outside the EU are similarly introducing or enhancing laws and regulations relating to privacy and data security, which enhances risks relating to compliance with such laws.

Additionally, we are subject to laws and regulations regarding cross-border transfers of personal data, including laws relating to transfer of personal data outside of the European Economic Area ("EEA"). We rely on transfer mechanisms permitted under these laws, including EU Standard Contract Clauses. Such mechanisms have received heightened regulatory and judicial scrutiny in recent years. If we cannot rely on existing mechanisms for transferring personal data from the EEA, the United Kingdom or other jurisdictions, we could be prevented from transferring personal data of users or employees in those regions. This could adversely affect the manner in which we provide our services and thus materially affect our operations and financial results.

Legislative or regulatory reforms may make it more difficult and costly for us to obtain regulatory clearance or approval of our planned or future products and to manufacture, market and distribute our products after clearance or approval is obtained.

From time to time, legislation is drafted and introduced in Congress that could significantly change the statutory provisions governing the regulatory approval, manufacture and marketing of regulated products or the reimbursement thereof. In addition, FDA regulations and guidance are often revised or reinterpreted by the FDA in ways that may significantly affect our business and our products. Any new regulations or revisions or reinterpretations of existing regulations may impose additional costs or lengthen review times of planned or future products. It is impossible to predict whether legislative changes will be enacted or FDA regulations, guidance or interpretations changed, and what the impact of such changes, if any, may be.

Any change in the laws or regulations that govern the clearance and approval processes relating to our current, planned and future products could make it more difficult and costly to obtain clearance or approval for new products or to produce, market and distribute existing products. Significant delays in receiving clearance or approval or the failure to receive clearance or approval for our new products would have an adverse effect on our ability to expand our business.

In the EU, on May 25, 2017 the new Medical Devices Regulation ("2017/745" or "MDR") was adopted. Following its entry into application on May 26, 2020, the MDR will introduce substantial changes to the obligations with which medical device manufacturers must comply in the EU. High risk medical devices will be subject to additional scrutiny during the conformity assessment procedure.

Risks Related to Our Intellectual Property

If we are unable to obtain and maintain patent or other intellectual property protection for our products, or if the scope of the patent and other intellectual property protection obtained is not sufficiently broad, our competitors could develop and commercialize products and technology similar or identical to ours, and our ability to successfully commercialize any products we may develop, and our technology, may be adversely affected.

As with other medical device companies, our success depends in large part on our ability to maintain and solidify a proprietary position for our products, which will depend upon our success in obtaining effective patent claims that cover, and other intellectual property with respect to, such products, their manufacturing processes and their intended methods of use and enforcing those patent claims once granted as well as our other intellectual property. In some cases, we may not be able to obtain issued claims covering our technologies which are sufficient to prevent third parties, such as our competitors, from utilizing our technology. Any failure to obtain or maintain patent and other intellectual property protection with respect to our IVL products and technologies or other aspects of our business could have a material adverse effect on our business, financial condition and results of operations.

Changes in either the patent laws or their interpretation in the United States and other countries may diminish our ability to protect our inventions, obtain, maintain and enforce our intellectual property rights and, more generally, could affect the value of our intellectual property or narrow the scope of our issued patents. Additionally, we cannot predict whether the patent applications we are currently pursuing will issue as patents in any particular jurisdiction or whether the claims of any issued patents will provide sufficient protection from competitors or other third parties.

The patent prosecution process is expensive, time-consuming and complex, and we may not be able to file, prosecute, maintain, enforce or license all necessary or desirable patent applications at a reasonable cost or in a timely manner. It is also possible that we will fail to identify patentable aspects of our research and development output in time to obtain patent protection. Although we enter into non-disclosure and confidentiality agreements with parties who have access to confidential or patentable aspects of our research and development output, such as our employees, corporate collaborators, outside scientific collaborators, suppliers, consultants, advisors and other third parties, any of these parties may breach the agreements and disclose such output before a patent application is filed, thereby jeopardizing our ability to seek patent protection. In addition, our ability to obtain and maintain valid and enforceable patents depends on whether the differences between our inventions and the prior art allow our inventions to be patentable over the prior art. Furthermore, the publication of discoveries in scientific literature often lags behind the actual discoveries, and patent applications in the United States and other jurisdictions are typically not published until 18 months after filing, or in some cases not at all. Therefore, we cannot be certain that we were the first to make the inventions claimed in any of our patents or pending patent applications, or that we were the first to file for patent protection of such inventions. Moreover, in some circumstances, we may not have the right to control the preparation, filing and prosecution of patent applications, or to maintain the patents, covering technology that we license from or license to third parties and are therefore reliant on our licensors or licensees. Therefore, these and any of our patents and applications may not be prosecuted and enforced in a manner consistent with the best interests of our business. Defects of form in the preparation or filing of our patents or patent applications may exist, or may arise in the future, for example, with respect to proper priority claims, inventorship and the like, although we are unaware of any such defects that we believe are of material importance. If we or any current or future licensors or licensees fail to establish, maintain, protect or enforce such patents and other intellectual property rights, such rights may be reduced or eliminated. If any current or future licensors or licensees are not fully cooperative or disagree with us as to the prosecution, maintenance or enforcement of any patent rights, such patent rights could be compromised. If there are material defects in the form, preparation or prosecution of our patents or patent applications, such patents or applications may be invalid and unenforceable. Any of these outcomes could impair our ability to prevent competition from third parties, which may have an adverse impact on our business.

The strength of patent rights generally, and particularly the patent position of medical device companies, involves complex legal and scientific questions and can be uncertain, and has been the subject of much litigation in recent years. This uncertainty includes changes to the patent laws through either legislative action to change statutory patent law or court action that may reinterpret existing law or rules in ways affecting the scope or validity of issued patents. Our current or future patent applications may fail to result in issued patents in the United States or foreign countries with claims that cover our products. Even if patents do successfully issue from our patent applications, third parties may challenge the validity, enforceability or scope of such patents, which may result in such patents being narrowed, invalidated or held unenforceable. Any successful challenge to our patents could deprive us of exclusive rights necessary for the successful commercialization of our products. Furthermore, even if they are unchallenged, our patents may not adequately protect our products, provide exclusivity for our products or prevent others from designing around our claims. If the scope of any patent protection we obtain is not sufficiently broad, or if we lose any of our patent protection, our ability to prevent our competitors from commercializing similar or identical technology and products would be adversely affected. If the breadth or strength of protection provided by the patents we hold or pursue with respect to our products is challenged, it could dissuade companies from collaborating with us to develop, or threaten our ability to commercialize, our products.

Patents have a limited lifespan. In the United States, the natural expiration of a utility patent is generally 20 years after its effective filing date and the natural expiration of a design patent is generally 14 years after its issue date, unless the filing date occurred on or after May 13, 2015, in which case the natural expiration of a design patent is generally 15 years after its issue date. Various extensions may be available; however, the life of a patent, and the protection it affords, is limited. Without patent protection for our products and services, we may be open to competition. Further, if we encounter delays in our development efforts, the period of time during which we could market our products and services under patent protection would be reduced and, given the amount of time required for the development, testing and regulatory review of planned or future products, patents protecting such products might expire before or shortly after such products are commercialized. As a result, our intellectual property may not provide us with sufficient rights to exclude others from commercializing products similar or identical to ours.

Moreover, the coverage claimed in a patent application can be significantly reduced before the patent is issued, and its scope can be reinterpreted after issuance. Even if patent applications we license or own, currently or in the future, issue as patents, they may not issue in a form that will provide us with any meaningful protection, prevent competitors or other third parties from competing with us, or otherwise provide us with any competitive advantage. Any patents that we own may be challenged, narrowed, circumvented or invalidated by third parties. Consequently, we do not know whether our IVL products and technologies will be protectable or remain protected by valid and enforceable patents. Our competitors or other third parties may be able to circumvent our patents by developing similar or alternative technologies or products in a non-infringing manner which could materially adversely affect our business, financial condition and results of operations.

Some of our patents and patent applications may in the future be co-owned with third parties. If we are unable to obtain an exclusive license to any such third party co-owners' interest in such patents or patent applications, such co-owners may be able to license their rights to other third parties, including our competitors, and our competitors could market competing products and technology. In addition, we may need the cooperation of any such co-owners of our patents in order to enforce such patents against third parties, and such cooperation may not be provided to us. Any of the foregoing could have a material adverse effect on our business, financial condition and results of operations.

Patents covering our products could be found invalid or unenforceable if challenged in court or before administrative bodies in the United States or abroad.

The issuance of a patent is not conclusive as to its inventorship, scope, validity or enforceability, and our patents may be challenged in the courts or patent offices in the United States and abroad. We may be subject to a third-party preissuance submission of prior art to the U.S. Patent and Trademark Office (the "USPTO"), or become involved in opposition, derivation, revocation, reexamination, post-grant and *inter partes* review ("IPR"), or interference proceedings or other similar proceedings challenging our patent rights. An adverse determination in any such submission, proceeding or litigation could reduce the scope of, or invalidate or render unenforceable, our patent rights, allow third parties to commercialize our technology or products and compete directly with us, without payment to us, or result in our inability to manufacture or commercialize products without infringing third-party patent rights. Moreover, we may have to participate in interference proceedings declared by the USPTO to determine priority of invention or in post-grant challenge proceedings, such as oppositions in a foreign patent office, that challenge our priority of invention or other features of patentability with respect to our patents and patent applications. Such challenges may result in loss of patent rights, in loss of exclusivity or in patent claims being narrowed, invalidated or held unenforceable, which could limit our ability to stop others from using or commercializing similar or identical technology and products, or limit the duration of the patent protection of our technology or products. Such proceedings also may result in substantial cost and require significant time from our scientists and management, even if the eventual outcome is favorable to us. For example, petitions for IPR of U.S. Pat. Nos. 9,642,673, 8,956,371 and 8,728,091 (the "IPR Patents"), which are three of our issued U.S. patents that relate to our current IVL Technology, were filed in December 2018 at the USPTO's Patent Trial and Appeal Board (the "PTAB") by Cardiovascular Systems, Inc., one of our competitors. The PTAB has decided to institute IPR proceedings for all three IPR Patents. We filed our responses to the petitions in November 2019 and optional oral hearings for each IPR are scheduled for April 16, 2020. The PTAB is expected to issue a decision in each IPR by July 2020. The IPR proceedings could result in the loss or narrowing in scope of the IPR Patents, which could limit our ability to stop others from using or commercializing products and technology similar or identical to ours. Any of the foregoing could have a material adverse effect on our business, financial condition and results of operations.

In addition, if we initiate legal proceedings against a third party to enforce a patent covering our products, the defendant could counterclaim that such patent is invalid or unenforceable. In patent litigation in the United States, defendant counterclaims alleging invalidity or unenforceability are commonplace. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, including lack of novelty, obviousness or non-enablement. Grounds for an unenforceability assertion could be an allegation that someone connected with prosecution of the patent withheld relevant information from the USPTO or made a misleading statement during prosecution. Third parties may also raise claims challenging the validity or enforceability of our patents before administrative bodies in the United States or abroad, even outside the context of litigation, including through re-examination, post-grant review, IPR, interference proceedings, derivation proceedings and equivalent proceedings in foreign jurisdictions (e.g., opposition proceedings). Such proceedings could result in the revocation of, cancellation of or amendment to our patents in such a way that they no longer cover our products. The outcome following legal assertions of invalidity and unenforceability is unpredictable. With respect to the validity question, for example, we cannot be certain that there is no invalidating prior art, of which we and the patent examiner were unaware during prosecution. If a third party were to prevail on a legal assertion of invalidity or unenforceability, we would lose at least part, and perhaps all, of the patent protection on our products. Such a loss of patent protection would have a material adverse effect on our business, financial condition and results of operations.

Obtaining and maintaining our patent protection depends on compliance with various procedural, document submission, fee payment and other requirements imposed by government patent agencies, and our patent protection could be reduced or eliminated for non-compliance with these requirements.

Obtaining and maintaining our patent protection depends on compliance with various procedural measures, document submissions, fee payments and other requirements imposed by government patent agencies, and our patent protection could be reduced or eliminated for non-compliance with these requirements.

Periodic maintenance fees, renewal fees, annuity fees and various other government fees on patents and applications will be due to be paid to the USPTO and various government patent agencies outside of the United States over the lifetime of our patents and applications. The USPTO and various non-U.S. government agencies require compliance with several procedural, documentary, fee payment and other similar provisions during the patent application process. In some cases, an inadvertent lapse can be cured by payment of a late fee or by other means in accordance with the applicable rules. There are situations, however, in which non-compliance can result in the abandonment or lapse of the patent or patent application, resulting in a partial or complete loss of patent rights in the relevant jurisdiction. In such an event, potential competitors might be able to enter the market with similar or identical products or technology, which could have a material adverse effect on our business, financial condition and results of operations.

We may not be able to protect our intellectual property and proprietary rights throughout the world.

Third parties may attempt to commercialize competitive products or services in foreign countries where we do not have any patents or patent applications and/or where legal recourse may be limited. This may have a significant commercial impact on our foreign business operations.

Filing, prosecuting and defending patents on our products in all countries throughout the world would be prohibitively expensive, and the laws of foreign countries may not protect our rights to the same extent as the laws of the United States. Consequently, we may not be able to prevent third parties from practicing our inventions in all countries outside the United States, or from selling or importing products made using our inventions in and into the United States or other jurisdictions. Competitors may use our technologies in jurisdictions where we have not obtained patent protection to develop their own products and, further, may export otherwise infringing products to territories where we have patent protection but enforcement is not as strong as that in the United States. These products may compete with our products, and our patents or other intellectual property rights may not be effective or sufficient to prevent them from competing.

Many companies have encountered significant problems in protecting and defending intellectual property rights in foreign jurisdictions. The legal systems of certain countries, particularly certain developing countries, do not favor the enforcement of patents, trade secrets and other intellectual property protection, which could make it difficult for us to stop the infringement of our patents or marketing of competing products in violation of our intellectual property and proprietary rights generally. Proceedings to enforce our intellectual property and proprietary rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business, could put our patents at risk of being invalidated or interpreted narrowly, could put our patent applications at risk of not issuing and could provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate, and the damages or other remedies awarded, if any, may not be commercially meaningful. Accordingly, our efforts to enforce our intellectual property and proprietary rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license.

Many countries have compulsory licensing laws under which a patent owner may be compelled to grant licenses to third parties. In addition, many countries limit the enforceability of patents against government agencies or government contractors. In these countries, the patent owner may have limited remedies, which could materially diminish the value of such patent. If we are forced to grant a license to third parties with respect to any patents relevant to our business, our competitive position may be impaired, and our business, financial condition and results of operations may be adversely affected.

Changes in U.S. patent law could diminish the value of patents in general, thereby impairing our ability to protect our products.

Changes in either the patent laws or interpretation of the patent laws in the United States could increase the uncertainties and costs surrounding the prosecution of patent applications and the enforcement or defense of issued patents. Assuming that other requirements for patentability are met, prior to March 2013, in the United States, the first to invent the claimed invention was entitled to the patent, while outside the United States, the first to file a patent application was entitled to the patent. After March 2013, under the Leahy-Smith America Invents Act (the "America Invents Act"), enacted in September 2011, the United States transitioned to a first inventor to file system in which, assuming that other requirements for patentability are met, the first inventor to file a patent application will be entitled to the patent on an invention regardless of whether a third party was the first to invent the claimed invention. A third party that files a patent application in the USPTO after March 2013, but before us could therefore be awarded a patent covering an invention of ours even if we had made the invention before it was made by such third party. This will require us to be cognizant of the time from invention to filing of a patent application. Since patent applications in the United States and most other countries are confidential for a period of time after filing or until issuance, we cannot be certain that we were the first to file any patent application related to our products or invent any of the inventions claimed in our patents or patent applications.

The America Invents Act also includes a number of significant changes that affect the way patent applications will be prosecuted and also may affect patent litigation. These include allowing third-party submission of prior art to the USPTO during patent prosecution and additional procedures to attack the validity of a patent by USPTO administered post-grant proceedings, including post-grant review, IPR and derivation proceedings. Because of a lower evidentiary standard in USPTO proceedings compared to the evidentiary standard in U.S. federal courts necessary to invalidate a patent claim, a third party could potentially provide evidence in a USPTO proceeding sufficient for the USPTO to hold a claim invalid even though the same evidence would be insufficient to invalidate the claim if first presented in a district court action. Accordingly, a third party may attempt to use the USPTO procedures to invalidate our patent claims that would not have been invalidated if first challenged by the third party as a defendant in a district court action. Therefore, the America Invents Act and its implementation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents. In addition, future actions by the U.S. Congress, the federal courts and the USPTO could cause the laws and regulations governing patents to change in unpredictable ways. Any of the foregoing could have a material adverse effect on our business, financial condition and results of operations.

Our reliance on third parties requires us to share our trade secrets, which increases the possibility that a competitor will discover them or that our trade secrets will be misappropriated or disclosed. If we are unable to protect the confidentiality of our trade secrets, our business and competitive position would be harmed.

In addition to seeking patent protection for our products, we also rely upon unpatented trade secrets, know-how and continuing technological innovation to develop and maintain a competitive position. We seek to protect such proprietary information, in part, through confidentiality agreements with our employees, collaborators, contractors, advisors, consultants and other third parties and invention assignment agreements with our employees. We also have agreements with some of our consultants that require them to assign to us any inventions created as a result of their working with us. The confidentiality agreements are designed to protect our proprietary information and, in the case of agreements or clauses containing invention assignment, to grant us ownership of technologies that are developed through a relationship with employees or third parties.

We cannot guarantee that we have entered into such agreements with each party that has or may have had access to our trade secrets or proprietary information. Additionally, despite these efforts, any of these parties may breach the agreements and disclose our proprietary information, including our trade secrets, and we may not be able to obtain adequate remedies for such breaches. Enforcing a claim that a party illegally disclosed or misappropriated a trade secret is difficult, expensive and time-consuming, and the outcome is unpredictable. In addition, some courts inside and outside the United States are less willing or unwilling to protect trade secrets. If any of our trade secrets were to be lawfully obtained or independently developed by a competitor or other third party, we would have no right to prevent them from using that technology or information to compete with us. If any of our trade secrets were to be disclosed to, or independently developed by, a competitor or other third party, our competitive position would be materially and adversely harmed. Furthermore, we expect these trade secrets, know-how and proprietary information to over time be disseminated within the industry through independent development, the publication of journal articles describing the methodology and the movement of personnel from academic to industry scientific positions.

We also seek to preserve the integrity and confidentiality of our data and trade secrets by maintaining physical security of our premises and physical and electronic security of our information technology systems. While we have confidence in these individuals, organizations and systems, agreements or security measures may be breached, and we may not have adequate remedies for any breach. In addition, our trade secrets may otherwise become known, or be independently discovered by, competitors. To the extent that our employees, consultants, contractors or collaborators use intellectual property owned by others in their work for us, disputes may arise as to the rights in related or resulting know-how and inventions, which could have a material adverse effect on our business, financial condition and results of operations.

We may be subject to claims challenging the ownership or inventorship of our patents and other intellectual property and, if unsuccessful in any of these proceedings, we may be required to obtain licenses from third parties, which may not be available on commercially reasonable terms, or at all, or to cease the development, manufacture and commercialization of one or more of our products.

We may be subject to claims that current or former employees, collaborators or other third parties have an interest in our patents, trade secrets or other intellectual property as an inventor or co-inventor. For example, we may have inventorship disputes arise from conflicting obligations of employees, consultants or others who are involved in developing our products. Litigation may be necessary to defend against these and other claims challenging inventorship of our patents, trade secrets or other intellectual property. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights, such as exclusive ownership of, or right to use, intellectual property that is important to our products. If we were to lose exclusive ownership of such intellectual property, other owners may be able to license their rights to other third parties, including our competitors. We also may be required to obtain and maintain licenses from third parties, including parties involved in any such disputes. Such licenses may not be available on commercially reasonable terms, or at all, or may be non-exclusive. If we are unable to obtain and maintain such licenses, we may need to cease the development, manufacture and commercialization of one or more of our products. The loss of exclusivity or the narrowing of our patent claims could limit our ability to stop others from using or commercializing similar or identical technology and products. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management and other employees. Any of the foregoing could have a material adverse effect on our business, financial condition and results of operations.

Third-party claims of intellectual property infringement, misappropriation or other violation against us or our collaborators may prevent or delay the sale and marketing of our products.

The medical device industry is highly competitive and dynamic. Due to the focused research and development that is taking place by several companies, including us and our competitors, in this field, the intellectual property landscape is in flux, and it may remain uncertain in the future. As such, we could become subject to significant intellectual property-related litigation and proceedings relating to our or third-party intellectual property and proprietary rights.

Our commercial success depends in part on our and any potential future collaborators' ability to develop, manufacture, market and sell any products that we may develop and use our proprietary technologies without infringing, misappropriating and otherwise violating the patents and other intellectual property rights of third parties. It is uncertain whether the issuance of any third-party patent would require us or any potential collaborators to alter our development or commercial strategies, obtain licenses or cease certain activities. The medical device industry is characterized by extensive litigation regarding patents and other intellectual property rights, as well as administrative proceedings for challenging patents, including interference, *inter partes* or post-grant review, derivation and reexamination proceedings before the USPTO or oppositions and other comparable proceedings in foreign jurisdictions.

Third parties, including our competitors, may currently have patents or obtain patents in the future and claim that the manufacture, use or sale of our products infringes upon these patents. We have not conducted an extensive search of patents issued or assigned to other parties, including our competitors, and no assurance can be given that patents containing claims covering our products, parts of our products, technology or methods do not exist, have not been filed or could not be filed or issued. In addition, because patent applications can take many years to issue and because publication schedules for pending applications vary by jurisdiction, there may be applications now pending of which we are unaware and which may result in issued patents which our current or future products infringe. Also, because the claims of published patent applications can change between publication and patent grant, there may be published patent applications that may ultimately issue with claims that we infringe. As the number of competitors in our market grows and the number of patents issued in this area increases, the possibility of patent infringement claims against us escalates. Moreover, we may face claims from non-practicing entities ("NPEs"), which have no relevant product revenue and against whom our own patent portfolio may have no deterrent effect. Third parties, including NPEs, have claimed, and may in the future claim, that our products infringe or violate their patents or other intellectual property rights.

In the event that any third party claims that we infringe their patents or that we are otherwise employing their proprietary technology without authorization and initiates litigation against us, even if we believe such claims are without merit, there is no assurance that a court would find in our favor on questions of infringement, validity, enforceability or priority. A court of competent jurisdiction could hold that these third-party patents are valid, enforceable and infringed by our products. In order to successfully challenge the validity of any such U.S. patent in federal court, we would need to overcome a presumption of validity. As this burden is a high one requiring us to present clear and convincing evidence as to the invalidity of any such U.S. patent claim, there is no assurance that a court of competent jurisdiction would invalidate the claims of any such U.S. patent. If we are found to infringe third-party patents, and we are unsuccessful in demonstrating that such patents are invalid or unenforceable, such third parties may be able to block our ability to commercialize the applicable products or technology unless we obtain a license under the applicable patents, or until such patents expire or are finally determined to be held invalid or unenforceable. Such a license may not be available on commercially reasonable terms, or at all. Even if we are able to obtain a license, the license would likely obligate us to pay significant license fees and/or royalties, and the rights granted to us might be non-exclusive, which could result in our competitors gaining access to the same technology. If we are unable to obtain a necessary license to a third-party patent on commercially reasonable terms, or at all, we may be unable to commercialize our products, or such commercialization efforts may be significantly delayed, which could in turn significantly harm our business.

Defense of infringement claims, regardless of their merit or outcome, would involve substantial litigation expense and would be a substantial diversion of management and other employee resources from our business, and may impact our reputation. In the event of a successful claim of infringement against us, we may be enjoined from further developing or commercializing the infringing products and/or have to pay substantial damages for use of the asserted intellectual property, including treble damages and attorneys' fees were we found to willfully infringe such intellectual property. We also might have to redesign our infringing products or technologies, which may be impossible or require substantial time and monetary expenditure.

Engaging in litigation to defend against third-party infringement claims is very expensive, particularly for a company of our size, and time-consuming. In addition, there could be public announcements of the results of hearings, motions or other interim proceedings or developments, and if securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on our common stock price. Such litigation or proceedings could substantially increase our operating losses and reduce the resources available for development activities or any future sales, marketing or distribution activities. We may not have sufficient financial or other resources to conduct such litigation or proceedings adequately. Some of our competitors may be able to sustain the costs of litigation or administrative proceedings more effectively than we can because of greater financial resources and more mature and developed intellectual property portfolios. Uncertainties resulting from the initiation and continuation of patent litigation or other proceedings against us could impair our ability to compete in the marketplace. The occurrence of any of the foregoing could have a material adverse effect on our business, financial condition or results of operations.

We may become involved in lawsuits to protect or enforce our patents and other intellectual property rights, which could be expensive, time-consuming and unsuccessful.

Competitors may infringe our patents, or we may be required to defend against claims of infringement. In addition, our patents also may become involved in inventorship, priority or validity disputes. To counter or defend against such claims can be expensive and time-consuming. In an infringement proceeding, a court may decide that a patent owned by us is invalid or unenforceable, or may refuse to stop the other party from using the technology at issue on the grounds that our patents do not cover such technology. An adverse result in any litigation proceeding could put one or more of our patents at risk of being invalidated or interpreted narrowly. Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during litigation.

Even if resolved in our favor, litigation or other legal proceedings relating to intellectual property claims may cause us to incur significant expenses and could distract our management and other personnel from their normal responsibilities. In addition, there could be public announcements of the results of hearings, motions or other interim proceedings or developments, and if securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on our common stock price. Such litigation or proceedings could substantially increase our operating losses and reduce the resources available for development activities or any future sales, marketing or distribution activities. We may not have sufficient financial or other resources to conduct such litigation or proceedings adequately. Some of our competitors may be able to sustain the costs of such litigation or proceedings more effectively than we can because of their greater financial resources and more mature and developed intellectual property portfolios. Uncertainties resulting from the initiation and continuation of patent litigation or other proceedings could have a material adverse effect on our ability to compete in the marketplace. Any of the foregoing could have a material adverse effect on our business, financial condition or results of operations.

We may not be successful in obtaining necessary rights to any products we may develop through acquisitions and in-licenses.

Many medical device companies and academic institutions are competing with us and filing patent applications potentially relevant to our business. We may find it necessary or prudent to obtain licenses from such third-party intellectual property holders. In addition, with respect to any patents we may in the future co-own with third parties, we may require licenses to such co-owners' interest to such patents. However, we may be unable to secure such licenses or otherwise acquire or in-license any intellectual property rights from third parties that we identify as necessary for planned or future products. The licensing or acquisition of third-party intellectual property rights is a competitive area, and more established companies may pursue strategies to license or acquire third-party intellectual property rights that we may consider attractive or necessary. These established companies may have a competitive advantage over us due to their size, capital resources and greater clinical development and commercialization capabilities. In addition, companies that perceive us to be a competitor may be unwilling to assign or license rights to us. We also may be unable to license or acquire third-party intellectual property rights on terms that would allow us to make an appropriate return on our investment or at all. If we are unable to successfully obtain rights to required third-party intellectual property rights or maintain the existing intellectual property rights we have, we may have to abandon development of the relevant products, which could have a material adverse effect on our business, financial condition and results of operations.

We may be subject to claims that our employees, consultants or advisors have wrongfully used or disclosed alleged trade secrets of their current or former employers or claims asserting ownership of what we regard as our own intellectual property.

Our employees, consultants and scientific advisors may be currently or previously employed or engaged at universities or other medical device or healthcare companies, including our competitors and potential competitors. Although we try to ensure that our employees, consultants and advisors do not use the proprietary information or know-how of others in their work for us, we may in the future become subject to claims that we or these individuals have, inadvertently or otherwise, used or disclosed intellectual property, including trade secrets or other proprietary information, of their current or former employer. Litigation may be necessary to defend against these claims. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel, which could have a material adverse effect on our business, financial condition and results of operations. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management.

In addition, while it is our policy to require our employees and contractors who may be involved in the conception or development of intellectual property to execute agreements assigning such intellectual property to us, we may be unsuccessful in executing such an agreement with each party who, in fact, conceives or develops intellectual property that we regard as our own. The assignment of intellectual property rights may not be self-executing, or the assignment agreements may be breached, and we may be forced to bring claims against third parties, or defend claims that they may bring against us, to determine the ownership of what we regard as our intellectual property. Such claims could have a material adverse effect on our business, financial condition and results of operations.

If our trademarks and trade names are not adequately protected, then we may not be able to build name recognition in our markets of interest and our business may be adversely affected.

Our trademarks or trade names may be challenged, infringed, circumvented, declared generic or determined to be violating or infringing on other marks. We may not be able to protect our rights to these trademarks and trade names, which we need to build name recognition among potential partners and customers in our markets of interest. At times, competitors or other third parties may adopt trade names or trademarks similar to ours, thereby impeding our ability to build brand identity and possibly leading to market confusion. In addition, there could be potential trade name or trademark infringement or dilution claims brought by owners of other trademarks. Over the long term, if we are unable to establish name recognition based on our trademarks and trade names, then we may not be able to compete effectively and our business may be adversely affected. Our efforts to enforce or protect our proprietary rights related to trademarks, trade secrets, domain names or other intellectual property may be ineffective, could result in substantial costs and diversion of resources and could adversely affect our business, financial condition and results of operations.

Our use of "open source" software could subject our proprietary software to general release, adversely affect our ability to sell our products and subject us to possible litigation.

A portion of the products or technologies licensed, developed and/or distributed by us incorporate so-called "open source" software and we may incorporate open source software into other products in the future. Such open source software is generally licensed by its authors or other third parties under open source licenses. Some open source licenses contain requirements that we disclose source code for modifications we make to the open source software and that we license such modifications to third parties at no cost. In some circumstances, distribution of our software in connection with open source software could require that we disclose and license some or all of our proprietary code in that software, as well as distribute our products that use particular open source software at no cost to the user. We monitor our use of open source software in an effort to avoid uses in a manner that would require us to disclose or grant licenses under our proprietary source code; however, there can be no assurance that such efforts will be successful. Open source license terms are often ambiguous and such use could inadvertently occur. There is little legal precedent governing the interpretation of many of the terms of these licenses, and the potential impact of these terms on our business may result in unanticipated obligations regarding our products and technologies. Companies that incorporate open source software into their products have, in the past, faced claims seeking enforcement of open source license provisions and claims asserting ownership of open source software incorporated into their product. If an author or other third party that distributes such open source software were to allege that we had not complied with the conditions of an open source license, we could incur significant legal costs defending ourselves against such allegations. In the event such claims were successful, we could be subject to significant damages or be enjoined from the distribution of our products. In addition, if we combine our proprietary software with open source software in certain ways, under some open source licenses, we could be required to release the source code of our proprietary software, which could substantially help our competitors develop products that are similar to or better than ours and otherwise adversely affect our business. These risks could be difficult to eliminate or manage, and, if not addressed, could harm our business, financial condition and results of operations.

Intellectual property rights do not necessarily address all potential threats.

The degree of future protection afforded by our intellectual property rights is uncertain because intellectual property rights have limitations and may not adequately protect our business or permit us to maintain our competitive advantage. For example:

- others may be able to make products that are similar to our products or utilize similar technology but that are not covered by the claims of our patents or that incorporate certain technology in our products that is in the public domain;
- we, or our future licensors or collaborators, might not have been the first to make the inventions covered by the applicable issued patent or pending patent application that we own now or may own or license in the future;
- we, or our future licensors or collaborators, might not have been the first to file patent applications covering certain of our or their inventions;
- others may independently develop similar or alternative technologies or duplicate any of our technologies without infringing our intellectual property rights;
- it is possible that our current or future pending patent applications will not lead to issued patents;
- issued patents that we hold rights to may be held invalid or unenforceable, including as a result of legal challenges by our competitors or other third parties;
- our competitors or other third parties might conduct research and development activities in countries where we do not have patent rights and then use the information learned from such activities to develop competitive products for sale in our major commercial markets;
- we may not develop additional proprietary technologies that are patentable;
- the patents of others may harm our business; and
- we may choose not to file a patent in order to maintain certain trade secrets or know-how, and a third party may subsequently file a patent covering such intellectual property.

Any of the foregoing could have a material adverse effect on our business, financial condition and results of operations.

Risks Related to Our Reliance on Third Parties

From time to time, we engage outside parties to perform services related to certain of our clinical studies and trials. If these third parties do not successfully carry out their contractual duties or meet expected deadlines, we may not be able to obtain regulatory approval for or commercialize our products.

From time to time, we engage consultants to help design, monitor and analyze the results of certain of our clinical studies and trials. The consultants we engage interact with clinical investigators to enroll patients in our clinical trials. We depend on these consultants and clinical investigators to conduct clinical studies and trials and monitor and analyze data from these studies and trials under the investigational plan and protocol for the study or trial and in compliance with applicable regulations and standards, such as GCP guidelines, the Common Rule, and FDA human subject protection regulations. We may face delays in our regulatory approval process if these parties do not perform their obligations in a timely, compliant or competent manner. If these third parties do not successfully carry out their duties or meet expected deadlines, or if the quality, completeness or accuracy of the data they obtain is compromised due to the failure to adhere to our clinical trial protocols or for other reasons, our clinical studies or trials may be extended, delayed or terminated or may otherwise prove to be unsuccessful, and we may have to conduct additional studies, which would significantly increase our costs, in order to obtain the regulatory clearances or approvals that we need to commercialize our products

We may need to depend on third parties to manufacture our products. If these manufacturers fail to meet our requirements and strict regulatory standards, we may be unable to develop, commercialize or market our products.

We may in the future need to depend upon third parties to manufacture our products. Reliance on a third-party manufacturer entails risks to which we would not be subject if we manufactured products ourselves, including:

- reliance on the third party for regulatory compliance and quality assurance;
- the possible breach of the manufacturing agreement by the third party because of factors beyond our control; and
- the possibility of termination or nonrenewal of the agreement by the third party because of our breach of the manufacturing agreement or based on its own business priorities.

Any of these factors could cause delay or suspension of clinical trials, regulatory submissions, required approvals, commercialization or marketing of our products or cause us to incur higher costs. Furthermore, if our contract manufacturers fail to deliver the required commercial quantities of finished products on a timely basis and at commercially reasonable prices and we are unable to find one or more replacement manufacturers capable of production at a substantially equivalent cost, in substantially equivalent volumes and quality, and on a timely basis, we would likely be unable to meet demand for our products and we would lose potential revenue. Any difficulties in locating and hiring third-party manufacturers, or in the ability of third-party manufacturers to supply quantities of our products at the times and in the quantities we need, could have a material adverse effect on our business. It may take a significant amount of time and resources (including costs) to establish an alternative source of supply for our products and to have any such new source approved by the FDA.

We depend upon third-party suppliers, including single source suppliers, making us vulnerable to supply problems and price fluctuations.

We rely on third-party suppliers to provide us with certain components of our products. We rely on single source suppliers for certain components of our products. In some cases, we do not have long-term supply agreements with, or guaranteed commitments from, our suppliers, including single source suppliers. We depend on our suppliers to provide us and our customers with materials in a timely manner that meet our and their quality, quantity and cost requirements. These suppliers may encounter problems during manufacturing for a variety of reasons, any of which could delay or impede their ability to meet our demand. These suppliers may cease producing the components we purchase from them or otherwise decide to cease doing business with us.

Any supply interruption from our suppliers or failure to obtain additional suppliers for any of the components used in our products would limit our ability to manufacture our products and could have a material adverse effect on our business, financial condition and results of operations.

We and our component suppliers may not meet regulatory quality standards applicable to our manufacturing processes, which could have an adverse effect on our business, financial condition and results of operations.

As a medical device manufacturer, we must register with the FDA and non-U.S. regulatory agencies, and we are subject to periodic inspection by the FDA and foreign regulatory agencies, for compliance with certain good manufacturing practices, including design controls, product validation and verification, in process testing, quality control and documentation procedures. Compliance with applicable regulatory requirements is subject to continual review and is rigorously monitored through periodic inspections by the FDA and foreign regulatory agencies. Our component suppliers are also required to meet certain standards applicable to their manufacturing processes.

We cannot assure you that we or our component suppliers comply or can continue to comply with all regulatory requirements. The failure by us or one of our component suppliers to achieve or maintain compliance with these requirements or quality standards may disrupt our ability to supply products sufficient to meet demand until compliance is achieved or, with a component supplier, until a new supplier has been identified and evaluated. Our or any of our component supplier's failure to comply with applicable regulations could cause sanctions to be imposed on us, including warning letters, fines, injunctions, civil penalties, failure of regulatory authorities to grant marketing approval of our products, delays, suspension or withdrawal of approvals or clearances, license revocation, seizures or recalls of products, operating restrictions and criminal prosecutions, which could harm our business. We cannot assure you that if we need to engage new suppliers to satisfy our business requirements, we can locate new suppliers in compliance with regulatory requirements at a reasonable cost and in an acceptable timeframe. Our failure to do so could have a material adverse effect on our business, financial condition and results of operations.

In the EU, we must maintain certain International Organization for Standardization ("ISO") certifications to sell our products and must undergo periodic inspections by notified bodies, including the BSI, to obtain and maintain these certifications. If we fail these inspections or fail to meet these regulatory standards, it could have a material adverse effect on our business, financial condition and results of operations.

We may seek strategic alliances or enter into licensing arrangements in the future and may not be successful in doing so, and even if we are, we may not realize the benefits or costs of such relationships.

We may form or seek strategic alliances, create joint ventures or collaborations or enter into additional licensing arrangements with third parties that we believe will complement or augment our sales and marketing efforts with respect to our products and any planned or future products that we may develop. For example, in December 2018, we entered into a collaboration with Abiomed pursuant to which we are working with Abiomed to integrate our products into Abiomed's physician training and education programs. We may not be successful in our efforts to establish such collaborations for our products. Any of these relationships may require us to incur non-recurring and other charges, increase our near and long-term expenditures, issue securities that dilute our existing stockholders or disrupt our management and business. In addition, we face significant competition in seeking appropriate strategic partners and the negotiation process is time-consuming and complex. Moreover, we may not be successful in our efforts to establish a strategic partnership or other alternative arrangements for our products. If we license products or businesses, we may not be able to realize the benefit of such transactions if we are unable to successfully integrate them with our existing operations and company culture. We cannot be certain that, following a strategic transaction or license, we will achieve the revenue or specific net income that justifies such transaction. Any delays in entering into new strategic partnership agreements related to our products could delay the commercialization of our products in certain geographies for certain indications, which would harm our business prospects, financial condition and results of operations.

In addition, any potential future collaborations may be terminable by our strategic partners, and we may not be able to adequately protect our rights under these agreements. Furthermore, strategic partners may negotiate for certain rights to control decisions regarding the development and commercialization of our products, if approved, and may not conduct those activities in the same manner as we do. Any termination of collaborations we enter into in the future, or any delay in entering into collaborations related to our products, could delay the development and commercialization of our products and reduce their competitiveness if they reach the market, which could have a material adverse effect on our business, financial condition and results of operations.

Risks Related to Ownership of Our Common Stock

The market price of our common stock has been and may continue to be highly volatile.

The trading price of our common stock has been and may continue to be highly volatile and could be subject to wide fluctuations in price in response to various factors, many of which are beyond our control. Since our initial public offering which occurred in March 2019 through March 5, 2020, the closing price of our common stock has ranged from $29.40 per share to $66.02 per share. The market price for our common stock may be influenced by many factors, including:

- the sales level for our products;
- the failure by our customers to obtain coverage and adequate reimbursements or reimbursement levels that would be sufficient to support product sales to our customers;
- unanticipated serious safety concerns related to the use of our products;
- introduction of new products or services offered by us or our competitors;
- announcements of significant acquisitions, strategic partnerships, joint ventures or capital commitments by us or our competitors;
- announcements of technological or medical innovations for the treatment of vascular disease;
- our ability to effectively manage our growth;
- the size and growth of our target markets;
- actual or anticipated quarterly variations in our or our competitors' results of operations;
- failure to meet estimates or recommendations by securities analysts who cover our stock;
- failure to meet our own financial estimates;
- accusations that we have violated a law or regulation;
- recalls of our products;
- disputes or other developments relating to proprietary rights, including patents, litigation matters and our ability to obtain, maintain, protect and enforce patent protection and other intellectual property rights for our technologies and products;
- significant litigation, including stockholder litigation or litigation related to intellectual property;
- our cash position;
- any delay in any regulatory filings for our planned or future products and any adverse development or perceived adverse development with respect to the applicable regulatory authority's review of such products;
- adverse regulatory decisions, including failure to receive regulatory approval or clearance of our planned and future products or maintain regulatory approval or clearance for our existing products;
- changes in laws or regulations applicable to our products;
- adverse developments concerning our suppliers or distributors;
- our inability to obtain adequate supplies and components for our products or inability to do so at acceptable prices;
- our inability to establish and maintain collaborations if needed;
- changes in the market valuations of similar companies;
- overall performance of the equity markets;
- sales of large blocks of our common stock, including sales by our executive officers, directors and significant stockholders;
- trading volume of our common stock;
- additions or departures of key scientific or management personnel;

- changes in accounting principles;
- ineffectiveness of our internal controls;
- actual or anticipated changes in healthcare policy and reimbursement levels;
- general market conditions and other factors, including factors unrelated to our operating performance or the operating performance of our competitors; and
- other events or factors, many of which are beyond our control.

In addition, the stock market in general and the market for medical device companies in particular have experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of those companies. These broad market and industry factors may seriously harm the market price of our common stock, regardless of our operating performance. In the past, following periods of volatility in the market, securities class action litigation has often been instituted against companies. Such litigation, if instituted against us, could result in substantial costs and diversion of management's attention and resources, which could materially adversely affect our business, financial condition and results of operations.

An active trading market for our common stock may not be sustained.

Our common stock is currently listed on the Nasdaq Global Select Market under the symbol "SWAV" and trades on that market. We cannot assure you that an active trading market for our common stock will be sustained. Accordingly, we cannot assure you of the liquidity of any trading market, your ability to sell your shares of our common stock when desired, or the prices that you may obtain for your shares.

We do not intend to pay dividends on our common stock, so any returns will be limited to increases, if any, in our stock's value. Your ability to achieve a return on your investment will depend on appreciation, if any, in the price of our common stock.

We currently anticipate that we will retain future earnings for the development, operation and expansion of our business and do not anticipate declaring or paying any cash dividends for the foreseeable future. Any future determination to declare dividends will be made at the discretion of our board of directors and will depend on, among other factors, our financial condition, operating results, capital requirements, general business conditions and other factors that our board of directors may deem relevant. Any return to stockholders will therefore be limited to the appreciation in the value of their stock, if any.

Our ability to utilize our net operating loss carryforwards and certain other tax attributes may be limited.

As of December 31, 2019, we had net operating loss ("NOL") carryforwards of approximately $180.3 million for federal income tax purposes, and $40.4 million for California and $153.5 million for other state income tax purposes. These federal NOLs (generated prior to 2018) begin expiring in 2030, the California NOLs begin expiring in 2031 and other state NOL carryforwards begin expiring in 2029. Utilization of these NOLs depends on many factors, including our future income, which cannot be assured. Some of these NOLs could expire unused and be unavailable to offset our future income tax liabilities. In addition, under Section 382 of the Internal Revenue Code of 1986, as amended (the "Code"), and corresponding provisions of state law, if a corporation undergoes an "ownership change," which is generally defined as a greater than 50% change, by value, in its equity ownership by 5% stockholders over a three-year period, the corporation's ability to use its pre-change NOLs and other pre-change tax attributes to offset its post-change income may be limited. We have not determined if we have experienced Section 382 ownership changes in the past and if a portion of our NOLs is subject to an annual limitation under Section 382. In addition, we may experience ownership changes in the future as a result of subsequent changes in our stock ownership, some of which may be outside of our control. If we determine that an ownership change has occurred and our ability to use our historical NOLs is materially limited, it could harm our future operating results by effectively increasing our future tax obligations. In addition, under the TCJA, federal NOLs incurred in 2018 and in future years may be carried forward indefinitely but generally may not be carried back and the deductibility of such NOLs is limited to 80% of taxable income.

Changes in tax laws or regulations that are applied adversely to us or our customers may have a material adverse effect on our business, cash flow, financial condition or results of operations.

The TCJA enacted many significant changes to the U.S. tax laws, and we are still awaiting guidance from the IRS and other tax authorities on some of the TCJA changes that may affect us. Changes in corporate tax rates, the realization of net deferred tax assets relating to our U.S. operations, the taxation of foreign earnings and the deductibility of expenses contained in the TCJA or future tax reform legislation could have a material impact on the value of our deferred tax assets, could result in significant one-time charges in the current or future taxable years and could increase our future U.S. tax expense. The foregoing items, as well as any future changes in tax laws, could have a material adverse effect on our business, cash flow, financial condition or results of operations. In addition, it is uncertain if and to what extent various states will conform to the TCJA or any newly enacted federal tax legislation.

Our principal stockholders and management own a significant percentage of our stock and will be able to exercise significant influence over matters subject to stockholder approval.

As of December 31, 2019, our executive officers, directors and 5% stockholders beneficially owned approximately 56.9% of the outstanding shares of capital stock. As of December 31, 2019, we had 31,446,787 shares of common stock outstanding. Of these shares, the 9,409,048 shares of common stock sold in our IPO and Follow-On Offering are freely tradeable.

As of December 31, 2019, our executive officers and directors held options to purchase an aggregate of 2,158,122 shares of our common stock at a weighted-average exercise price of $4.88 per share and 29,000 shares of common stock underlying outstanding restricted stock units (“RSUs”). We have registered all of the shares of common stock issuable upon the exercise of outstanding options, upon the vesting of outstanding restricted stock and upon exercise or settlement of any other equity incentives we may grant in the future, for public resale under the Securities Act. Accordingly, these shares may be freely sold in the public market upon issuance as permitted by any applicable vesting requirements. Furthermore, as of December 31, 2019, holders of approximately 5,395,605 shares of our common stock have certain rights with respect to the registration of such shares under the Securities Act.

We are an emerging growth company, and we cannot be certain if the reduced reporting requirements applicable to emerging growth companies will make our common stock less attractive to investors.

We are an emerging growth company, as defined in the Jumpstart Our Business Startups Act of 2012 (the “JOBS Act”). For as long as we continue to be an emerging growth company, we may take advantage of exemptions from various reporting requirements that are applicable to other public companies that are not emerging growth companies, including not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act, reduced disclosure obligations regarding executive compensation and our periodic reports and proxy statements and exemptions from the requirements of holding nonbinding advisory votes on executive compensation and stockholder approval of any golden parachute payments not previously approved. We could be an emerging growth company for up to five years following the year in which we completed our initial public offering, although circumstances could cause us to lose that status earlier. We will remain an emerging growth company until the earlier of (i) the last day of the fiscal year (a) following the fifth anniversary of the completion of our initial public offering, (b) in which we have total annual gross revenue of at least $1.07 billion or (c) in which we are deemed to be a large accelerated filer, which requires the market value of our common stock that is held by non-affiliates to exceed $700.0 million as of the prior June 30th, and (ii) the date on which we have issued more than $1.0 billion in non-convertible debt during the prior three-year period.

We will incur significant costs as a result of operating as a public company, and our management will be required to devote substantial time to new compliance initiatives.

As a public company, we have incurred and will incur significant legal, accounting and other expenses. We are subject to the reporting requirements of the Securities Exchange Act of 1934, as amended (the “Exchange Act”), which requires, among other things, that we file with the SEC, annual, quarterly and current reports with respect to our business and financial condition. In addition, the Sarbanes-Oxley Act of 2002, as amended (the “Sarbanes-Oxley Act”), as well as rules subsequently adopted by the SEC and the Nasdaq Global Select Market to implement provisions of the Sarbanes-Oxley Act, impose significant requirements on public companies, including requiring that we evaluate and determine the effectiveness of our internal control over financial reporting, beginning with our annual report for the year ending December 31, 2020, which must be attested to by our independent registered public accounting firm to the extent we are no longer an “emerging growth company,” as defined by the JOBS Act, or a smaller reporting company under the Securities Act. Further, in July 2010, the Dodd-Frank Wall Street Reform and Consumer Protection Act (the “Dodd-Frank Act”), was enacted. There are significant corporate governance and executive compensation related provisions in the Dodd-Frank Act that require the SEC to adopt

additional rules and regulations in these areas such as "say on pay" and proxy access. Emerging growth companies are permitted to implement many of these requirements over a longer period and up until March 6, 2024, which is five years from the pricing of our initial public offering. We intend to take advantage of this legislation but cannot guarantee that we will not be required to implement these requirements sooner than anticipated or planned and thereby incur unexpected expenses. Stockholder activism, the current political environment and the current high level of government intervention and regulatory reform may lead to substantial new regulations and disclosure obligations, which may lead to additional compliance costs and impact the manner in which we operate our business in ways we cannot currently anticipate.

Compliance with the rules and regulations applicable to public companies can be more time-consuming and costly. If these requirements divert the attention of our management and personnel from other business concerns, they could have a material adverse effect on our business, financial condition and results of operations. For example, we expect these rules and regulations to make it more difficult and more expensive for us to obtain director and officer liability insurance, and we may be required to incur substantial costs to maintain the same or similar coverage. We cannot predict or estimate the amount or timing of additional costs we may incur to respond to these requirements. The impact of these requirements could also make it more difficult for us to attract and retain qualified persons to serve on our board of directors, our board committees or as executive officers.

If we have material weaknesses in our internal control over financial reporting, we may not detect errors on a timely basis and our consolidated financial statements may be materially misstated. We are in the process of designing and implementing our internal control over financial reporting in which the process will be time-consuming, costly and complicated. Until such time as we are no longer an "emerging growth company," our auditors will not be required to attest as to our internal control over financial reporting. If we identify material weaknesses in our internal control over financial reporting, if we are unable to comply with the requirements of Section 404 of the Sarbanes-Oxley Act in a timely manner, if we are unable to assert that our internal control over financial reporting is effective or, once required, if our independent registered public accounting firm is unable to attest that our internal control over financial reporting is effective, investors may lose confidence in the accuracy and completeness of our financial reports and the market price of our common stock could decrease. We could also become subject to stockholder or other third-party litigation, as well as investigations by the stock exchange on which our securities are listed, the SEC or other regulatory authorities, which could require additional financial and management resources and could result in fines, trading suspensions or other remedies.

We are at risk of securities class action litigation.

In the past, securities class action litigation has often been brought against a company following a decline in the market price of its securities. This risk is especially relevant for us because medical device companies have experienced significant stock price volatility in recent years. If we face such litigation, it could result in substantial costs and a diversion of management's attention and resources, which could harm our business.

If securities or industry analysts do not publish research or publish inaccurate or unfavorable research about our business, our stock price and trading volume could decline.

Our stock price and trading volume is heavily influenced by the way analysts and investors interpret our financial information and other disclosures. If securities or industry analysts do not publish research or reports about our business, delay publishing reports about our business or publish negative reports about our business, regardless of accuracy, our stock price and trading volume could decline.

The trading market for our common stock depends, in part, on the research and reports that securities or industry analysts publish about us or our business. We do not have any control over these analysts. A limited number of analysts are currently covering our company. If the number of analysts that cover us declines, demand for our common stock could decrease and our common stock price and trading volume may decline.

Even if our common stock is actively covered by analysts, we do not have any control over the analysts or the measures that analysts or investors may rely upon to forecast our future results. Over-reliance by analysts or investors on any particular metric to forecast our future results may result in forecasts that differ significantly from our own.

Regardless of accuracy, unfavorable interpretations of our financial information and other public disclosures could have a negative impact on our stock price. If our financial performance fails to meet analyst estimates, for any of the reasons discussed above or otherwise, or one or more of the analysts who cover us downgrade our common stock or change their opinion of our common stock, our stock price would likely decline.

Our restated certificate of incorporation, our amended and restated bylaws and Delaware law contain provisions that could discourage another company from acquiring us and may prevent attempts by our stockholders to replace or remove our current management.

Provisions of Delaware law (where we are incorporated), our restated certificate of incorporation and amended and restated bylaws may discourage, delay or prevent a merger or acquisition that stockholders may consider favorable, including transactions in which you might otherwise receive a premium for your shares. In addition, these provisions may frustrate or prevent any attempts by our stockholders to replace or remove our current management by making it more difficult for stockholders to replace or remove our board of directors. These provisions include:

- authorizing the issuance of "blank check" preferred stock without any need for action by stockholders;
- requiring supermajority stockholder voting to effect certain amendments to our restated certificate of incorporation and amended and restated bylaws;
- eliminating the ability of stockholders to call and bring business before special meetings of stockholders;
- prohibiting stockholder action by written consent;
- establishing advance notice requirements for nominations for election to the board of directors or for proposing matters that can be acted on by stockholders at stockholder meetings;
- dividing our board of directors into three classes so that only one third of our directors will be up for election in any given year; and
- providing that our directors may be removed by our stockholders only for cause.

In addition, we are subject to Section 203 of the Delaware General Corporation Law, which may have an anti-takeover effect with respect to transactions not approved in advance by our board of directors, including discouraging takeover attempts that could have resulted in a premium over the market price for shares of our common stock.

These provisions apply even if a takeover offer may be considered beneficial by some stockholders and could delay or prevent an acquisition that our board of directors determines is not in our and our stockholders' best interests and could also affect the price that some investors are willing to pay for our common stock. See the section titled "Description of Capital Stock."

Our restated certificate of incorporation provides that the Court of Chancery of the State of Delaware will be the exclusive forum for substantially all disputes between us and our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers or employees.

Our restated certificate of incorporation provides that the Court of Chancery of the State of Delaware is the exclusive forum for: any derivative action or proceeding brought on our behalf; any action asserting a breach of fiduciary duty; any action asserting a claim against us arising pursuant to the Delaware General Corporation Law, our restated certificate of incorporation or our amended and restated bylaws; or any action asserting a claim against us that is governed by the internal affairs doctrine. The choice of forum provision may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers or other employees, which may discourage such lawsuits against us and our directors, officers and other employees. If a court were to find the choice of forum provision contained in our restated certificate of incorporation to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could harm our business and financial condition. This exclusive forum provision will not apply to suits brought to enforce a duty or liability created by the Securities Act or the Exchange Act or any other claim for which the federal courts have exclusive jurisdiction.

Item 1B. Unresolved Staff Comments.

None.

Item 2. Properties.

We completed the move of our production of our IVL catheters from our prior Fremont, California facility to our facilities in Santa Clara, California in the second half of 2019. We produce all of our IVL catheters in-house at our facilities in Santa Clara, California, which, together with our research and development, controlled environment room and office space, currently totals 35,000 square feet.

In December 2019, we entered into a lease for office and laboratory space in two buildings located in Santa Clara, California. The purpose and effect of the lease agreement is to extend the existing Santa Clara office and laboratory premises of 35,000 square feet to approximately 85,200 square feet of rentable space.

We believe that the above Santa Clara facilities meets our current and future anticipated needs.

Item 3. Legal Proceedings.

Petitions for *inter partes* review ("IPR") of U.S. Pat. Nos. 9,642,673, 8,956,371 and 8,728,091 (the "IPR Patents"), which are three of our issued U.S. patents that relate to our current IVL Technology, were filed in December 2018 at the USPTO's Patent Trial and Appeal Board (the "PTAB") by Cardiovascular Systems, Inc., one of our competitors. The PTAB has decided to institute IPR proceedings for all three IPR Patents. We filed our responses to the petitions in November 2019 and optional oral hearings for each IPR are scheduled for April 16, 2020. The PTAB is expected to issue a decision in each IPR by July 2020. The IPR proceedings could result in the loss or narrowing in scope of the IPR Patents, which could limit our ability to stop others from using or commercializing products and technology similar or identical to ours. For more information regarding the risks presented by such proceedings, please see the section titled "Risk Factors—Risks Related to Our Intellectual Property."

We may be subject to other legal proceedings and claims in the ordinary course of business. We have received, and may from time to time receive, letters from third parties alleging patent infringement, violation of employment practices or trademark infringement, and we may in the future participate in litigation to defend ourselves. We cannot predict the results of any such disputes, and despite the potential outcomes, the existence thereof may have an adverse material impact on us due to diversion of management time and attention as well as the financial costs related to resolving such disputes.

Item 4. Mine Safety Disclosures.

Not applicable.

PART II

Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities.

Market Information for Common Stock

Our common stock is traded on the Nasdaq Global Select Market under the symbol SWAV. Public trading of our common stock began on March 7, 2019. Prior to that, there was no public market for our common stock. The following table sets forth for the periods indicated the high and low sales prices per share of our common stock on the Nasdaq Global Select Market:

	Low	High
Fiscal year ending December 31, 2019		
First quarter (beginning March 7, 2019)	$ 24.58	$ 43.39
Second quarter	28.80	68.39
Third quarter	28.93	59.72
Fourth quarter	28.31	45.57

Dividend Policy

We have never declared or paid, and do not anticipate declaring or paying in the foreseeable future, any cash dividends on our capital stock. Any future determination as to the declaration and payment of dividends, if any, will be at the discretion of our board of directors, subject to applicable laws and will depend on then existing conditions, including our financial condition, operating results, contractual restrictions, capital requirements, business prospects, and other factors our board of directors may deem relevant.

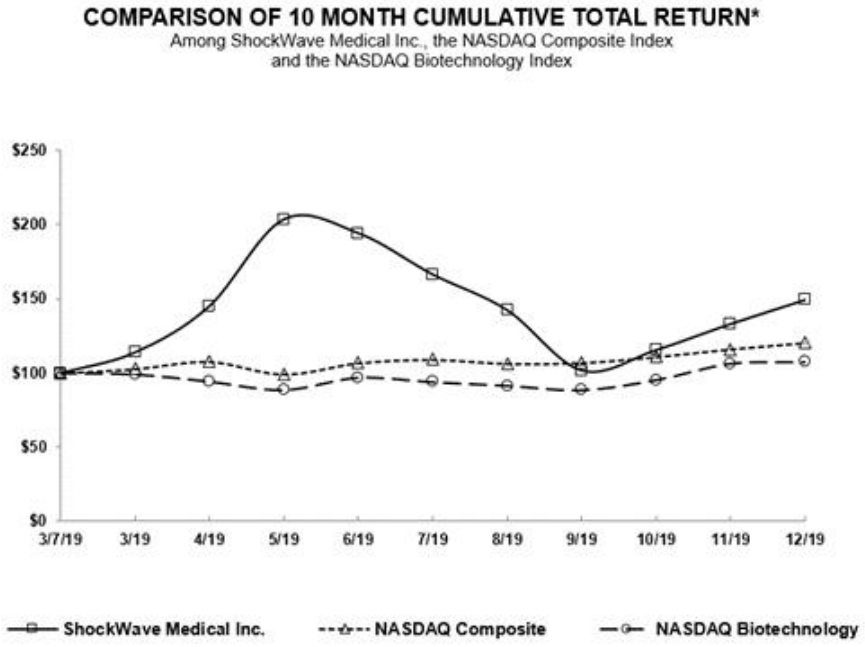
Stockholders

As of March 5, 2020, there were 35 holders of record of our common stock, including The Depository Trust Company, which holds shares of our common stock on behalf of an indeterminate number of beneficial owners.

Stock Performance Graph

The following shall not be deemed "filed" for purposes of Section 18 of the Exchange Act, or incorporated by reference into any of our other filings under the Exchange Act or the Securities Act of 1933, as amended, except to the extent we specifically incorporate it by reference into such filing.

This chart compares the cumulative total return on our common stock with that of the NASDAQ Composite Index and the NASDAQ Biotechnology Index. The graph assumes $100 was invested in each of the Company's common stock, the NASDAQ Composite Index and the NASDAQ Biotechnology Index, and assumes reinvestment of any dividends. Note that historic stock price performance is not necessarily indicative of future stock price performance.



*$100 invested on 3/7/19 in stock or 2/28/19 in index, including reinvestment of dividends.
Fiscal year ending December 31.

Item 6. Selected Financial Data.

The consolidated statements of operations data for the fiscal years ended December 31, 2019, 2018, and 2017, and the selected consolidated balance sheets data as of December 31, 2019 and 2018, are derived from our audited consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

The selected consolidated balance sheet data as of December 31, 2017 is derived from our audited consolidated financial statements which are not included in this Annual Report on Form 10-K.

The information set forth below is not necessarily indicative of results of future operations, and should be read in conjunction with Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations" and the Consolidated Financial Statements and related notes included in Part II, Item 8, "Consolidated Financial Statements and Supplementary Data" in this Annual Report on Form 10-K.

	Year Ended December 31, (in thousands, except share and per share data)		
Consolidated Statement of Operations Data:	**2019**	**2018**	**2017**
Revenue:			
Product revenue	$ 42,927	$ 12,263	$ 1,719
Operating expenses:			
Cost of product revenue	17,159	7,250	2,836
Research and development	32,853	22,698	17,963
Sales and marketing	30,620	17,536	6,363
General and administrative	14,134	5,979	5,422
Total operating expenses	94,766	53,463	32,584
Loss from operations	(51,839)	(41,200)	(30,865)
Interest expense	(944)	(401)	(58)
Change in fair value of warrant liability	(609)	(52)	(32)
Other income, net	2,345	589	366
Net loss before taxes	(51,047)	(41,064)	(30,589)
Income tax provision	62	38	26
Net loss	$ (51,109)	$ (41,102)	$ (30,615)
Net loss per share attributable to common shareholders:			
Net loss per share, basic and diluted	$ (2.14)	$ (23.39)	$ (19.71)
Shares used in computing net loss per share, basic and diluted	23,904,828	1,757,102	1,553,365

	As of December 31,		
Consolidated Balance Sheet Data:	**2019**	**2018**	**2017**
Cash, cash equivalents and short-term investments	$ 195,349	$ 39,643	$ 53,729
Working capital	192,689	39,365	53,318
Total assets	231,938	53,421	59,304
Long-term debt, current and non-current	13,819	15,050	—
Convertible preferred stock warrant liability	—	313	577
Convertible preferred stock	—	152,806	137,469
Accumulated deficit	(177,974)	(126,865)	(85,763)
Total stockholders' equity (deficit)	192,653	(122,588)	(83,292)

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations.

You should read the following discussion and analysis of our financial condition and results of operations together with our consolidated financial statements and the related notes included in Part II, Item 8 of this Annual Report on Form 10-K.

This Annual Report on Form 10-K contains forward-looking statements within the meaning of Section 27A of the Securities Exchange Act of 1933, as amended, or the Securities Act, and Section 21E of the Securities Exchange Act of 1934, as amended ("the Exchange Act"). Forward-looking statements are identified by words such as "believe," "will," "may," "estimate," "continue," "anticipate," "intend," "should," "plan," "expect," "predict," "could," "potentially" or the negative of these terms or similar expressions. You should read these statements carefully because they discuss future expectations, contain projections of future results of operations or financial condition, or state other "forward-looking" information. These statements relate to our future plans, objectives, expectations, intentions and financial performance and the assumptions that underlie these statements. These forward-looking statements are subject to certain risks and uncertainties that could cause actual results to differ materially from those anticipated in the forward-looking statements. Factors that might cause such a difference include, but are not limited to, those discussed in this report in Part I, Item 1A — "Risk Factors," and elsewhere in this report. Forward-looking statements are based on our management's beliefs and assumptions and on information currently available to our management. These statements, like all statements in this report, speak only as of their date, and we undertake no obligation to update or revise these statements in light of future developments. We caution investors that our business and financial performance are subject to substantial risks and uncertainties.

Company Overview

We are a medical device company focused on developing and commercializing products intended to transform the way calcified cardiovascular disease is treated. We aim to establish a new standard of care for medical device treatment of atherosclerotic cardiovascular disease through our differentiated and proprietary local delivery of sonic pressure waves for the treatment of calcified plaque, which we refer to as intravascular lithotripsy ("IVL"). Our IVL system (our "IVL System"), which leverages our IVL technology (our "IVL Technology"), is a minimally invasive, easy-to-use and safe way to significantly improve patient outcomes. Our Shockwave M5 IVL catheter ("M5 catheter") was CE-Marked in April 2018 and cleared by the U.S. Food and Drug Administration ("FDA") in July 2018 for use in our IVL System for the treatment of peripheral artery disease ("PAD"). Our Shockwave C2 IVL catheter ("C2 catheter"), which we are currently marketing in Europe, was CE-Marked in June 2018 for use in our IVL System for the treatment of coronary artery disease ("CAD"). In August 2019, we received the Breakthrough Device Designation from the FDA for our C2 catheters using our IVL System for the treatment of CAD. The second version of our Shockwave S4 IVL catheter ("S4 catheter") was cleared by the FDA in August 2019. We also have ongoing clinical programs across several products and indications, which, if successful, will allow us to expand commercialization of our products into new geographies and indications. Importantly, we are undertaking ongoing clinical trials of our C2 catheter intended to support a pre-market application ("PMA") in the United States and a Shonin submission in Japan for the treatment of CAD. In October 2018, we received staged investigational drug exemption ("IDE") approval for our DISRUPT CAD III global study, which began enrollment in 2019. This study is designed to support U.S. PMA approval for our C2 catheters. We anticipate having final data from these ongoing clinical trials intended to support a U.S. launch of our C2 catheter in the first half of 2021 and a Japan launch in 2022.

The first two indications we are targeting with our IVL System are PAD, the narrowing or blockage of vessels that carry blood from the heart to the extremities, and CAD, the narrowing or blockage of the arteries that supply blood to the heart. In the future, we see significant opportunity in the potential treatment of aortic stenosis ("AS"), a condition where the heart's aortic valve becomes increasingly calcified with age, causing it to narrow and obstruct blood flow from the heart.

We have adapted the use of lithotripsy to the cardiovascular field with the aim of creating what we believe can become the safest, most effective means of addressing the growing challenge of cardiovascular calcification. Lithotripsy has been used to successfully treat kidney stones (deposits of hardened calcium) for over 30 years. By integrating lithotripsy into a device that resembles a standard balloon catheter, physicians can prepare, deliver and treat calcified lesions using a familiar form factor, without disruption to their standard procedural workflow. Our differentiated IVL System works by delivering shockwaves through the entire depth of the artery wall, modifying calcium in the medial layer of the artery, not just at the superficial most intimal layer. The shockwaves crack this calcium and enable the stenotic artery to expand at low pressures, thereby minimizing complications inherent to traditional balloon dilations, such as dissections or tears. Preparing the vessel with IVL facilitates optimal outcomes with other therapies, including stents and drug-eluting technologies. Using IVL also avoids complications associated with atherectomy devices such as dissection, perforation and embolism. When followed by an anti-proliferative therapy such as a drug-coated balloons or drug-eluting stents, the micro-fractures may enable better drug penetration into the arterial wall and improve drug uptake, thereby improving the effectiveness of the combination treatment.

We market our products to hospitals whose interventional cardiologists, vascular surgeons and interventional radiologists treat patients with PAD and CAD. We have dedicated meaningful resources to establish a direct sales capability in the United States, Germany, Austria and Switzerland, which we have complemented with distributors in more than 35 countries. We are actively expanding our international field presence through new distributors, additional sales and clinical personnel and are adding new U.S. sales territories.

For the years ended December 31, 2019, 2018 and 2017, we generated product revenue of $42.9 million, $12.3 million and $1.7 million, respectively, and a $51.8 million, $41.2 million and $30.9 million loss from operations for the years ended December 31, 2019, 2018 and 2017, respectively. For the years ended December 31, 2019, 2018 and 2017, 47%, 43% and 44%, respectively, of our product revenue was generated from customers located outside of the United States. Our sales outside of the United States are denominated principally in Euros. As a result, we have foreign exchange exposure. We have not entered into any material foreign currency hedging contracts, although we may do so in the future.

Since inception, we have incurred significant net losses and expect to continue to incur net losses for the foreseeable future. To date, our principal sources of liquidity have been the net proceeds we received through the sale of our common stock in our initial public offering, private sales of equity securities and payments received from customers using our products. As of December 31, 2019, we had $195.3 million in cash, cash equivalents and short-term investments and an accumulated deficit of $178.0 million.

Public Offerings of Common Stock

On March 11, 2019, we closed on our initial public offering ("IPO") of 6,555,000 shares of common stock at an offering price of $17.00 per share, which included the full exercise of the underwriters' over-allotment option to purchase 855,000 additional shares of our common stock. We raised a total of $111.4 million in gross proceeds from the IPO, or approximately $99.9 million in net proceeds after deducting underwriters' discounts and commissions of $7.1 million and offering costs of $4.4 million. Concurrent with the IPO, we issued 588,235 shares of common stock in a private placement (the "Private Placement") for net proceeds of $10.0 million.

On November 15, 2019, we completed an underwritten public offering ("Follow-On Offering) of 2,854,048 shares of our common stock, including 372,267 shares sold pursuant to the underwriters' exercise of their option to purchase additional shares at a public offering price of $36.25 per share. We raised a total of $103.5 million in gross proceeds from the Follow-On Offering, or approximately $96.7 million in net proceeds after deducting underwriters' discounts and commissions of $6.2 million and offering costs of $0.6 million.

New Lease

In December 2019, we entered into a lease for office and laboratory space in two buildings located in Santa Clara, California. The purpose and effect of the lease agreement is to extend the existing Santa Clara office and laboratory premises of 35,000 square foot to approximately 85,200 square feet of rentable space.

Factors Affecting Our Business

There are a number of factors that have impacted, and we believe will continue to impact, our results of operations and growth. These factors include:

- ***Market acceptance***. The growth of our business depends on our ability to gain broader acceptance of our current products by continuing to make physicians and other hospital staff aware of the benefits of our products to generate increased demand and frequency of use, and thus increase sales to our hospital customers. Our ability to grow our business will also depend on our ability to expand our customer base in existing or new target end markets. Although we are attempting to increase the number of patients treated with procedures that use our products through our established relationships and focused sales efforts, we cannot provide assurance that our efforts will increase the use of our products.
- ***Regulatory approvals/clearances and timing and efficiency of new product introductions***. We must successfully obtain timely approvals or clearances and introduce new products that gain acceptance with physicians, ensuring adequate supply while avoiding excess inventory of older products and resulting inventory write-downs or write-offs. For our sales to grow, we will also need to receive FDA approval for the use of our C^2 catheters in our IVL System for the treatment of CAD in the United States, and will need to obtain regulatory clearance or approval of our other pipeline products in the United States and in international markets. In addition, as we introduce new products, we expect to build our inventory of components and finished goods in advance of sales, which may cause quarterly fluctuations in our results of operations.

- ***Sales force size and effectiveness***. The rate at which we grow our sales force and the speed at which newly hired salespeople become effective can impact our revenue growth or our costs incurred in anticipation of such growth. We intend to continue to make significant investments in our sales and marketing organization by increasing the number of U.S. sales representatives and expanding our international marketing programs to help facilitate further adoption among existing hospital accounts as well as broaden awareness of our products to new hospital accounts.
- ***Competition***. Our industry is intensely competitive and, in particular, we compete with a number of large, well-capitalized companies. We must continue to successfully compete in light of our competitors' existing and future products and related pricing and their resources to successfully market to the physicians who use our products.
- ***Reimbursement***. The level of reimbursement from third-party payors for procedures performed using our products could have a substantial impact on the prices we are able to charge for our products and how widely our products are accepted. The level at which reimbursement is set for procedures using our products, and any increase in reimbursement for procedures using our products, will depend substantially on our ability to generate clinical evidence, to gain advocacy in the respective physician societies and to work with the Centers for Medicare & Medicaid Services and payors.
- ***Clinical results***. Publications of clinical results by us, our competitors and other third parties can have a significant influence on whether, and the degree to which, our products are used by physicians and the procedures and treatments those physicians choose to administer for a given condition.
- ***Product and Geographic Mix; Timing***. Our financial results, including our gross margins, may fluctuate from period to period based on the timing of customer orders or medical procedures, the number of available selling days in a particular period, which can be impacted by a number of factors, such as holidays or days of severe inclement weather in a particular geography, the mix of products sold and the geographic mix of where products are sold. In particular, our distributors for international sales receive a distribution margin on sales of our IVL catheters, which affects our gross margin.
- ***Seasonality***. We expect to experience a seasonal slowing of demand for our products in our fourth quarters due to year-end clinical treatment patterns, such as the postponement of elective surgeries around the winter holidays. In addition, we have experienced some seasonality during summer months, which we believe is attributable to the postponement of elective surgeries for summer vacation plans of physicians and patients. We expect these seasonal factors to become more pronounced in the future as our business grows.

In addition, we have experienced and expect to continue to experience meaningful variability in our quarterly revenue and gross profit/loss as a result of a number of factors, including, but not limited to: inventory write-offs and write-downs; costs, benefits and timing of new product introductions; the availability and cost of components and raw materials; and fluctuations in foreign currency exchange rates. Additionally, we experience quarters in which operating expenses, in particular research and development expenses, fluctuate depending on the stage and timing of product development.

While these factors may present significant opportunities for us, they also pose significant risks and challenges that we must address.

Components of Our Results of Operations

Product revenue

Product revenue is primarily from the sale of our IVL catheters.

We sell our products to hospitals, primarily through direct sales representatives, as well as through distributors in selected international markets. For products sold through direct sales representatives, control is transferred upon delivery to customers. For products sold to distributors internationally and certain customers that purchase stocking orders in the United States, control is transferred upon shipment or delivery to the customer's named location, based on the contractual shipping terms. Additionally, a significant portion of our revenue is generated through a consignment model under which inventory is maintained at hospitals. For consignment inventory, control is transferred at the time the catheters are consumed in a procedure.

Cost of product revenue

Cost of product revenue consists primarily of costs of components for use in our products, the materials and labor that are used to produce our products, the manufacturing overhead that directly supports production and the depreciation relating to the equipment used in our IVL System that we loan to our hospital customers without charge to facilitate the use of our IVL catheters in their procedures. We depreciate equipment over a three-year period. We expect cost of product revenue to increase in absolute terms as our revenue grows.

Our gross margin has been and will continue to be affected by a variety of factors, primarily production volumes, the cost of direct materials, product mix, geographic mix, discounting practices, manufacturing costs, product yields, headcount and cost-reduction strategies. We expect our gross margin percentage to increase over the long term to the extent we are successful in increasing our sales volume and are therefore able to leverage our fixed costs. We intend to use our design, engineering and manufacturing capabilities to further advance and improve the efficiency of our manufacturing processes, which, if successful, we believe will reduce costs and enable us to increase our gross margin percentage. While we expect gross margin percentage to increase over the long term, it will likely fluctuate from quarter to quarter as we continue to introduce new products and adopt new manufacturing processes and technologies.

Research and development expenses

Research and development ("R&D") expenses consist of applicable personnel, consulting, materials and clinical trial expenses. R&D expenses include:

- certain personnel-related expenses, including salaries, benefits, bonus, travel and stock-based compensation;
- cost of clinical studies to support new products and product enhancements, including expenses for clinical research organizations ("CROs") and site payments;
- materials and supplies used for internal R&D and clinical activities;
- allocated overhead including facilities and information technology expenses; and
- cost of outside consultants who assist with technology development, regulatory affairs, clinical affairs and quality assurance.

R&D costs are expensed as incurred. In the future, we expect R&D expenses to increase in absolute dollars as we continue to develop new products, enhance existing products and technologies and perform activities related to obtaining additional regulatory approval.

Sales and marketing expenses

Sales and marketing expenses consist of personnel-related expenses, including salaries, benefits, sales commissions, travel and stock-based compensation. Other sales and marketing expenses include marketing and promotional activities, including trade shows and market research, and cost of outside consultants. We expect to continue to grow our sales force and increase marketing efforts as we continue commercializing products based on our IVL Technology.

General and administrative expenses

General and administrative expenses consist of personnel-related expenses, including salaries, benefits, bonus, travel and stock-based compensation. Other general and administrative expenses include professional services fees, including legal, audit and tax fees, insurance costs, cost of outside consultants and employee recruiting and training costs. Moreover, we expect to incur additional expenses associated with operating as a public company, including legal, accounting, insurance, exchange listing and SEC compliance and investor relations.

Interest expense

Interest expense consists of interest on our debt and amortization of associated debt discount. In February 2018, we entered into a Loan and Security Agreement with Silicon Valley Bank for a term loan and a revolving line of credit, as described in Note 7 to our audited consolidated financial statements appearing elsewhere in this Annual Report on Form 10-K (the "Loan and Security Agreement"). In June 2018 and December 2018, we drew an aggregate of $15.0 million in borrowings under the term loan facility. As of December 31, 2019, we had $13.3 million outstanding under the term loan and no amounts outstanding under the revolving line of credit.

As described in Note 13 to our audited consolidated financial statements elsewhere in this Annual Report on Form 10-K, on February 11, 2020, the Company entered into the First Amendment (the "Amended Credit Facility") to the Loan and Security Agreement, to refinance the existing term loan. The Amendment provided us with a supplemental term loan in the amount of $16.5 million. The Company used $13.2 million of the proceeds from the supplemental term loan to repay in full all amounts due under the existing term loan and to pay related expenses. In addition, the Amendment terminated the Company's revolving line of credit.

Change in fair value of warrant liability

We accounted for our freestanding warrants to purchase shares of our convertible preferred stock prior to the initial public offering as liabilities at fair value primarily because the shares underlying the warrants contained contingent redemption features outside our control. The warrants were subject to re-measurement at each balance sheet date with gains and losses reported through our consolidated statements of operations and comprehensive loss. On the completion of the initial public offering, all of our outstanding preferred stock warrants were converted into 54,903 common stock warrants, which resulted in the reclassification of the convertible preferred stock warrant liability to additional paid-in capital.

Other income, net

Other income consists primarily of interest earned on our cash equivalents and short-term investments.

Income tax provision

Income tax provision consists primarily of income taxes in certain foreign jurisdictions in which we conduct business. We have a full valuation allowance for deferred tax assets, including net operating loss carryforwards and tax credits related primarily to R&D.

Results of Operations

Comparison of the Years Ended December 31, 2019 and 2018:

	Year Ended December 31,			
	2019	2018	Change $	Change %
	(in thousands, except percentages)			
Revenue:				
Product revenue	$ 42,927	$ 12,263	$ 30,664	250%
Operating expenses:				
Cost of product revenue	17,159	7,250	9,909	137%
Research and development	32,853	22,698	10,155	45%
Sales and marketing	30,620	17,536	13,084	75%
General and administrative	14,134	5,979	8,155	136%
Total operating expenses	94,766	53,463	41,303	77%
Loss from operations	(51,839)	(41,200)	(10,639)	26%
Interest expense	(944)	(401)	(543)	135%
Change in fair value of warrant liability	(609)	(52)	(557)	1,071%
Other income, net	2,345	589	1,756	298%
Net loss before taxes	(51,047)	(41,064)	(9,983)	24%
Income tax provision	62	38	24	63%
Net loss	$ (51,109)	$ (41,102)	$ (10,007)	24%

Product revenue. Product revenue increased by $30.7 million, or 250%, from $12.3 million in 2018 to $42.9 million in 2019. The change was due to an increase in the number of customers and an increase in the purchase volume of our products both within the United States and internationally.

Product revenue consisted primarily of the sale of our IVL catheters. Product revenue, classified by the major geographic areas in which our products are shipped, was $22.7 million within the United States and $20.2 million for all other countries in 2019 compared to $7.0 million within the United States and $5.3 million for all other countries in 2018.

Cost of product revenue and gross margin percentage. Cost of product revenue increased by $9.9 million, or 137%, from $7.3 million in 2018 to $17.2 million in 2019. The increase was primarily due to growth in sales volume. Gross margin percentage improved to 60.0% in 2019, compared to 40.9% in 2018. This change in gross margin percentage was primarily due to lower fixed costs per unit from increased production volume of our IVL catheters and increased efficiencies from improvements to operations and production.

Research and development expenses. The following table summarizes our R&D expenses incurred during the periods presented:

	Year Ended December 31,			
	2019	2018	Change $	Change %
	(in thousands, except percentages)			
Compensation and personnel-related costs	$ 13,302	$ 10,580	$ 2,722	26%
Clinical-related costs	12,933	5,626	7,307	130%
Material and supplies	2,094	2,541	(447)	(18)%
Facilities and other allocated costs	2,252	1,560	692	44%
Outside consultants	1,449	1,360	89	7%
Other research and development costs	823	1,031	(208)	(20)%
Total research and development expenses	$ 32,853	$ 22,698	$ 10,155	45%

R&D expenses increased by $10.2 million, or 45%, from $22.7 million in 2018 to $32.9 million in 2019. The increase was primarily due to a $7.3 million increase in clinical-related costs and a $2.7 million increase in compensation and personnel-related costs to support clinical trials. Clinical-related costs in 2019 were primarily related to the CAD II, CAD III CAD IV and PAD III clinical trials. There was also a $0.7 million increase in facilities and other allocated costs due to increased rent and building expenditures. These increases were partially offset by a $0.4 million decrease in materials and supplies for R&D.

Sales and marketing expenses. Sales and marketing expenses increased by $13.1 million, or 75%, from $17.5 million in 2018 to $30.6 million in 2019. The increase was primarily due to a $10.4 million increase in compensation and personnel-related costs, which included a $4.0 million increase in commission expense, as a result of a higher headcount and increased sales of our products. Marketing and promotional expenses increased by $1.6 million to support the commercialization of our products.

General and administrative expenses. General and administrative expenses increased by $8.2 million, or 136%, from $6.0 million in 2018 to $14.1 million in 2019. The change was primarily due to a $2.6 million increase in professional services and general corporate expenses incurred in connection with our operations as a public company, a $2.8 million increase in compensation and personnel-related costs, a $2.0 million increase in legal fees, and a $0.8 million increase in costs associated with outside consultants.

Interest expense. Interest expense increased by $0.5 million, or 135%, from $0.4 million in 2018 to $0.9 million in 2019. The increase in interest expense was attributable to incurring a full year of interest expense in 2019 compared to us incurring only a partial year’s worth of interest expense in 2018 due to the Loan and Security Agreement being funded in June 2018 and December 2018.

Change in fair value of warrant liability. The change in fair value of warrant liability of $0.6 million in 2019 from $0.1 million in 2018 was due to the fair value of our convertible warrant liability increasing by $0.5 million in 2019 up to the final measurement on the date of our initial public offering.

Other income, net. Other income, net increased by $1.8 million, or 298%, to $2.3 million in 2019 from $0.6 million in 2018. The increase was primarily due to a $1.7 million increase in interest income from increased investment balances and a $0.1 million increase in other income primarily due to net foreign currency gains.

Income tax provision. The income tax provision increased by $24,000, or 63%, to $62,000 in 2019 from $38,000 in 2018. This increase was primarily due to an increase in foreign income tax expense.

Years Ended December 31, 2018 and 2017

	Year Ended December 31,			
	2018	2017	Change $	Change %
	(in thousands, except percentages)			
Revenue:				
Product revenue	$ 12,263	$ 1,719	$ 10,544	613%
Operating expenses:				
Cost of product revenue	7,250	2,836	4,414	156%
Research and development	22,698	17,963	4,735	26%
Sales and marketing	17,536	6,363	11,173	176%
General and administrative	5,979	5,422	557	10%
Total operating expenses	53,463	32,584	20,879	64%
Loss from operations	(41,200)	(30,865)	(10,335)	33%
Interest expense	(401)	(58)	(343)	591%
Change in fair value of warrant liability	(52)	(32)	(20)	63%
Other income, net	589	366	223	61%
Net loss before taxes	(41,064)	(30,589)	(10,475)	34%
Income tax provision	38	26	12	46%
Net loss	$ (41,102)	$ (30,615)	$ (10,487)	34%

Comparison of the Years Ended December 31, 2018 and 2017

Product revenue. Product revenue increased by $10.5 million, or 613%, from $1.7 million in 2017 to $12.3 million in 2018. The increase was primarily due to an increase in the number of customers and an increase in purchase volume of our products per customer both within the United States and internationally.

Product revenue consisted primarily of the sale of our IVL catheters. Product revenue, classified by the major geographic areas in which our products are shipped, was $1.0 million within the United States and $0.7 million for all other countries in 2017 and $7.0 million within the United States and $5.3 million for all other countries in 2018.

Cost of product revenue and gross margin percentage. Cost of product revenue increased by $4.4 million, or 156%, from $2.8 million in 2017 to $7.3 million in 2018. The increase was primarily due to growth in sales volume. Gross margin percentage was negative 65% for the year ended December 31, 2017. Gross margin percentage improved to 41% for the year ended December 31, 2018. This change in gross margin percentage was primarily due to increased sales volume of our catheters.

Research and development expenses. The following table summarizes our R&D expenses incurred during the periods presented:

	Year Ended December 31,			
	2018	2017	Change $	Change %
	(in thousands, except percentages)			
Compensation and personnel-related costs	$ 10,580	$ 10,263	$ 317	3%
Clinical-related costs	5,626	3,358	2,268	68%
Material and supplies	2,541	1,805	736	41%
Facilities and other allocated costs	1,560	1,153	407	35%
Outside consultants	1,360	788	572	73%
Other research and development costs	1,031	596	435	73%
Total research and development expenses	$ 22,698	$ 17,963	$ 4,735	26%

R&D expenses increased by $4.7 million, or 26%, from $18.0 million in 2017 to $22.7 million in 2018. The increase was primarily due to a $2.3 million increase in clinical-related costs and a $0.6 million increase in costs associated with outside consultants to support clinical trials. There was also a $0.7 million increase in materials and supplies for R&D and a $0.4 million increase in facilities and other allocated costs due to higher rent and building expenditures.

Sales and marketing expenses. Sales and marketing expenses increased by $11.2 million, or 176%, from $6.4 million in 2017 to $17.5 million in 2018. The increase was primarily due to a $9.5 million increase in compensation and personnel-related costs, which includes a $3.1 million increase in commission expense, as a result of increased headcount and increased business development related activities to expand the domestic and international customer base. Marketing and promotional expenses increased by $0.8 million to support the commercialization of our products.

General and administrative expenses. General and administrative expenses increased by $0.6 million, or 10%, from $5.4 million in 2017 to $6.0 million in 2018. The increase was primarily due to a $0.8 million increase in professional services and general corporate expenses incurred in connection with our preparation to become a public company, partially offset by a $0.3 million decrease in recruiting and training expenses.

Interest expense. Interest expense increased by $0.3 million, or 591%, from $0.1 million in 2017 to $0.4 million in 2018. The increase in interest expense was attributable to us entering into the Loan and Security Agreement and drawing down on the first tranche of the term loan in June 2018 of $10.0 million and the second tranche of the term loan in December 2018 of $5.0 million.

Change in fair value of warrant liability. The change in fair value of warrant liability was $32,000 in 2017 and $0.1 million in 2018, reflecting an increase in the convertible preferred stock warrant liability of $0.2 million from changes to the Black-Scholes option pricing model assumptions used to value the warrant liability, partially offset by a decrease in the convertible preferred stock warrant liability of $0.1 million related to the expiration of 46,102 of our Series A-1 convertible preferred stock warrants in 2018.

Other income, net. Other income, net increased by $0.2 million, or 61%, from $0.4 million in 2017 to $0.6 million in 2018. The increase was primarily due to a $0.3 million increase in interest income on our cash, cash equivalents and short-term investments due to increases in interest rates on balances held in interest-earning instruments, partially offset by a $0.1 million increase in other expenses.

Income tax provision. Income tax provision increased by $12,000, or 46%, from $26,000 in 2017 to $38,000 in 2018. This increase was primarily due to an increase in foreign income tax expense.

Quarterly Results of Operations

The following tables presenting our quarterly results of operations should be read in conjunction with the consolidated financial statements and related notes included in Part II, Item 8 of this Annual Report on Form 10-K. We have prepared the unaudited information on the same basis as our audited consolidated financial statements. Our operating results for any quarter are not necessarily indicative of results for any future quarters or for a full year.

The following table presents our unaudited quarterly results of operations for the eight quarters ended December 31, 2019. This table includes all adjustments, consisting only of normal recurring adjustments, that we consider necessary for a fair presentation of our consolidated financial position and operating results for the quarters presented.

	Three Months Ended,			
	December 31,	September 30,	June 30,	March 31,
	(in thousands, except per share data)			
2019				
Revenue	$ 14,312	$ 11,333	$ 10,012	$ 7,269
Loss from operations	(15,363)	(13,065)	(11,253)	(12,159)
Net loss	(14,745)	(12,957)	(10,608)	(12,792)
Net loss per share, basic and diluted	(0.49)	(0.46)	(0.38)	(1.37)
2018				
Revenue	$ 5,062	$ 3,600	$ 2,279	$ 1,322
Loss from operations	(11,128)	(10,076)	(10,194)	(9,802)
Net loss	(11,223)	(10,178)	(10,107)	(9,594)
Net loss per share, basic and diluted	(6.23)	(5.73)	(5.79)	(5.63)

Liquidity and Capital Resources

Sources of liquidity

To date, our principal sources of liquidity have been the net proceeds we received through the sales of our common stock in our public offerings, private sales of our equity securities, payments received from customers using our products and to a lesser extent proceeds from our debt financings. On March 11, 2019, we completed our initial public offering, including the underwriters' full exercise of their over-allotment option, selling 6,555,000 shares of our common stock at $17.00 per share. Upon completion of our initial public offering, we received net proceeds of $99.9 million, after deducting underwriting discounts and commissions and offering expenses. Concurrent with the initial public offering, we issued 588,235 shares of common stock in our Private Placement for net proceeds of $10.0 million. On November 15, 2019, we completed a Follow-On Offering of 2,854,048 shares of our common stock, including 372,267 shares sold pursuant to the underwriters' exercise of their option to purchase additional shares at a public offering price of $36.25 per share. Upon completion of our Follow-On Offering, we received net proceeds of $96.7 million, after deducting underwriting discounts and commissions and offering expenses.

We have a number of ongoing clinical trials, and expect to continue to make substantial investments in these trials and in additional clinical trials that are designed to provide clinical evidence of the safety and efficacy of our products. We intend to continue to make significant investments in our sales and marketing organization by increasing the number of U.S. sales representatives and expanding our international marketing programs to help facilitate further adoption among existing hospital accounts and physicians as well as broaden awareness of our products to new hospitals. We also expect to continue to make investments in R&D, regulatory affairs and clinical studies to develop future generations of products based on our IVL Technology, support regulatory submissions and demonstrate the clinical efficacy of our products. Moreover, we expect to incur additional expenses associated with operating as a public company, including legal, accounting, insurance, exchange listing and SEC compliance, investor relations and other expenses. Because of these and other factors, we expect to continue to incur substantial net losses and negative cash flows from operations for the foreseeable future.

Our future capital requirements will depend on many factors, including:

- the cost, timing and results of our clinical trials and regulatory reviews;
- the cost and timing of establishing sales, marketing and distribution capabilities;
- the terms and timing of any other collaborative, licensing and other arrangements that we may establish including any contract manufacturing arrangements;
- the timing, receipt and amount of sales from our current and potential products;
- the degree of success we experience in commercializing our products;
- the emergence of competing or complementary technologies;
- the cost of preparing, filing, prosecuting, maintaining, defending and enforcing any patent claims and other intellectual property rights; and
- the extent to which we acquire or invest in businesses, products or technologies, although we currently have no commitments or agreements relating to any of these types of transactions.

We believe that our cash, cash equivalents and short-term investments as of December 31, 2019 will be sufficient to fund our operations for at least the next 12 months from the date the audited consolidated financial statements are filed with the SEC. As of December 31, 2019, we had $195.3 million in cash, cash equivalents and short-term investments and an accumulated deficit of $178.0 million.

Debt obligations

Loan and Security Agreement. In February 2018, we entered into our Loan and Security Agreement with Silicon Valley Bank ("the Loan and Security Agreement"). The terms of the Loan and Security Agreement included a term loan of $15.0 million and a revolving line of credit of $2.0 million. The term loan is available in two tranches, of which the first tranche of $10.0 million was drawn down in June 2018 and the second tranche of $5.0 million was drawn down in December 2018. In connection with the execution of the Loan and Security Agreement, we issued Silicon Valley Bank a warrant to purchase 34,440 shares of our common stock, with a term of ten years. In April 2019, all of these common stock warrants were net exercised into 29,887 shares of common stock.

On February 11, 2020, we entered into the Amended Credit Facility to the Loan and Security Agreement, to refinance our existing term loan. The Amended Credit Facility provided us with a supplemental term loan in the amount of $16.5 million. We used $13.2 million of the proceeds from the supplemental term loan to repay in full all amounts due under the existing term loan and to pay related expenses. In addition, the Amended Credit Facility terminated the Company's revolving line of credit.

The principal amount outstanding under the supplemental term loan accrues interest, payable monthly in arrears, at a floating per annum rate equal to the greater of (A) the Wall Street Journal prime rate minus 1.25% and (B) 3.50%. No principal payments are due on the supplemental term loan until June 30, 2021; provided that such interest only period shall be extended to December 31, 2021 if we achieve specified revenue milestones and shall be extended further to June 30, 2022 if we achieve specified revenue and regulatory milestones (the date that such interest only period ends, the "Amortization Date"). Following the Amortization Date, the principal amount of the supplemental term loan shall be due in equal monthly installments through the maturity date, December 1, 2023. There is also a final payment equal to 9.5% of the original principal amount of the supplemental term loan, or $1.6 million, due at maturity (or any earlier date of optional pre-payment or acceleration of principal due to an event of default). We may, at our option, prepay the supplemental term loan in full, subject to an additional prepayment fee ranging between 0% and 3% of the original principal amount of the supplemental term loan. The prepayment fee would also be due and payable in the event of an acceleration of the principal amount of the supplemental term loan due to an event of default.

The supplemental term loan is secured by all of the Company's assets, excluding intellectual property and certain other assets. The supplemental term loan is subject to customary affirmative and restrictive covenants, including with respect to our ability to enter into fundamental transactions, incur additional indebtedness, grant liens, pay any dividend or make any distributions to stockholders, make investments and merge or consolidate with any other person or engage in transactions with affiliates, but is not subject to any financial covenants.

Cash Flows

The following table summarizes our cash flows for the periods indicated:

	Year Ended December 31,		
	2019	2018	2017
	(in thousands)		
Cash used in operating activities	$ (48,107)	$ (41,465)	$ (30,347)
Cash used in investing activities	(59,543)	(174)	(2,232)
Cash provided by financing activities	208,052	29,809	33,687
Net increase (decrease) in cash, cash equivalents and restricted cash	$ 100,402	$ (11,830)	$ 1,108

Operating activities

In 2019, cash used in operating activities was $48.1 million, attributable to a net loss of $51.1 million and a net change in our net operating assets and liabilities of $3.5 million, partially offset by non-cash charges of $6.5 million. Non-cash charges primarily consisted of $3.6 million in stock-based compensation, $1.3 million in depreciation and amortization, $0.9 million in amortization of right-of-use assets, $0.6 million in the change in fair value of our warrant liability, $0.4 million in amortization of debt issuance costs and $0.1 million of a loss due to the write down of fixed assets, partially offset by $0.5 million in accretion of discount on available-for-sale securities. The change in our net operating assets and liabilities was primarily due to a $6.8 million increase in inventory and $4.5 million increase in accounts receivable due to an increase in sales, a $0.8 million increase in prepaid expenses and other current assets and a $1.0 million decrease in lease liabilities. These changes were partially offset by a $9.6 million increase in accrued and other current liabilities and accounts payable resulting primarily from the expansion in our operating activities and accrued bonuses and commissions.

In 2018, cash used in operating activities was $41.5 million, attributable to a net loss of $41.1 million and a net change in our net operating assets and liabilities of $2.6 million, partially offset by non-cash charges of $2.3 million. Non-cash charges primarily consisted of $1.3 million in stock-based compensation, $0.7 million in depreciation and amortization and $0.2 million in amortization of debt issuance costs. The change in our net operating assets and liabilities was primarily due to a $2.6 million increase in inventory and $2.2 million increase in accounts receivable due to an increase in sales, and a $0.9 million increase in other assets from deferred offering costs. These changes were partially offset by a $3.1 million increase in accrued and other current liabilities and accounts payable resulting primarily from increases in our operating activities and accrued professional services fees.

In 2017, cash used in operating activities was $30.3 million, attributable to a net loss of $30.6 million and a net change in our net operating assets and liabilities of $1.3 million, partially offset by non-cash charges of $1.5 million. Non-cash charges primarily consisted of $1.0 million in stock-based compensation and $0.5 million in depreciation. The change in our net operating assets and liabilities was primarily due to a $1.9 million increase in inventory for anticipated growth in our business, a $0.6 million increase in accounts receivable due to increase in sales, and a $0.4 million increase in prepaid expenses and other current assets. These changes were partially offset by a $1.6 million increase in accrued and other current liabilities and accounts payable resulting primarily from increases in our operating activities.

Investing activities

In 2019, cash used in investing activities was $59.5 million, attributable to the purchase of available-for-sale securities of $119.5 million and the purchase of property and equipment of $3.8 million, partially offset by proceeds from the maturity of available-for-sale investments of $63.8 million.

In 2018, cash used in investing activities was $0.2 million, attributable to the purchase of property and equipment of $2.0 million, partially offset by the maturity of available-for-sale investments of $1.8 million.

In 2017, cash used in investing activities was $2.2 million, attributable to purchases of investments of $17.7 million and purchase of property and equipment of $0.4 million, partially offset by maturity of available-for-sale investments of $15.9 million.

Financing activities

In 2019, cash provided by financing activities was $208.1 million, attributable to net proceeds of $100.5 million received in the IPO in March 2019, net proceeds of $96.9 million from our Follow-On Offering in November 2019, net proceeds of $10.0 million from the concurrent Private Placement in March 2019, and proceeds of $2.2 million from stock option exercises and $0.1 million from warrant exercises. These changes were offset by payments of our term loan of $1.7 million.

In 2018, cash provided by financing activities was $29.8 million, attributable to proceeds of $15.0 million from borrowings on the Loan and Security Agreement, net proceeds of $14.9 million from the issuance of our Series D convertible preferred stock and proceeds from stock option exercises and warrant exercises of $0.5 million, partially offset by deferred offering cost payments of $0.6 million.

In 2017, cash provided by financing activities was $33.7 million, attributable to net proceeds of $34.9 million from the issuance of our Series C convertible preferred stock and proceeds from stock option exercises and warrant exercises of $0.3 million, partially offset by the principal payment of our term loan of $1.6 million.

Contractual Obligations and Commitments

The following table summarizes our contractual obligations and commitments as of December 31, 2019:

	Payments Due by Period				
	Total	Less than 1 Year	1-3 Years	3-5 Years	More than 5 Years
	(in thousands)				
Operating lease obligations(1)	$ 18,998	$ 1,292	$ 4,349	$ 5,166	$ 8,191
Debt, principal and interest(2)	14,789	7,000	7,789	—	—
Total	$ 33,787	$ 8,292	$ 12,138	$ 5,166	$ 8,191

(1) In December 2019, we entered into a lease for office and laboratory space in two buildings located in Santa Clara, California. The lease term for the first building began in December 2019 and the lease term for the second building will begin in September 2022. Operating lease obligations in the above table includes lease expense for both buildings.

(2) In June 2018 and December 2018, we borrowed $10.0 and $5.0 million, respectively, pursuant to a term loan under the Loan and Security Agreement. The term loan matures in December 2021. Principal payments associated with the term loan are included in the above table. Interest expense incurred on the term loan is included in the above table based on obligations outstanding and rates effective as of December 31, 2019, including a final one-time payment of $1.0 million in December 2021. In February 2020, we refinanced the term loan that provides us with a supplemental term loan in the amount of $16.5 million. We used $13.2 million of the proceeds from our new supplemental term loan to repay in full all amounts due under the existing term loan and to pay related expenses. Refer to Note 13 for details on our refinancing.

Off-Balance Sheet Arrangements

During the periods presented, we did not have, nor do we currently have, any off-balance sheet arrangements as defined in the rules and regulations of the SEC.

Critical Accounting Policies and Estimates

Management’s discussion and analysis of our financial condition and results of operations is based on our consolidated financial statements, which have been prepared in accordance with U.S. generally accepted accounting principles (“GAAP”). The preparation of these consolidated financial statements requires us to make estimates and assumptions for the reported amounts of assets, liabilities, revenue, expenses and related disclosures. Our estimates are based on our historical experience and on various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions and any such differences may be material.

While our significant accounting policies are more fully described in the Note 2 to our audited consolidated financial statements appearing elsewhere in this Annual Report on Form 10-K, we believe the following discussion addresses our most critical accounting policies, which are those that are most important to our financial condition and results of operations and require our most difficult, subjective and complex judgments.

Revenue recognition

We adopted Accounting Standards Codification ("ASC") 606, *Revenue from Contracts with Customers*, effective January 1, 2018 using the modified retrospective method. The adoption of ASC 606 did not have a material effect on our revenue recognition.

We sell our products to hospitals, primarily through direct sales representatives, as well as through distributors in selected international markets. For products sold through direct sales representatives, control is transferred upon delivery to customers. For products sold to distributors internationally and certain customers that purchase stocking orders in the United States, control is transferred upon shipment or delivery to the customer's named location, based on the contractual shipping terms. Additionally, a significant portion of our revenue is generated through a consignment model under which inventory is maintained at hospitals. For consignment inventory, control is transferred at the time the catheters are consumed in a procedure.

Under agreements with our customers, we generally provide for the use of an IVL generator and connector cable at no charge to facilitate the use of our IVL catheters. These agreements do not contain contractually enforceable minimum commitments and are generally cancellable by either party with 30 days' notice.

Accrued research and development costs

We accrue liabilities for estimated costs of R&D activities conducted by our third-party service providers, which include the conduct of preclinical and clinical studies. We record the estimated costs of R&D activities based upon the estimated amount of services provided but not yet invoiced, and include these costs in accrued liabilities on the consolidated balance sheet and within R&D expense on the consolidated statements of operations and comprehensive loss.

We accrue for these costs based on factors, such as estimates of the work completed and budget provided and in accordance with agreements established with our third-party service providers. We make significant judgments and estimates in determining the accrued liabilities balance in each reporting period. As actual costs become known, we adjust our accrued liabilities. We have not experienced any material differences between accrued costs and actual costs incurred since our inception.

Recent Accounting Pronouncements

Please refer to Note 2 to our consolidated financial statements appearing under Part 2, Item 8 for a discussion of new accounting standards updates that may impact us.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk.

Interest rate risk

Our cash, cash equivalents and short-term investments as of December 31, 2019 consist of $195.3 million in bank deposits and money market funds. Such interest-earning instruments carry a degree of interest rate risk. The goals of our investment policy are liquidity and capital preservation; we do not enter into investments for trading or speculative purposes and have not used any derivative financial instruments to manage our interest rate exposure. We believe that we do not have any material exposure to changes in the fair value of these assets as a result of changes in interest rates due to the short-term nature of our cash, cash equivalents and short-term investments.

As of December 31, 2019, we had $13.8 million in variable rate debt outstanding. In February 2020, we refinanced the term loan that provides us with a supplemental term loan in the amount of $16.5 million. We used $13.2 million of the proceeds from our new supplemental term loan to repay in full all amounts due under the existing term loan and to pay related expenses. The supplemental term loan requires monthly repayments of principal starting as early as June 2021, subject to a contingent deferral if certain milestones are met. The supplemental term loan matures on December 1, 2023 and accrues interest at a floating per annum rate equal to the greater of the Prime Rate minus 1.25% and 3.5%. Interest rate was 3.50% as of the date of the amendment.

Foreign currency exchange risk

As we expand internationally, our results of operations and cash flows may become increasingly subject to fluctuations due to changes in foreign currency exchange rates. Our revenue is denominated primarily in U.S. dollars and Euros. For the years ended December 31, 2019 and 2018, approximately 27% and 26% of our product revenue, respectively, was denominated in Euros. Our expenses are generally denominated in the currencies in which our operations are located, which is primarily in the United States. A 10% change in exchange rates could result in a change in fair value of $1.2 million and $0.2 million in foreign currency cash and accounts receivable as of December 31, 2019 and 2018, respectively. As our operations in countries outside of the United States grow, our results of operations and cash flows may be subject to fluctuations due to changes in foreign currency exchange rates, which could harm our business in the future. To date, we have not entered into any material foreign currency hedging contracts, although we may do so in the future.

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

Report of Independent Registered Public Accounting Firm

To the Stockholders and the Board of Directors of ShockWave Medical, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of ShockWave Medical, Inc. (the Company) as of December 31, 2019 and 2018, the related consolidated statements of operations and comprehensive loss, stockholders' equity (deficit) and cash flows for each of the three years in the period ended December 31, 2019, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2019 and 2018, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2019, in conformity with U.S. generally accepted accounting principles.

Basis for Opinion

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

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2016.

San Jose, California
March 12, 2020

SHOCKWAVE MEDICAL, INC.
Consolidated Balance Sheets
(in thousands, except share and per share data)

	December 31, 2019	December 31, 2018
ASSETS		
CURRENT ASSETS:		
Cash and cash equivalents	$ 139,045	$ 39,643
Short-term investments	56,304	—
Accounts receivable, net	7,377	2,850
Inventory	12,074	5,131
Prepaid expenses and other current assets	1,897	1,112
Total current assets	216,697	48,736
Operating lease right-of-use assets	8,825	—
Property and equipment, net	4,910	2,619
Other assets	1,506	2,066
TOTAL ASSETS	$ 231,938	$ 53,421
LIABILITIES, CONVERTIBLE PREFERRED STOCK AND STOCKHOLDERS' EQUITY (DEFICIT)		
CURRENT LIABILITIES:		
Accounts payable	$ 2,790	$ 1,487
Term notes, current portion	6,667	1,667
Accrued liabilities	13,777	6,217
Lease liability, current portion	774	—
Total current liabilities	24,008	9,371
Lease liability, noncurrent portion	8,125	—
Term notes, noncurrent portion	7,152	13,383
Convertible preferred stock warrant liability	—	313
Other liabilities	—	136
TOTAL LIABILITIES	39,285	23,203
Commitments and contingencies (Note 6)		
Convertible preferred stock, $0.001 par value; 5,000,000 and 229,098,987 shares authorized as of December 31, 2019 and 2018; nil and 18,670,328 shares issued and outstanding as of December 31, 2019 and 2018	—	152,806
STOCKHOLDERS' EQUITY (DEFICIT):		
Preferred stock	—	—
Common stock, $0.001 par value; 281,274,838 and 325,000,000 shares authorized as of December 31, 2019 and 2018; 31,446,787 and 1,824,852 shares as of December 31, 2019 and 2018 issued and outstanding	31	2
Additional paid-in capital	370,561	4,275
Accumulated other comprehensive income	35	—
Accumulated deficit	(177,974)	(126,865)
TOTAL STOCKHOLDERS' EQUITY (DEFICIT)	192,653	(122,588)
TOTAL LIABILITIES, CONVERTIBLE PREFERRED STOCK AND STOCKHOLDERS' EQUITY (DEFICIT)	$ 231,938	$ 53,421

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

SHOCKWAVE MEDICAL, INC.
Consolidated Statements of Operations and Comprehensive Loss
(in thousands, except share and per share data)

	Year Ended December 31,		
	2019	**2018**	**2017**
Revenue:			
Product revenue	$ 42,927	$ 12,263	$ 1,719
Operating expenses:			
Cost of product revenue	17,159	7,250	2,836
Research and development	32,853	22,698	17,963
Sales and marketing	30,620	17,536	6,363
General and administrative	14,134	5,979	5,422
Total operating expenses	94,766	53,463	32,584
Loss from operations	(51,839)	(41,200)	(30,865)
Interest expense	(944)	(401)	(58)
Change in fair value of warrant liability	(609)	(52)	(32)
Other income, net	2,345	589	366
Net loss before taxes	(51,047)	(41,064)	(30,589)
Income tax provision	62	38	26
Net loss	$ (51,109)	$ (41,102)	$ (30,615)
Unrealized gain (loss) on available-for-sale securities	35	1	(1)
Total comprehensive loss	$ (51,074)	$ (41,101)	$ (30,616)
Net loss per share, basic and diluted	$ (2.14)	$ (23.39)	$ (19.71)
Shares used in computing net loss per share, basic and diluted	23,904,828	1,757,102	1,553,365

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

SHOCKWAVE MEDICAL, INC.
Consolidated Statements of Convertible Preferred Stock and Stockholders' Equity (Deficit)
(in thousands, except share data)

	Convertible Preferred Stock		Common Stock		Additional Paid-In Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Deficit	Total Stockholders' Equity (Deficit)
	Shares	Amount	Shares	Amount				
Balance—December 31, 2016	14,605,589	$ 102,180	1,555,510	$ 2	$ 1,315	$ —	$ (55,148)	$ (53,831)
Issuance of Series C convertible preferred stock, net of issuance costs of $93	2,840,504	34,907	—	—	—	—	—	—
Exercise of Series A-1 warrants	63,952	382	—	—	—	—	—	—
Exercise of stock options	—	—	71,522	—	139	—	—	139
Unrealized loss on available-for-sale securities	—	—	—	—	—	(1)	—	(1)
Vesting of early exercised options	—	—	—	—	51	—	—	51
Stock-based compensation	—	—	—	—	965	—	—	965
Net loss	—	—	—	—	—	—	(30,615)	(30,615)
Balance—December 31, 2017	17,510,045	137,469	1,627,032	2	2,470	(1)	(85,763)	(83,292)
Issuance of Series D convertible preferred stock, net of issuance costs of $80	1,090,608	14,920	—	—	—	—	—	—
Exercise of Series A-1 warrants	69,675	417	—	—	—	—	—	—
Issuance of common stock warrants	—	—	—	—	104	—	—	104
Exercise of stock options	—	—	197,820	—	326	—	—	326
Unrealized gain on available-for-sale securities	—	—	—	—	—	1	—	1
Vesting of early exercised options	—	—	—	—	78	—	—	78
Stock-based compensation	—	—	—	—	1,297	—	—	1,297
Net loss	—	—	—	—	—	—	(41,102)	(41,102)
Balance — December 31, 2018	18,670,328	152,806	1,824,852	2	4,275	—	(126,865)	(122,588)
Exercise of common stock warrants for cash	—	—	50,331	—	110	—	—	110
Issuance of common stock upon net exercise of warrants	—	—	180,952	—	133	—	—	133
Conversion of preferred stock to common stock upon initial public offering	(18,670,328)	(152,806)	18,670,328	18	152,788	—	—	152,806
Conversion of Series A-1 warrants to common stock warrants upon initial public offering	—	—	—	—	789	—	—	789
Issuance of common stock in connection with initial public offering, net of issuance costs of $11.5 million	—	—	6,555,000	7	99,917	—	—	99,924
Issuance of common stock in connection with private placement	—	—	588,235	1	9,999	—	—	10,000
Issuance of common stock in connection with public offering, net of issuance costs of $6.8 million	—	—	2,854,048	3	96,674	—	—	96,677
Exercise of stock options	—	—	723,155	—	2,206	—	—	2,206
Vesting of early exercised options	—	—	—	—	27	—	—	27
Stock-based compensation	—	—	—	—	3,646	—	—	3,646
Adjustment for fractional shares resulting from reverse stock split	—	—	(114)	—	(3)	—	—	(3)
Unrealized gain on available-for-sale securities	—	—	—	—	—	35	—	35
Net loss	—	—	—	—	—	—	(51,109)	(51,109)
Balance — December 31, 2019	—	$ —	31,446,787	$ 31	$ 370,561	$ 35	$ (177,974)	$ 192,653

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

SHOCKWAVE MEDICAL, INC.
Consolidated Statements of Cash Flows
(in thousands)

	Year Ended December 31,		
	2019	2018	2017
CASH FLOWS FROM OPERATING ACTIVITIES:			
Net loss	$ (51,109)	$ (41,102)	$ (30,615)
Adjustments to reconcile net loss to net cash used in operating activities:			
Depreciation and amortization	1,337	700	468
Stock-based compensation	3,646	1,297	965
Amortization of right-of-use assets	944	—	—
Accretion of discount on available-for-sale securities	(543)	—	—
Loss on write down of fixed assets	67	31	38
Change in fair value of warrant liability	609	52	32
Amortization of debt issuance costs	436	206	18
Changes in operating assets and liabilities:			
Accounts receivable	(4,527)	(2,211)	(594)
Inventory	(6,824)	(2,608)	(1,863)
Prepaid expenses and other current assets	(785)	(144)	(373)
Other assets	41	(917)	—
Accounts payable	1,272	360	249
Accrued and other current liabilities	8,339	2,773	1,328
Lease liabilities	(1,010)	—	—
Other liabilities	—	98	—
Net cash used in operating activities	(48,107)	(41,465)	(30,347)
CASH FLOWS FROM INVESTING ACTIVITIES:			
Purchase of available-for-sale securities	(119,476)	—	(17,707)
Proceeds from maturities of available-for-sale securities	63,750	1,807	15,900
Purchase of property and equipment	(3,817)	(1,981)	(425)
Net cash used in investing activities	(59,543)	(174)	(2,232)
CASH FLOWS FROM FINANCING ACTIVITIES:			
Proceeds from issuance of common stock upon initial public offering, net of issuance costs paid	100,547	—	—
Proceeds from issuance of convertible preferred stock, net of issuance costs	—	14,920	34,907
Proceeds from issuance of common stock in private placement	10,000	—	—
Issuance of common stock in public offering, net of issuance costs	96,856	—	—
Proceeds from term loans	—	14,988	—
Payment of deferred offering costs	—	(626)	—
Proceeds from stock option exercises	2,206	426	139
Proceeds from warrant exercises	110	101	198
Principal payment of term loan	(1,667)	—	(1,557)
Net cash provided by financing activities	208,052	29,809	33,687
Net increase (decrease) in cash, cash equivalents and restricted cash	100,402	(11,830)	1,108
Cash, cash equivalents and restricted cash at beginning of period	40,093	51,923	50,815
Cash, cash equivalents and restricted cash equivalents at end of period	$ 140,495	$ 40,093	$ 51,923
SUPPLEMENTAL DISCLOSURES OF CASH FLOW INFORMATION:			
Interest paid	$ 534	$ 156	$ 40
Income tax paid	$ 120	$ 5	$ —
NON-CASH INVESTING AND FINANCING ACTIVITIES:			
Common stock issued on conversion of convertible preferred stock	$ 152,806	$ —	$ —
Issuance of Series A-1 convertible preferred stock on net exercise of warrants	$ —	$ 316	$ —
Deferred offering cost included in account payable and accrued liabilities	$ —	$ 893	$ —
Offering cost included in account payable and accrued liabilities	$ 179	$ —	$ —
Common stock warrants issued on conversion of preferred stock warrants and the reclassification of the warrant liability	$ 789	$ —	$ —
Right-of-use asset obtained in exchange for lease liability	$ 6,948	$ —	$ —
Property and equipment purchases included in accounts payable and accrued liabilities	$ 52	$ 55	$ 58
Issuance of common stock warrants in connection with debt financing	$ —	$ 104	$ —
Transfer of fixed assets to inventory	$ 119	$ —	$ —

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

1. Organization and Basis of Presentation

ShockWave Medical, Inc. (the "Company") was incorporated on June 17, 2009. The Company is primarily engaged in the development of Intravascular Lithotripsy ("IVL") Technology for the treatment of calcified plaque in patients with peripheral vascular, coronary vascular and heart valve disease. Built on a balloon catheter platform, the IVL technology uses lithotripsy to disrupt both superficial and deep vascular calcium, while minimizing soft tissue injury, and an integrated angioplasty balloon to dilate blockages at low pressures, restoring blood flow.

In 2016, the Company began commercial and manufacturing operations, and began selling catheters based on the IVL Technology. The Company's headquarters are in Santa Clara, California. The Company is located and operates primarily in the United States and has a subsidiary in Germany.

Initial Public Offering

On March 11, 2019, the Company completed an initial public offering ("IPO") of its common stock. As part of the IPO, the Company issued and sold 6,555,000 shares of its common stock, which included 855,000 shares sold pursuant to the exercise of the underwriters' over-allotment option, at a public offering price of $17.00 per share. The Company received net proceeds of approximately $99.9 million from the IPO, after deducting underwriters' discounts and commissions. Prior to the completion of the IPO, all shares of Series A, A-1, B, C and D convertible preferred stock then outstanding were converted into 18,670,259 shares of common stock on a one-to-one basis.

In addition, on the completion of the IPO, all the Company's outstanding preferred stock warrants were converted into 54,903 common stock warrants, which resulted in the reclassification of the convertible preferred stock warrant liability to additional paid-in capital. Furthermore, 101,744 shares of common stock were issued upon net exercise of warrants at the time of the IPO.

Concurrent with the IPO, the Company issued 588,235 shares of its common stock in a private placement for net proceeds of $10.0 million.

Public Offering

On November 15, 2019, the Company completed an underwritten public offering ("Follow-On Offering") of 2,854,048 shares of its common stock, including 372,267 shares sold pursuant to the underwriters' exercise of their option to purchase additional shares at a public offering price of $36.25 per share. The Company received net proceeds of $96.7 million from the Follow-On Offering after deducting underwriters' discounts and commissions.

Reverse Stock Split

In February 2019, the Company's board of directors approved an amended and restated certificate of incorporation to effect a reverse split of shares of the Company's common stock and convertible preferred stock on a 12.2-for-one basis (the "Reverse Stock Split"). The par values of the common stock and convertible preferred stock were not adjusted as a result of the Reverse Stock Split. All references to common stock, convertible preferred stock, warrants to purchase common stock, warrants to purchase convertible preferred stock, options to purchase common stock, early exercised options, share data, per share data and related information contained in the consolidated financial statements have been retrospectively adjusted to reflect the effect of the Reverse Stock Split for all periods presented. The number of shares of the Company's common stock contained in the consolidated financial statements includes fractional shares resulting from the Reverse Stock Split, aggregating to 45 whole shares of common stock and 69 whole shares of preferred stock as of December 31, 2018, which fractional shares were settled in cash in fiscal 2019.

Liquidity

As of December 31, 2019, the Company had cash, cash equivalents and short-term investments of $195.3 million, which are available to fund future operations. The Company believes that its cash, cash equivalents and short-term investments as of December 31, 2019, will be sufficient for the Company to continue as a going concern for at least 12 months from the date the consolidated financial statements are filed with the Securities and Exchange Commission ("SEC").

2. Summary of Significant Accounting Policies

Principles of Consolidation

The accompanying consolidated financial statements include the accounts of the Company and its wholly owned subsidiary. All intercompany balances and transactions have been eliminated in consolidation.

Use of Estimates

The preparation of consolidated financial statements in conformity with accounting principles generally accepted in the United States of America ("U.S. GAAP") requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of expenses during the reporting period. Significant estimates and assumptions made in the accompanying consolidated financial statements include, but are not limited to the valuation of inventory, the fair value of common stock, the fair value of preferred stock warrant liabilities, the fair value of stock options, recoverability of the Company's net deferred tax assets, and related valuation allowance and certain accruals. The Company evaluates its estimates and assumptions on an ongoing basis using historical experience and other factors and adjusts those estimates and assumptions when facts and circumstances dictate. Actual results could materially differ from those estimates.

Cash, Cash Equivalents and Restricted Cash

The Company considers all highly liquid investments purchased with original maturities of three months or less from the purchase date to be cash equivalents. Cash equivalents consist primarily of amounts invested in money market accounts.

The following table provides a reconciliation of cash, cash equivalents and restricted cash reported within the consolidated balance sheets that sum to the total of the same amounts shown in the consolidated statements of cash flows:

	December 31, 2019	December 31, 2018
	(in thousands)	
Cash and cash equivalents	$ 139,045	$ 39,643
Restricted cash	1,450	450
Total cash, cash equivalents, and restricted cash	$ 140,495	$ 40,093

Restricted cash as of December 31, 2019 and 2018 relates to letters of credit established for leases entered into in May 2018 and December 2019 and is recorded as other assets on the consolidated balance sheets.

Short-Term Investments

Short-term investments have been classified as available-for-sale and are carried at estimated fair value as determined based upon quoted market prices or pricing models for similar securities. The Company determines the appropriate classification of its investments in debt securities at the time of purchase. Available-for-sale securities with original maturities beyond three months at the date of purchase are classified as current based on their availability for use in current operations.

Unrealized gains and losses are excluded from earnings and are reported as a component of comprehensive loss. The Company periodically evaluates whether declines in fair values of its marketable securities below their book value are other-than-temporary. This evaluation consists of several qualitative and quantitative factors regarding the severity and duration of the unrealized loss as well as the Company's ability and intent to hold the marketable security until a forecasted recovery occurs. Additionally, the Company assesses whether it has plans to sell the security or it is more likely than not it will be required to sell any marketable securities before recovery of its amortized cost basis. Realized gains and losses and declines in fair value judged to be other than temporary, if any, on marketable securities are included in other income, net. The cost of investments sold is based on the specific-identification method. Interest on marketable securities is included in other income, net.

Concentration of Credit Risk

Financial instruments that potentially subject the Company to significant concentrations of credit risk consist primarily of cash, cash equivalents, restricted cash, investments and trade receivables. Risks associated with cash, cash equivalents and restricted cash are mitigated by banking with creditworthy institutions and the Company's investments have investment grade ratings when purchased. The Company performs ongoing evaluations of its customers and generally does not require collateral.

Concentration of Customers

For the years ended December 31, 2019 and 2018, no customer accounted for 10% of the Company's revenue. There was one customer which accounted for 11% of the Company's accounts receivable as of December 31, 2019. There were no customers which accounted for more than 10% of the Company's accounts receivable as of December 31, 2018.

Fair Value of Financial Instruments

The Company's cash and cash equivalents, restricted cash, short-term investments, accounts receivable, accounts payable and accrued liabilities approximate their fair value due to their short maturities. Management believes that its term notes bear interest at the prevailing market rates for instruments with similar characteristics; accordingly, the carrying value of this instrument approximates its fair value.

The Company utilizes valuation techniques that maximize the use of observable inputs and minimize the use of unobservable inputs to the extent possible. The Company determines the fair value of its financial instruments based on assumptions that market participants would use in pricing an asset or liability in the principal or most advantageous market. When considering market participant assumptions in fair value measurements, the following fair value hierarchy distinguishes between observable and unobservable inputs, which are categorized in one of the following levels:

Level 1 – Inputs are unadjusted, quoted prices in active markets for identical assets or liabilities at the measurement date;

Level 2 – Inputs are observable, unadjusted quoted prices in active markets for similar assets or liabilities, unadjusted quoted prices for identical or similar assets or liabilities in markets that are not active or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the related assets or liabilities; and

Level 3 – Unobservable inputs that are significant to the measurement of the fair value of the assets or liabilities that are supported by little or no market data.

Accounts Receivable and Allowance for Doubtful Accounts

Accounts receivable are recorded at invoice value, net of any allowance for doubtful accounts. Estimates of the allowance for doubtful accounts are determined based on existing contractual payment terms, historical payment patterns of customers and individual customer circumstances. The allowance for doubtful accounts was $194,000 as of December 31, 2019 and the Company recognized accounts receivable write-offs in the amount of $3,400 for the year ended December 31, 2019. The allowance for doubtful accounts was $76,000 as of December 31, 2018 and the Company recognized accounts receivable write-offs in the amount of $1,000 for the year ended December 31, 2018.

Inventory

Inventory is stated at the lower of standard cost (which approximates actual cost on a first-in, first-out basis) and net realizable value. Inventory costs include direct materials, direct labor and normal manufacturing overhead. Prior to achieving normal capacity, excess capacity costs are expensed in cost of product revenue as period costs. Finished goods that are used for research and development are expensed as consumed. Provisions for slow-moving, excess or obsolete inventories are recorded when required to reduce inventory values to their estimated net realizable values based on product life cycle, development plans, product expiration or quality issues.

Property and Equipment

Property and equipment are stated at cost, net of accumulated depreciation and amortization. Depreciation and amortization is computed using the straight-line method over the estimated useful lives of the respective assets, generally three to five years. Leasehold improvements are amortized over the lesser of their useful life or the remaining life of the lease. When assets are retired or otherwise disposed of, the cost and related accumulated depreciation and amortization are removed from the balance sheet and any resulting gain or loss is reflected in operations in the period realized. Maintenance and repairs are charged to operations as incurred.

Impairment of Long-Lived Assets

The Company reviews long-lived assets for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Recoverability is measured by comparing the carrying amount to the future net undiscounted cash flows which the assets are expected to generate. If such assets are considered to be impaired, the impairment to be recognized is measured by the amount by which the carrying amount of the assets exceeds the projected discounted future net cash flows arising from the asset. The Company has not identified any such impairment losses to date.

Convertible Preferred Stock Warrant Liability

The Company has accounted for its freestanding warrants to purchase shares of the Company's convertible preferred stock as liabilities at fair value upon issuance primarily because the shares underlying the warrants contain contingent redemption features outside the control of the Company. The warrants are subject to re-measurement at each balance sheet date and any change in fair value is recognized as the change in fair value of warrant liability. The carrying value of the warrants will continue to be adjusted until such time as these instruments are exercised, expire or convert into warrants to purchase shares of the Company's common stock upon the completion of a liquidation event, including the completion of the IPO, which occurred on March 11, 2019. At that time, the preferred stock warrant liability was reclassified to additional paid-in capital, a component of stockholders' equity (deficit).

Revenue

The Company adopted Accounting Standards Codification ("ASC") 606, *Revenue from Contracts with Customers*, effective January 1, 2018 using the modified retrospective method. Results for reporting periods beginning after January 1, 2018 are presented under ASC 606, while prior period amounts are not adjusted and continue to be reported in accordance with our historic accounting under ASC 605, *Revenue Recognition*. The adoption of this standard did not have a cumulative effect on opening accumulated deficit as of January 1, 2018, as the timing and measurement of revenue recognition is materially the same under ASC 606 as it was under the prior guidance.

The Company records product revenue primarily from the sale of its IVL catheters. The Company sells its products to hospitals, primarily through direct sales representatives, as well as through distributors in selected international markets. Additionally, a significant portion of the Company's revenue is generated through a consignment model under which inventory is maintained at hospitals.

Under ASC 606, revenue is recognized when a customer obtains control of promised goods or services, in an amount that reflects the consideration which the entity expects to receive in exchange for those goods or services. To determine revenue recognition for arrangements that an entity determines are within the scope of ASC 606, the Company performs the following five steps: (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when (or as) the entity satisfies a performance obligation.

For products sold through direct sales representatives, control is transferred upon delivery to customers. For products sold to distributors internationally and certain customers that purchase stocking orders in the United States, control is transferred upon shipment or delivery to the customer's named location, based on the contractual shipping terms. For consignment inventory, control is transferred at the time the catheters are consumed in a procedure.

The Company generally provides for the use of an IVL generator and connector cable under an agreement to customers at no charge to facilitate use of the IVL catheters. These agreements do not contain contractually enforceable minimum commitments and are generally cancellable by either party with 30 days' notice.

Research and Development Costs

Research and development costs, including new product development, regulatory compliance, and clinical research are expensed as incurred.

Accrued Research and Development Costs

The Company accrues liabilities for estimated costs of research and development activities conducted by its third-party service providers, which include the conduct of preclinical and clinical studies. The estimated costs of research and development activities are recorded based upon the estimated amount of services provided but not yet invoiced, and these costs are included in accrued liabilities on the consolidated balance sheets and within research and development expense on the consolidated statements of operations and comprehensive loss.

These costs are accrued for based on factors such as estimates of the work completed and budget provided and in accordance with agreements established with third-party service providers. Significant judgments and estimates are made in determining the accrued liabilities balance in each reporting period. Accrued liabilities are adjusted as actual costs become known. There have not been any material differences between accrued costs and actual costs incurred since the Company's inception.

Stock-Based Compensation

The Company accounts for share-based payments at fair value. The fair value of stock options is measured using the Black-Scholes option-pricing model. For share-based awards that vest subject to the satisfaction of a service requirement, the fair value measurement date for stock-based compensation awards is the date of grant and the expense is recognized on a straight-line basis, over the vesting period. The Company accounts for forfeitures as they occur.

Leases

The Company adopted ASU No. 2016-02, *Leases* (Topic 842) using the modified retrospective approach with a cumulative-effect adjustment as of January 1, 2019. Results for reporting periods beginning after January 1, 2019 are presented under Topic 842. Prior period amounts have not been adjusted and continue to be reported in accordance with the Company's historical accounting under previous lease guidance, ASC 840: *Leases* (Topic 840).

For its long-term operating lease, the Company recognized a right-of-use asset and a lease liability on its consolidated balance sheet. The lease liability is determined as the present value of future lease payments using an estimated rate of interest that the Company would have to pay to borrow equivalent funds on a collateralized basis at the lease commencement date. The right-of-use asset is based on the liability adjusted for any prepaid or deferred rent. The lease term at the commencement date is determined by considering whether renewal options and termination options are reasonably assured of exercise.

Rent expense for the operating lease is recognized on a straight-line basis over the lease term and is included in operating expenses on the consolidated statements of operations and comprehensive loss. Variable lease payments include lease operating expenses.

The Company elected to exclude from its balance sheets recognition of leases having a term of 12 months or less (short-term leases) and elected to not separate lease components and non-lease components for its long-term real estate leases.

Defined Contribution Plan

The Company has a defined contribution retirement savings plan under Section 401(k) of the Internal Revenue Code. This plan allows eligible employees to defer a portion of their annual compensation on a pre-tax basis. The Company is authorized to make matching contributions but has not made such contributions for the years ended December 31, 2019 and 2018.

Comprehensive Loss

Comprehensive loss is comprised of net loss and changes in unrealized gains and losses on the Company's available-for-sale investments.

Foreign Currency

The functional currency of the Company's foreign subsidiary is the U.S. Dollar. Accordingly, all monetary assets and liabilities of the subsidiary are remeasured at the current exchange rate at the end of the period, nonmonetary assets and liabilities are remeasured at historical rates, and revenue and expenses are remeasured at average exchange rates during the period. There were net foreign currency transaction gains of $56,000 for the year ended December 31, 2019 and net foreign currency transaction losses of $46,000 for the year ended December 31, 2018.

Net Loss Per Share

Basic net loss per share is calculated by dividing net loss by the weighted-average number of shares of common stock outstanding for the period, without consideration of potential dilutive shares of common stock. The unvested portion of early exercised stock options are excluded from the computation of weighted-average shares as the continuing vesting of such shares is contingent on the holders' continued service to the Company. Since the Company was in a loss position for the period presented, basic net loss per share is the same as diluted net loss per share since the effects of potentially dilutive securities are antidilutive.

Income Taxes

The Company uses the asset and liability method of accounting for income taxes. Under this method, deferred tax assets and liabilities are determined based on the differences between the financial reporting and the tax bases of assets and liabilities and are measured using the enacted tax rates and laws that will be in effect when the differences are expected to reverse. Management makes an assessment of the likelihood that the resulting deferred tax assets will be realized. A valuation allowance is provided when it is more likely than not that some portion or all of a deferred tax asset will not be realized. Due to the Company's historical operating performance and the recorded cumulative net losses in prior fiscal periods, the net deferred tax assets have been fully offset by a valuation allowance.

The Company recognizes uncertain income tax positions at the largest amount that is more likely than not to be sustained upon audit by the relevant taxing authority. An uncertain income tax position will not be recognized if it has less than a 50% likelihood of being sustained. Changes in recognition or measurement are reflected in the period in which judgment occurs. The Company's policy is to recognize interest and penalties related to the underpayment of income taxes as a component of provision for income taxes.

Segment Reporting

Operating segments are defined as components of an entity for which separate financial information is available and that is regularly reviewed by the Chief Operating Decision Maker ("CODM") in deciding how to allocate resources to an individual segment and in assessing performance. The Company's CODM is its Chief Executive Officer. The Company has determined that it operates in one segment.

Recently Adopted Accounting Pronouncements

In February 2016, the FASB issued ASU No. 2016-02, *Leases*. This new standard requires lessees to apply a dual approach, classifying leases as either finance or operating leases based on the principle of whether or not the lease is effectively a financed purchase by the lessee. This classification will determine whether lease expense is recognized based on an effective interest method or on a straight-line basis over the term of the lease. A lessee is also required to record a right-of-use asset and a lease liability for all leases with a term of greater than 12 months regardless of their classification. Leases with a term of 12 months or less will be accounted for similar to existing guidance for operating leases.

Upon adoption of Topic 842, on January 1, 2019, the Company recorded operating right-of-use assets of $2.9 million and operating lease liabilities of $3.0 million and derecognized the deferred rent liability of $0.1 million. Results for the year ended December 31, 2019 are presented under Topic 842. Prior period amounts have not been adjusted and continue to be reported in accordance with the Company's historical accounting under previous lease guidance, ASC 840: *Leases* (Topic 840).

Recent Accounting Pronouncements

In June 2016, the FASB issued ASU No. 2016-13, *Financial Instruments-Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments*, which amends the incurred loss impairment methodology in current GAAP with a methodology requires measurement and recognition of expected credit losses for most financial assets and certain other instruments, including but not limited to available-for-sale debt securities. Credit losses relating to available-for-sale debt securities will be recorded through an allowance for credit losses rather than as a direct write-down to the security. ASU 2016-13 is effective for annual reporting periods, and interim periods within those years, beginning after December 15, 2019, and requires a cumulative effect adjustment to the balance sheet as of the beginning of the first reporting period in which the guidance is effective. In November 2019, the FASB issued ASU No. 2019-10, *Financial Instruments—Credit Losses (Topic 326), Derivatives and Hedging (Topic 815) and Leases (Topic 842): Effective Dates*, which defers the effective date of this ASU to fiscal years beginning after December 15, 2022 for all entities except SEC reporting companies that are not smaller reporting companies. The Company will adopt Topic 326 on January 1, 2020. The adoption of this guidance is not expected to have a material impact on the Company's consolidated financial statements.

In November 2019, the FASB issued ASU No. 2019-12, *Income Taxes (Topic 740)*, which simplifies the accounting for income taxes, primarily by eliminating certain exceptions to the guidance in ASC 740. This ASU is effective for fiscal periods beginning after December 15, 2020. The Company is currently evaluating this guidance and the impact it may have on the Company's consolidated financial statements.

3. Financial Instruments and Fair Value Measurements

The following tables summarize the Company's financial assets and liabilities measured at fair value on a recurring basis by level within the fair value hierarchy:

	December 31, 2019			
	Level 1	Level 2	Level 3	Total
	(in thousands)			
Assets:				
U.S. Treasury securities	$ 43,245	$ —	$ —	$ 43,245
Money market funds	29,386	—	—	29,386
Reverse repurchase agreements	—	10,000	—	10,000
Commercial paper	—	6,958	—	6,958
Corporate bonds	—	8,096	—	8,096
Total assets	$ 72,631	$ 25,054	$ —	$ 97,685

	December 31, 2018			
	Level 1	Level 2	Level 3	Total
	(in thousands)			
Assets:				
Money market funds	$ 21,680	$ —	$ —	$ 21,680
Total assets	$ 21,680	$ —	$ —	$ 21,680
Liabilities:				
Convertible preferred stock warrant liability	$ —	$ —	$ 313	$ 313
Total liabilities	$ —	$ —	$ 313	$ 313

The change in the fair value of the warrant liability is summarized below:

	Year Ended December 31,		
	2019	2018	2017
	(in thousands)		
Beginning Balance	$ 313	$ 577	$ 729
Expiration of warrants, included in change in fair value of warrant liability	—	(133)	—
Net exercise of warrants	(133)	—	—
Exercise of warrants	—	(316)	(184)
Change in fair value of warrant liability	609	185	32
Conversion of Series A preferred stock warrants to common stock warrants upon the closing of the IPO	(789)	—	—
Balance at December 31, 2019	$ —	$ 313	$ 577

The valuation of the Company's convertible preferred stock warrant liability contains unobservable inputs that reflect the Company's own assumptions for which there is little, if any, market activity for at the measurement date. Accordingly, the Company's convertible preferred stock warrant liability is measured at fair value on a recurring basis using unobservable inputs and are classified as Level 3 inputs, and any change in fair value is recognized as change in fair value of warrant liability in the consolidated statements of operations and comprehensive loss.

The fair value of the warrants, which were converted to common stock warrants upon the closing of the IPO in March 2019, was determined using the Black-Scholes option pricing model and the following assumptions:

	December 31,	
	2019	2018
Expected term (in years)	5.3	5.5
Expected volatility	43.9%	42.8%
Risk-free interest rate	2.5%	2.9%
Expected dividend yield	0%	0%

There were no transfers between Levels 1, 2 or 3 for the periods presented.

4. Cash Equivalents and Short-Term Investments

The following is a summary of the Company's cash equivalents and short-term investments:

	December 31, 2019			
	Amortized Cost Basis	Unrealized Gains	Unrealized Losses	Fair Value
	(in thousands)			
U.S. Treasury securities	$ 43,219	$ 27	$ (1)	$ 43,245
Money market funds	29,386	—	—	29,386
Reverse repurchase agreements	10,000	—	—	10,000
Commercial paper	6,958	—	—	6,958
Corporate bonds	8,087	9	—	8,096
Total	$ 97,650	$ 36	$ (1)	$ 97,685
Reported as:				
Cash equivalents				$ 41,381
Short-term investments				56,304
Total				$ 97,685

	December 31, 2018			
	Amortized Cost Basis	Unrealized Gains	Unrealized Losses	Fair Value
	(in thousands)			
Money market funds	$ 21,680	$ —	$ —	$ 21,680
Total	$ 21,680	$ —	$ —	$ 21,680
Reported as:				
Cash equivalents				$ 21,680
Total				$ 21,680

At December 31, 2019, the remaining contractual maturities for available-for-sale securities were less than one year. For the years ended December 31, 2019 and 2018, the Company recognized no material realized gains or losses on cash equivalents and short-term investments.

5. Balance Sheet Components

Inventory

Inventory consists of the following:

	December 31,	
	2019	2018
	(in thousands)	
Raw material	$ 2,501	$ 1,084
Work in progress	1,364	634
Finished goods	6,642	2,313
Consigned inventory	1,567	1,100
Total inventory	$ 12,074	$ 5,131

Property and Equipment, Net

Property and equipment, net consists of the following:

	December 31,	
	2019	2018
	(in thousands)	
Equipment	$ 3,759	$ 2,321
Equipment on loan to customers	1,495	786
Office furniture	76	90
Software	97	76
Leasehold improvements	1,329	764
Construction in progress	553	236
Property and equipment, gross	7,309	4,273
Less accumulated depreciation and amortization	(2,399)	(1,654)
Total property and equipment, net	$ 4,910	$ 2,619

Depreciation and amortization expense amounted to $1.3 million, $0.7 million and $0.5 million for the years ended December 31, 2019, 2018 and 2017, respectively.

Other Assets

Other assets consist of the following:

	December 31,	
	2019	2018
	(in thousands)	
Deferred offering costs	$ —	$ 1,519
Restricted cash	1,450	450
Other	56	97
Total other assets	$ 1,506	$ 2,066

Accrued Liabilities

Accrued liabilities consist of the following:

	December 31,	
	2019	2018
	(in thousands)	
Accrued employee compensation	$ 8,139	$ 3,135
Accrued research and development costs	3,090	1,115
Accrued professional services	804	1,391
Other	1,744	576
Total accrued liabilities	$ 13,777	$ 6,217

6. Commitments and Contingencies

Operating Leases

The Company's lease for office space located in Fremont, California expired on September 30, 2019.

In May 2018, the Company entered into a new lease agreement for office and laboratory space which consists of approximately 35,000 square feet located in Santa Clara, California. The lease term commenced in September 2018 and ends in August 2022. In connection with the lease, the Company maintains a letter of credit for the benefit of the landlord in the amount of $0.5 million, which is secured by restricted cash recorded as other assets on the consolidated balance sheets. In connection with the lease, the Company has an operating lease right-of-use asset of $1.9 million as of December 31, 2019 and an aggregate lease liability of $2.1 million on its consolidated balance sheet. The remaining lease term is two years and eight months.

In December 2019, the Company entered into a lease for office and laboratory space in two buildings located in Santa Clara, California (the "Betsy Ross Lease"). The purpose and effect of the lease agreement is to extend the existing Santa Clara office and laboratory premises of 35,000 square foot to approximately 85,200 square feet of rentable space. The Santa Clara lease entered in May 2018 will continue in its existing terms (and with no changes to its terms, including its base rent) until its expiration on August 31, 2022, at which point the leased space under the May 2018 lease will become subject to the terms of the Betsy Ross Lease. The initial term of the first building in the Betsy Ross Lease began in December 2019 and is for 96 months, with an option by the Company to extend for an additional five years on one or both of the buildings. The base rent of part of the premises for the first building shall be abated for the first 19 months, and the second floor of the same premises shall be abated for the first four months. The landlord provided the Company with a tenant improvement allowance of up to $1.8 million. In connection with the Betsy Ross Lease, the Company provided an initial security deposit of $1.0 million in the form of a letter of credit, which is secured by restricted cash recorded as other assets on the consolidated balance sheets. While this amount will increase to $1.5 million on September 1, 2022 when the office and laboratory space of the lease entered into in May 2018 is added to the Betsy Ross Lease, the letter of credit will be reduced annually from and after September 1, 2022 until the Betsy Ross Lease's expiration. In connection with the first building lease, the Company has recorded an operating lease right-of-use asset of $6.8 million as of December 31, 2019 and an aggregate lease liability of $6.7 million on its consolidated balance sheet. The remaining lease term is seven years and eleven months.

The Company also leases vehicles for use by employees. In connection with the vehicle leases, the Company has an operating lease right-of-use asset of $115,000 as of December 31, 2019 and an aggregate lease liability of $115,000 on its consolidated balance sheet. The weighted average remaining lease term is two years and four months.

The weighted average incremental borrowing rate used to measure the operating lease liability is 6.97%.

Short-term leases are leases having a term of 12 months or less. The Company recognizes short-term leases on a straight-line basis and does not record a related lease asset or liability for such leases.

The following are minimum future rental payments owed under these agreements which commenced as of December 31, 2019:

	(in thousands)
2020	$ 1,292
2021	1,941
2022	2,063
2023	1,498
2024	1,546
Thereafter	4,826
Total minimum lease payments	$ 13,166
Less: imputed interest	(4,267)
Total lease liability	$ 8,899

The following are minimum future rental payments owed for the second building under the Betsy Ross Lease which has not yet commenced as of December 31, 2019:

	(in thousands)
2020	$ —
2021	—
2022	345
2023	1,044
2024	1,078
Thereafter	3,365
Total minimum lease payments	$ 5,832

Operating lease cost for the year ended December 31, 2019 was $1.2 million. Rent expense for the years ended December 31, 2018 and 2017 was $0.9 million and $0.4 million, respectively.

7. Term Notes

2014 Loan and Security Agreement

In June 2014, the Company entered into a Loan and Security Agreement with Silicon Valley Bank (the “2014 Loan and Security Agreement”), under which a total of $4.0 million was borrowed. The Company made monthly payments of principal and interest through the maturity date of October 1, 2017, and a one-time payment of $0.2 million on the maturity date of the loan. All the borrowings under the 2014 Loan and Security Agreement were fully repaid as of December 31, 2017.

In connection with the 2014 Loan and Security Agreement, the Company issued warrants to purchase shares of the Company’s Series A-1 convertible preferred stock. Upon issuance, the fair value of the warrants was recorded as a debt discount. The debt discount was amortized to interest expense, net over the repayment period of the loan. During the year ended December 31, 2017, amortization of debt discount was $0.1 million.

Loan and Security Agreement

In February 2018, the Company entered into a Loan and Security Agreement with Silicon Valley Bank (the "Loan and Security Agreement"). The terms of the Loan and Security Agreement included a term loan of $15.0 million and a revolving line of credit of $2.0 million. The term loan was available in two tranches, of which the first tranche of $10.0 million was funded in June 2018 and the second tranche of $5.0 million was funded in December 2018. The Company has not drawn down on its revolving line of credit as of December 31, 2019.

The term loan matures in December 2021, with interest-only monthly payments until September 2019. The interest-only period will extend through December 2019 if certain financing milestones are met. The term loan accrues interest at a floating per annum rate equal to the greater of the Wall Street Journal prime rate minus 1.75% and 2.75% (5.87% as of December 31, 2019). There is a final payment equal to 6.75% of the original aggregate principal amount, or $1.0 million, of the term loan advances, which will be accrued over the term of the loan using the effective-interest method.

The line of credit matures in February 2021 and accrues interest at the Wall Street Journal prime rate.

In connection with the execution of the Loan and Security Agreement, the Company issued warrants to purchase 34,440 shares of the Company's common stock. Upon issuance, the fair value of the warrants of $0.1 million was recorded as a debt issuance cost. The debt issuance cost will be amortized to interest expense, net over the repayment period of the loan.

During the years ended December 31, 2019 and 2018, the Company recorded interest expense related to the Loan and Security Agreement of $0.5 million and $0.2 million, respectively. Debt discount amortized as interest expense was $0.4 million and $0.2 million for the years ended December 31, 2019 and 2018, respectively.

The term loan is secured by all of the Company's assets, excluding intellectual property and certain other assets. The loan contains customary affirmative and restrictive covenants, including with respect to the Company's ability to enter into fundamental transactions, incur additional indebtedness, grant liens, pay any dividend or make any distributions to its holders, make investments, merge or consolidate with any other person or engage in transactions with the Company's affiliates, but does not include any financial covenants.

Long-term debt and net premium balances are as follows:

	December 31,	
	2019	2018
	(in thousands)	
Principal amount of term note	$ 13,334	$ 15,000
Net premium associated with accretion of final payment, issuance of common stock warrants, and other debt issuance costs	485	50
Term note, current and noncurrent	13,819	15,050
Less term note, current portion	(6,667)	(1,667)
Term note, noncurrent portion	$ 7,152	$ 13,383

Future minimum payments of principal and estimated payments of interest on the Company's outstanding variable rate borrowings as of December 31, 2019 are as follows:

Year ending December 31:	(in thousands)
2020	$ 7,000
2021	7,789
Total future payments	14,789
Less amounts representing interest	(442)
Less final payment	(1,013)
Total principal amount of term note payments	$ 13,334

See Note 13 for the Company's amendment to the Loan and Security Agreement.

8. Convertible Preferred Stock and Stockholders' Equity (Deficit)

Convertible Preferred Stock

Immediately prior to the closing of the Company's IPO, 18,670,259 shares of outstanding convertible preferred stock converted into 18,670,259 shares of common stock. As discussed in Note 1, the fractional shares resulting from the Reverse Stock Split, aggregating to 45 whole shares of common stock and 69 whole shares of convertible preferred stock were settled in cash in fiscal 2019.

Preferred Stock

The Company's amended and restated certificate of incorporation, which became effective upon the completion of the IPO, authorizes 5,000,000 shares of preferred stock, of which no shares were issued or outstanding as of December 31, 2019.

The convertible preferred stock as of December 31, 2018 consisted of the following:

	December 31, 2018			
	Shares Authorized	Shares Issued and Outstanding	Net Carrying Value	Aggregate Liquidation Preference
	(in thousands, except share amounts)			
Series A	19,280,722	1,580,387	$ 4,226	$ 4,473
Series A-1	51,874,893	4,197,138	14,054	12,996
Series B	64,777,331	5,309,617	39,877	40,000
Series C	79,209,457	6,492,578	79,729	80,000
Series D	13,956,584	1,090,608	14,920	15,000
	229,098,987	18,670,328	$ 152,806	$ 152,469

Preferred Stock Warrants

Upon the closing of the IPO, all of the outstanding convertible preferred stock warrants were converted into 54,903 common stock warrants, which resulted in the reclassification of the convertible preferred stock warrant liability of $0.8 million to additional paid-in capital. In April 2019, all of these common stock warrants were net exercised into 49,321 shares of common stock.

Common Stock Warrants

Upon the IPO, 91,446 common stock warrants held by related parties were net exercised based on the IPO price of $17.00 per share into 79,632 shares of common stock.

In February 2018, in connection with the execution of a Loan and Security Agreement with Silicon Valley Bank for a term loan and revolving line of credit, the Company issued warrants to purchase shares of the Company's common stock. In April 2019, all of these common stock warrants were net exercised into 29,887 shares of common stock.

The key terms of the outstanding common stock warrants are summarized in the following table:

	Warrants Outstanding December 31, 2019	Warrants Outstanding December 31, 2018	Exercise Price	Expiration
Related party common stock warrants	—	141,778	$ 2.196	May 2025
Common stock warrants issued in connection with the Loan and Security Agreement	—	34,440	$ 4.026	February 2028
Total common stock warrants	—	176,218		

9. Stock-Based Compensation

Total stock-based compensation was as follows:

	Year Ended December 31,		
	2019	2018	2017
	(in thousands)		
Cost of product revenue	$ 268	$ 67	$ 46
Research and development	943	235	185
Sales and marketing	972	294	130
General and administrative	1,463	701	604
Total stock-based compensation	$ 3,646	$ 1,297	$ 965

Determination of Fair Value

The estimated grant-date fair value of all the Company's stock-based awards was calculated using the Black-Scholes option pricing model, based on the following assumptions:

	Year Ended December 31,		
	2019	2018	2017
Expected term (in years)	6.08	6.08	6.08
Expected volatility	42.4%-42.9%	40.8%-41.9%	45.6%
Risk-free interest rate	2.4%-2.6%	2.5%-3.1%	1.9%-2.2%
Expected dividend yield	0%	0%	0%

The fair value of each stock option grant was determined by the Company using the methods and assumptions discussed below. Each of these inputs is subjective and generally requires significant judgment and estimation by management.

Expected Term—The expected term represents the period that stock-based awards are expected to be outstanding. The Company's historical share option exercise information is limited due to a lack of sufficient data points, and did not provide a reasonable basis upon which to estimate an expected term. The expected term for option grants is therefore determined using the simplified method. The simplified method deems the expected term to be the midpoint between the vesting date and the contractual life of the stock-based awards.

Expected Volatility—Since the Company has limited trading history for its common stock due to its short trading history, the expected volatility was estimated based on the average volatility for comparable publicly traded biotechnology companies over a period equal to the expected term of the stock option grants. The comparable companies were chosen based on their similar size, stage in the life cycle or area of specialty.

Risk-Free Interest Rate—The risk-free interest rate is based on the U.S. Treasury yield curve in effect at the date of grant for zero-coupon U.S. Treasury notes with maturities approximately equal to the stock-based awards' expected term.

Expected Dividend Yield—The expected dividend yield is zero as the Company has not paid nor does it anticipate paying any dividends on its common stock in the foreseeable future.

The Company has elected to recognize forfeitures of share-based payment awards as they occur.

2009 Equity Incentive Plan and 2019 Equity Incentive Plan

On June 17, 2009, the Company adopted the 2009 Equity Incentive Plan (the "Plan") under which the Board may issue stock options to employees, directors and consultants.

In February 2019, the Company adopted the 2019 Stock Option and Incentive Plan (the "2019 Plan"), which became effective in connection with the IPO. As a result, effective as of March 6, 2019, the Company may not grant any additional awards under the 2009 Plan. The 2009 Plan will continue to govern outstanding equity awards granted thereunder. The Company has initially reserved 2,000,430 shares of common stock for the issuance of a variety of awards under the 2019 Plan, including stock options, stock appreciation rights, awards of restricted stock and awards of restricted stock units. In addition, the number of shares of common stock reserved for issuance under the 2019 Plan will automatically increase on the first day of January for a period of up to ten years, commencing on January 1, 2020, in an amount equal to 3% of the total number of shares of the Company's capital stock outstanding on the last day of the preceding year, or a lesser number of shares determined by the Company's board of directors.

The Board has the authority to determine to whom options will be granted, the number of shares, the term and the exercise price. If an individual owns stock representing 10% or more of the outstanding shares, the price of each share shall be at least 110% of the fair market value, as determined by the Board. Options granted under the Plan have a term of up to 10 years and generally vest over a 4 year period with a straight-line vesting and a 25% one year cliff. As of December 31, 2019, the Company had reserved 1,421,674 shares of common stock for issuance under the 2019 Plan.

Stock Options

Activity under the 2009 Plan and 2019 Plan is set forth below:

	Shares Available for Grant	Number of Shares	Weighted-Average Exercise Price Per Share	Weighted-Average Remaining Term	Aggregate Intrinsic Value
				(in years)	(in thousands)
Balance, December 31, 2016	887,885	1,365,934	$ 1.95		$ 2,011
Awards authorized	1,352,677	—			
Options granted	(1,974,589)	1,974,589	3.42		
Options exercised	—	(71,522)	1.95		
Options cancelled	160,397	(160,397)	2.44		
Balance, December 31, 2017	426,370	3,108,604	$ 2.81	$ 8.03	$ 3,647
Awards authorized	691,503	—			
Options granted	(1,015,963)	1,015,963	5.25		
Options exercised	—	(197,820)	2.20		
Options cancelled	290,389	(290,389)	3.42		
Balance, December 31, 2018	392,299	3,636,358	$ 3.54	$ 7.79	$ 11,267
Awards authorized	2,000,430	—			
Options expired	(287,600)	—			
Options granted	(442,858)	442,858	14.69		
Options exercised	—	(722,242)	3.10		
Options cancelled	41,973	(41,973)	3.85		
Balance, December 31, 2019	1,704,244	3,315,001	$ 5.08	$ 7.28	$ 128,744
Vested and exercisable, December 31, 2019		1,741,614	$ 3.31	$ 6.41	$ 70,721
Vested and expected to vest, December 31, 2019		3,315,001	$ 5.08	$ 7.28	$ 128,744

The weighted-average grant date fair value of options granted during the years ended December 31, 2019, 2018 and 2017 was $6.58, $2.56, and $1.59 per share, respectively. The total grant date fair value of options vested was $1.9 million, $1.6 million and $0.9 million for the years ended December 31, 2019, 2018 and 2017, respectively.

As of December 31, 2019, total unrecognized stock-based compensation related to unvested stock options was $4.6 million, which the Company expects to recognize over a remaining weighted-average period of 2.1 years.

Restricted Stock Units

Restricted stock units ("RSUs") are share awards that entitle the holder to receive freely tradable shares of the Company's common stock upon vesting. The RSUs cannot be transferred and the awards are subject to forfeiture if the holder's employment terminates prior to the release of the vesting restrictions. The RSUs generally vest over a four-year period with straight-line vesting and a 25% one year cliff or over a three year period in equal amounts on a semi-annual basis, provided the employee remains continuously employed with the Company. The fair value of the RSUs is equal to the closing price of the Company's common stock on the grant date.

RSU activity under the 2019 Plan is set forth below:

	Number of Shares	Weighted-Average Grant Date Fair Value Per Share
Balance, December 31, 2018	—	$ —
RSUs granted	288,170	38.28
RSUs forfeited	(5,600)	40.01
RSUs vested	(1,666)	59.79
Balance, December 31, 2019	280,904	$ 38.12

The total grant date fair value of RSUs vested for the year ended December 31, 2019 was $0.1 million. There were no RSUs granted prior to 2019. As of December 31, 2019, there was $9.5 million of unrecognized stock-based compensation expense related to RSUs to be recognized over a weighted-average period of 3.5 years.

Employee Share Purchase Plan (ESPP)

In February 2019, the Company adopted the 2019 Employee Stock Purchase Plan ("ESPP"), which became effective as of March 6, 2019. The Company has initially reserved 300,650 shares of common stock for purchase under the ESPP. Each offering to the employees to purchase stock under the ESPP will begin on each September 1 and March 1 and will end on the following February 28 or 29 and August 30, respectively. The first offering period began on September 1, 2019 and will end on February 29, 2020. On each purchase date, which falls on the last date of each offering period, ESPP participants will purchase shares of common stock at a price per share equal to 85% of the lesser of (1) the fair market value per share of the common stock on the offering date or (2) the fair market value of the common stock on the purchase date. The occurrence and duration of offering periods under the ESPP are subject to the determinations of the Company's Compensation Committee, in its sole discretion.

The fair value of the ESPP shares is estimated using the Black-Scholes option pricing model. The Company recorded $255,000 of stock-based compensation expense related to the ESPP for the year ended December 31, 2019.

	Year Ended December 31, 2019
Expected term (in years)	0.5
Expected volatility	76.93%
Risk-free interest rate	1.89%
Expected dividend yield	0%

10. Income Taxes

The following table presents income (loss) before income taxes for the periods presented:

	December 31,		
	2019	2018	2017
	(in thousands)		
Domestic	$ (51,179)	$ (41,145)	$ (30,654)
Foreign	132	81	65
Total loss before income taxes	$ (51,047)	$ (41,064)	$ (30,589)

Current income tax provision consists of the following:

	December 31,		
	2019	2018	2017
	(in thousands)		
Domestic	$ —	$ 3	$ 1
Foreign	62	35	25
Total current income tax provision	$ 62	$ 38	$ 26

The components of the deferred tax assets are as follows:

	December 31,	
	2019	2018
	(in thousands)	
Deferred tax assets:		
Net operating loss carryovers	$ 49,862	$ 28,834
Fixed and intangible assets	450	837
Accruals and reserves	1,619	761
Stock-based compensation	780	132
Research and development credits	2,336	1,716
Contributions	20	14
Lease liability	2,135	—
Total deferred tax assets	57,202	32,294
Less valuation allowance	(55,085)	(32,294)
Gross deferred tax assets	2,117	—
Deferred tax liabilities:		
Right-of-use-assets	(2,117)	—
Gross deferred tax liabilities	(2,117)	—
Total net deferred tax assets	$ —	$ —

Reconciliation of the statutory federal income tax to the Company's effective tax is as follows:

	December 31,		
	2019	2018	2017
	(in thousands)		
Income tax benefit at federal statutory rate	$ (10,720)	$ (8,624)	$ (10,404)
State and local income taxes net of federal tax benefit	(9)	3	1
Foreign tax rate differential	35	11	(3)
Change in valuation allowance	14,470	8,497	(522)
Stock-based compensation	(3,403)	123	309
R&D tax credits	(354)	(313)	(222)
Other	43	341	109
Federal rate change (pursuant to the Tax Cuts and Jobs Act of 2017)	—	—	10,758
Total current income tax provision	$ 62	$ 38	$ 26

Due to the uncertainties surrounding the realization of deferred assets through future taxable income, the Company has provided a full valuation allowance and, therefore, no benefit has been recognized for the net operating loss and other deferred tax assets. The valuation allowance increased by $22.8 million, $10.0 million and $0.6 million during the years ended December 31, 2019, 2018 and 2017, respectively.

As of December 31, 2019, the Company had net operating loss carryforwards available to reduce future federal, California and other state income of $180.3 million, $40.4 million and $153.5 million, respectively. The federal net operating loss carryforwards of $80.7 million and $99.6 million begin expiring in 2030 and never expire respectively, the California net operating loss carryforwards begin expiring in 2031 and other state net operating loss carryforwards begin expiring in various years, starting in 2029.

As of December 31, 2019, the Company had research and development credit carryforwards of $2.8 million for federal income tax purposes and $2.4 million for California state income tax purposes available to reduce future taxable income, if any. The federal research and development credit carryforwards expire beginning 2032 and California credits can be carried forward indefinitely.

Utilization of the net operating loss carryforward may be subject to an annual limitation due to the ownership change provided by the Internal Revenue Code of 1986, as amended, and similar state provisions. The annual limitation may result in the expiration of the net operating loss before utilization.

Legislation enacted in 2017, informally known as the Tax Cuts and Jobs Act ("TCJA"), reduces the top U.S. federal corporate tax rate from 35% to 21%, requires companies to pay a one-time transition tax on earnings of certain foreign subsidiaries that were previously tax deferred, changes the rules related to uses and limitations of net operating loss carryforwards created in tax years beginning after December 31, 2017, allows for immediate expensing of fixed asset additions beginning after September 27, 2017, and creates new taxes on certain foreign sourced earnings. In 2017, the Company was not subject to a one-time transition tax as no foreign accumulated earnings and profits existed. As a result of the signing of the TCJA, the Company recorded a $10.1 million reduction as of December 31, 2017, due to remeasurement of its deferred tax assets along with a corresponding reduction of its valuation allowance.

Subsequent to the enactment of the TCJA, the SEC staff issued Staff Accounting Bulletin No. 118 ("SAB 118"), which allowed companies to record provisional amounts related to the effects of the TCJA during a measurement period not to extend beyond one year of the enactment date. The accounting for the tax effects of the TCJA has been completed as of December 31, 2018 and was not material to income tax expense for the year then ended.

The Company has adopted the approach of recording the consequences of the global intangible low-taxed income ("GILTI") provisions of the TCJA as period costs when incurred effective for periods beginning after December 31, 2017.

Uncertain Tax Positions

The activity related to the gross amount of unrecognized tax benefits is as follows:

	December 31,		
	2019	2018	2017
	(in thousands)		
Beginning balance	$ 1,896	$ 893	$ 688
Additions based on tax positions related to prior years	—	394	—
Additions based on tax positions related to current years	690	609	205
Balance at end of year	$ 2,586	$ 1,896	$ 893

If recognized, gross unrecognized tax benefits would not have an impact on the Company's effective tax rate due to the Company's full valuation allowance position. While it is often difficult to predict the final outcome of any particular uncertain tax position, the Company does not believe that the amount of gross unrecognized tax benefits will change significantly in the next twelve months. The Company is subject to taxation in the United States and in Germany. The Company files federal, California, and various other state income tax returns. The Company is not currently under examination by any income tax authorities. The federal and California statute of limitations remains open for three and four years, respectively, from the date of utilization of any net operating loss or credits.

It is the Company's policy to include penalties and interest expense related to income taxes as a component of the income tax provision as necessary. The Company determined that no accrual for interest and penalties was required as of December 31, 2019.

11. Net Loss Per Share

The following outstanding potentially dilutive common stock equivalents have been excluded from the calculation of diluted net loss per share for the period presented due to their anti-dilutive effect:

	December 31,		
	2019	2018	2017
	(in thousands)		
Convertible preferred stock on an as-converted basis	—	18,670,328	17,510,045
Common stock options issued and outstanding	3,315,001	3,636,358	3,108,604
Restricted stock units	280,904	—	—
Early exercised options subject to future vesting	—	13,422	11,603
Convertible preferred stock warrants	—	54,903	183,162
Common stock warrants	—	176,218	141,778
Total	3,595,905	22,551,229	20,955,192

12. Segment and Geographic Information

The following table represents the Company's product revenue based on the location to which the product is shipped:

	Year Ended December 31,		
	2019	2018	2017
	(in thousands)		
United States	$ 22,699	$ 7,022	$ 969
Germany	3,402	1,393	597
Rest of Europe	14,097	3,516	143
All other countries	2,729	332	10
Product revenue	$ 42,927	$ 12,263	$ 1,719

As of December 31, 2019, the Company's long-lived assets are all held in the United States.

13. Subsequent Events

In February 2020, the Company entered into a First Amendment to its Loan and Security Agreement (the "Amended Credit Facility") to refinance its existing term loan. Under the Amended Credit Facility, the existing revolving line of credit of $2.0 million was terminated and the $20,000 termination fee was waived. The Amended Credit Facility provides the Company with a supplemental term loan in the amount of $16.5 million. The Company used $13.2 million of the proceeds from the supplemental term loan to repay in full all amounts due under the existing term loan and to pay related expenses. The principal amount outstanding under the supplemental term loan accrues interest at a floating per annum rate equal to the greater of the Prime Rate minus 1.25% and 3.5%. The supplemental term loan matures on December 1, 2023. The Amended Credit Facility provides an interest-only payments period through either (a) June 30, 2021, if the Company does not achieve a certain financial performance target on or before June 30, 2021 ("Performance Milestone One"), or (b) December 31, 2021, if the Company achieves Performance Milestone One but does not achieve both of a certain regulatory milestone and a certain financial performance target on or before December 31, 2021 ("Performance Milestone Two") or (c) until June 30, 2022, if the Company achieves both Performance Milestones. The additional final payment for the Amended Credit Facility is $1.6 million.

Item 9. Changes in and Disagreements With Accountants on Accounting and Financial Disclosure.

None.

Item 9A. Controls and Procedures.

Evaluation of disclosure controls and procedures.

Our management, with the participation and supervision of our Chief Executive Officer and our Chief Financial Officer, have evaluated our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended, or the Exchange Act) as of the end of the period covered by this Annual Report on Form 10-K. Based on that evaluation, our Chief Executive Officer and Chief Financial Officer have concluded that, as of the end of the period covered by this Annual Report on Form 10-K, our disclosure controls and procedures are effective to provide reasonable assurance that information we are required to disclose in reports that we file or submit under the Exchange Act is recorded, processed, summarized, and reported within the time periods specified in SEC rules and forms, and that such information is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer, as appropriate, to allow timely decisions regarding required disclosure.

Changes in internal control over financial reporting.

There was no change in our internal control over financial reporting identified in connection with the evaluation required by Rule 13a-15(d) and 15d-15(d) of the Exchange Act that occurred during the period covered by this Annual Report on Form 10-K that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Inherent limitation on the effectiveness of internal control.

Our management, including our Chief Executive Officer and Chief Financial Officer, does not expect that our disclosure controls or our internal control over financial reporting will prevent all errors and all fraud. A control system, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met. Further, the design of a control system must reflect the fact that there are resource constraints, and the benefits of controls must be considered relative to their costs. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, have been detected. These inherent limitations include the realities that judgments in decision-making can be faulty, and that breakdowns can occur because of a simple error or mistake. Additionally, controls can be circumvented by the individual acts of some persons, by collusion of two or more people or by management override of the controls. The design of any system of controls is also based in part upon certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions; over time, controls may become inadequate because of changes in conditions, or the degree of compliance with policies or procedures may deteriorate. Because of the inherent limitations in a cost-effective control system, misstatements due to error or fraud may occur and not be detected.

Management's Report on Internal Control over Financial Reporting

The Annual Report on Form 10-K does not include a report of management's assessment regarding internal control over financial reporting or an attestation report of our independent registered public accounting firm due to a transition period established by the rules of the SEC for newly public companies.

Limitations on Effectiveness of Controls and Procedures

In designing and evaluating the disclosure controls and procedures, management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives. In addition, the design of disclosure controls and procedures must reflect the fact that there are resource constraints and that management is required to apply judgment in evaluating the benefits of possible controls and procedures relative to their costs.

Attestation Report of Registered Public Accounting Firm

This Annual Report on Form 10-K does not include an attestation report of our registered public accounting firm regarding internal control over financial reporting due to an exemption established by the JOBS Act for "emerging growth companies."

Item 9B. Other Information.

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

The information required by this item is incorporated by reference from our definitive Proxy Statement to be filed with the SEC in connection with our 2020 Annual Meeting of Stockholders within 120 days after the end of the fiscal year ended December 31, 2019 (the "Proxy Statement").

Item 11. Executive Compensation.

The information required by this item will be included in the Proxy Statement and is incorporated herein by reference.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.

The information required by this item will be included in the Proxy Statement and is incorporated herein by reference.

Item 13. Certain Relationships and Related Transactions, and Director Independence.

The information required by this item will be included in the Proxy Statement and is incorporated herein by reference.

Item 14. Principal Accounting Fees and Services.

The information required by this item will be included in the Proxy Statement and is incorporated herein by reference.

PART IV

Item 15. Exhibits, Financial Statement Schedules.

We have filed the following documents as part of this Annual Report on Form 10-K:

1. Financial Statements: The financial statements included in "Index to Consolidated Financial Statements" in Part II, Item 8 are filed as part of this Annual Report on Form 10-K

2. Exhibits: The exhibits listed in the accompanying index to exhibits are filed or incorporated by reference as part of this Annual Report on Form 10-K.

Item 16. Form 10-K Summary

None.

Exhibit Index

Exhibit Number	Description	Incorporation by Reference			
		Form	File No.	Exhibit(s)	Filing Date
3.1	Restated Certificate of Incorporation	8-K	001-38829	3.3	March 12, 2019
3.2	Amended and Restated Bylaws	8-K	001-38829	3.4	March 12, 2019
4.1	Specimen Common Stock Certificate	S-1	333-229590	4.1	February 8, 2019
4.2	Amended and Restated Investors' Rights Agreement, between the Registrant and the investors listed on Exhibit A thereto	S-1	333-229590	4.2	February 8, 2019
4.3*	Description of Securities Registered Pursuant to Section 12 of the Securities Exchange Act of 1934				
10.1	Sublease Agreement by and between the Registrant and Benvenue Medical, Inc. for facilities at 5403 Betsy Ross Drive, Santa Clara, California, dated May 7, 2018	S-1	333-229590	10.1	February 8, 2019
10.2*	Lease Agreement by and between the Registrant and Betsy Ross Property, LLC for facilities at 5403 and 5353 Betsy Ross Drive, Santa Clara, California, dated December 13, 2019				
10.3†	2009 Equity Incentive Plan, and forms of Stock Option Agreement and Early Exercise Stock Option Agreement	S-1	333-229590	10.3	February 8, 2019
10.4†	2019 Equity Incentive Plan and form of Stock Option Agreement	S-1/A	333-229590	10.4	February 25, 2019
10.5†	Form of Restricted Stock Unit Agreement	10-Q	001-38829	10.1	August 6, 2019
10.6†	Employee Stock Purchase Plan	S-1/A	333-229590	10.5	February 25, 2019
10.7†	Form of Indemnification Agreement by and between the Registrant and each of its directors and executive officers	S-1	333-229590	10.6	February 8, 2019
10.8†	Offer Letter with Douglas Godshall	S-1	333-229590	10.7	February 8, 2019
10.9†	Separation Pay Agreement with Douglas Godshall	10-Q	001-38829	10.1	November 8, 2019
10.10†	Offer Letter with Dan Puckett	S-1	333-229590	10.8	February 8, 2019
10.11†	Offer Letter with Isaac Zacharias	S-1	333-229590	10.9	February 8, 2019

10.12†	Form of Separation Pay Agreement for Executive Officers (other than CEO)	10-Q	001-38829	10.2	November 8, 2019
10.13†	Non-Employee Director Compensation Policy	S-1/A	333-229590	10.11	February 25, 2019
10.14	Loan and Security Agreement by and between the Registrant and Silicon Valley Bank, dated February 26, 2018	S-1	333-229590	10.10	February 8, 2019
10.15*	First Amendment to Loan and Security Agreement				
21.1*	Subsidiaries of the Registrant				
23.1*	Consent of Ernst & Young LLP				
24.1*	Power of Attorney (included on signature page)				
31.1*	Certification of Principal Executive Officer required under Rule 13a-14(a) and 15d-14(a) of the Securities Exchange Act of 1934, as amended.				
31.2*	Certification of Principal Financial Officer required under Rule 13a-14(a) and 15d-14(a) of the Securities Exchange Act of 1934, as amended.				
32.1*	Certification of Principal Executive Officer required under Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended, and 18 U.S.C. §1350.				
32.2*	Certification of Principal Financial Officer required under Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended, and 18 U.S.C. §1350.				
101.INS	XBRL Instance Document				
101.SCH	XBRL Taxonomy Extension Schema Document				
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document				
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document				
101.LAB	XBRL Taxonomy Extension Label Linkbase Document				
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document				

* Filed herewith

† Indicates a management contract or compensatory plan or arrangement.

SIGNATURES

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

ShockWave Medical, Inc.

Date: March 12, 2020

By: /s/ Douglas Godshall
Douglas Godshall
President, Chief Executive Officer & Director
(principal executive officer)

POWER OF ATTORNEY AND SIGNATURES

KNOW ALL MEN BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Douglas Godshall and Dan Puckett, and each of them, his or her true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution, for him or her and in his or her name, place and stead, in any and all capacities, to sign any and all amendments to this Annual Report on Form 10-K, and to file the same, with all exhibits thereto, and all other documents in connection therewith, with the Securities and Exchange Commission, granting unto each said attorney-in-fact and agents full power and authority to do and perform each and every act in person, hereby ratifying and confirming all that said attorneys-in-fact and agents or either of them or their or his or her substitute or substitutes may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1934, this registration statement has been signed by the following persons in the capacities and on the dates indicated.

Name	Title	Date
/s/ Douglas Godshall Douglas Godshall	President, Chief Executive Officer & Director (principal executive officer)	March 12, 2020
/s/ Dan Puckett Dan Puckett	Chief Financial Officer (principal financial and accounting officer)	March 12, 2020
/s/ C. Raymond Larkin, Jr. C. Raymond Larkin, Jr.	Chairman & Director	March 12, 2020
/s/ F.T. “Jay” Watkins F.T. Watkins	Director	March 12, 2020
/s/ Antoine Papiernik Antoine Papiernik	Director	March 12, 2020
/s/ Colin Cahill Colin Cahill	Director	March 12, 2020
/s/ Frederic Moll, M.D. Frederic Moll	Director	March 12, 2020
/s/ Laura Francis Laura Francis	Director	March 12, 2020

Exhibit 4.3

DESCRIPTION OF CAPITAL STOCK

The following descriptions are summaries of the material terms of our restated certificate of incorporation, amended and restated bylaws, the amended and restated investors' rights agreement to which we and certain of our stockholders are parties and of the Delaware General Corporation Law. Because the following is only a summary, it does not contain all of the information that may be important to you. For a complete description, you should refer to our restated certificate of incorporation, amended and restated bylaws and amended and restated investors' rights agreement, copies of which are incorporated herein by reference.

General

Our authorized capital stock consists of 281,274,838 shares of common stock, par value $0.001 per share, and 5,000,000 shares of undesignated preferred stock, par value $0.001 per share.

Common Stock

Common stock. As of December 31, 2019, there were 31,444,844 shares of our common stock issued and outstanding, held by 38 stockholders of record, and no shares of preferred stock issued or outstanding. All outstanding shares of common stock are fully paid and non-assessable.

Voting rights. The holders of common stock are entitled to one vote per share on all matters to be voted upon by the stockholders.

Dividend rights. Subject to preferences that may be applicable to any outstanding preferred stock, the holders of common stock are entitled to receive ratably such dividends, if any, as may be declared from time to time by our board of directors, out of funds legally available therefor.

Rights upon liquidation. In the event of liquidation, dissolution or winding up of the company, the holders of common stock are entitled to share ratably in all assets remaining after payment of liabilities, subject to prior distribution rights of preferred stock, if any, then outstanding.

Other rights. The holders of our common stock have no preemptive or conversion rights or other subscription rights. There are no redemption or sinking fund provisions applicable to the common stock.

Preferred Stock

As of December 31, 2019, no shares of preferred stock are outstanding. Under our restated certificate of incorporation, our board of directors has the authority to issue undesignated preferred stock in one or more series and to fix the rights, preferences, privileges and restrictions thereof, including dividend rights, dividend rates, conversion rights, voting rights, terms of redemption, redemption prices, liquidation preferences and the number of shares constituting any series or the designation of such series, without further vote or action by the stockholders.

The issuance of preferred stock may have the effect of delaying, deferring or preventing a change in control of the company without further action by the stockholders and may adversely affect the voting and other rights of the holders of common stock. At present, we have no plans to issue any of the preferred stock following consummation of this offering.

Common Stock Options

As of December 31, 2019, we had outstanding options to purchase an aggregate of 3,315,001 shares of our common stock, with a weighted-average exercise price of $5.08 per share, under our 2009 Plan and 2019 Plan.

Restricted Stock Units

As of December 31, 2019, we had outstanding RSUs that may be settled for an aggregate of 280,904 shares of our common stock granted pursuant to our 2019 Plan.

Registration Rights

Certain holders of our common stock are entitled to rights with respect to the registration of their shares under the Securities Act of 1933, as amended (the "Securities Act") pursuant to our Investors' Rights Agreement as described in additional detail below ("registrable securities"). In an underwritten offering, the managing underwriter, if any, has the right, subject to specified conditions, to limit the number of shares such holders may include.

Demand Registration Rights

The holders of approximately 4,304,997 shares of our common stock as of December 31, 2019 are entitled to certain demand registration rights. The holders of at least 40% of the registrable securities have the right to require us, on not more than two occasions, to file a registration statement under the Securities Act in order to register the resale of their shares of common stock, *provided* that such registration of shares would result in aggregate proceeds (after deducting the estimated underwriting discounts and commissions) of at least $10.0 million. We may, in certain circumstances, defer such registrations and the underwriters have the right, subject to certain limitations, to limit the number of shares included in such registrations.

Piggyback Registration Rights

If we propose to register the offer and sale of any of our securities under the Securities Act, in connection with the public offering of such securities the holders of approximately 4,304,997 shares of our common stock as of December 31, 2019 are entitled to certain "piggyback" registration rights, allowing the holders to include their shares in such registration, subject to certain limitations. If our proposed registration involves an underwriting, the managing underwriter of such offering will have the right to limit the number of shares to be underwritten for reasons related to the marketing of the shares.

S-3 Registration Rights

We are required to use commercially reasonable efforts to qualify for registration on Form S-3. After we are qualified for registration on Form S-3, the holders of approximately 4,304,997 shares of our common stock as of December 31, 2019 may make a written request that we register the offer and sale of their shares on Form S-3, *provided* that such registration of shares would result in an aggregate price to the public of not less than $2,000,000 and we have not effected two such registrations in the last 12 months. We may, in certain circumstances, defer such registrations and the underwriters have the right, subject to certain limitations, to limit the number of shares included in such registrations.

Expenses

Subject to specified conditions and limitations, we are required to pay all expenses, other than underwriting discounts and commissions and stock transfer taxes, incurred in connection with any exercise of these registration rights.

Indemnification

Our Investors' Rights Agreement contains customary cross-indemnification provisions, pursuant to which we are obligated to indemnify the selling holders of registrable securities in the event of either material misstatements or omissions in the applicable registration statement attributable to us or our violation of the Securities Act, and the selling stockholders are obligated to indemnify us for material misstatements or omissions in the registration statement attributable to them, subject to certain limitations.

Termination

The registration rights terminate upon the earliest of: (i) such date on which all shares of registrable securities may be sold during any 90 day period pursuant to Rule 144 of the Securities Act, (ii) the fifth anniversary of the completion of our initial public offering, (iii) the occurrence of a deemed liquidation event or (iv) the date that no registrable securities remain outstanding that have not previously been sold to the public pursuant to a registration or in reliance on Rule 144 of the Securities Act.

Anti-Takeover Effects of our Certificate of Incorporation and our Bylaws

Election and Removal of Directors

Our board of directors consists of seven directors. The exact number of directors will be fixed from time to time by resolution of the board. No director may be removed except for cause, and directors may be removed for cause by an affirmative vote of shares representing a majority of the shares then entitled to vote at an election of directors. Any vacancy occurring on the board of directors and any newly created directorship may be filled only by a majority of the remaining directors in office.

Staggered Board

Our board of directors is divided into three classes serving staggered three-year terms. Class I, Class II and Class III directors will serve until our annual meetings of stockholders in 2020, 2021 and 2022, respectively. At each annual meeting of stockholders, directors will be elected to succeed the class of directors whose terms have expired. This classification of our board of directors could have the effect of increasing the length of time necessary to change the composition of a majority of the board of directors. In general, at least two annual meetings of stockholders will be necessary for stockholders to effect a change in a majority of the members of the board of directors.

Limits on Written Consents

Our restated certificate of incorporation and our amended and restated bylaws provide that holders of our common stock will not be able to act by written consent without a meeting, unless such consent is unanimous.

Stockholder Meetings

Our restated certificate of incorporation and our amended and restated bylaws provide that special meetings of our stockholders may be called only by the chairman of our board of directors or a majority of the directors. Our restated certificate of incorporation and bylaws specifically deny any power of any other person to call a special meeting.

Amendment of Certificate of Incorporation

The provisions of our restated certificate of incorporation described under “Election and Removal of Directors,” “Stockholder Meetings” and “Limits on Written Consents” may be amended only by the affirmative vote of holders of at least 75% of the voting power of our outstanding shares of voting stock, voting together as a single class. The affirmative vote of holders of at least a majority of the voting power of our outstanding shares of stock are generally required to amend other provisions of our restated certificate of incorporation.

Amendment of Bylaws

Our amended and restated bylaws may generally be altered, amended or repealed, and new bylaws may be adopted, with:

- the affirmative vote of a majority of directors present at any regular or special meeting of the board of directors called for that purpose, provided that any alteration, amendment or repeal of, or adoption of any bylaw inconsistent with, specified provisions of the bylaws, including those related to special and annual meetings of stockholders, action of stockholders by written consent, classification of the board of directors, nomination of directors, special meetings of directors, removal of directors, committees of the board of directors and indemnification of directors and officers, requires the affirmative vote of at least 75% of all directors in office at a meeting called for that purpose; or

- the affirmative vote of holders of 75% of the voting power of our outstanding shares of voting stock, voting together as a single class.

Other Limitations on Stockholder Actions

Our amended and restated bylaws also impose some procedural requirements on stockholders who wish to:

- make nominations in the election of directors;

- propose that a director be removed;

- propose any repeal or change in our bylaws; or

- propose any other business to be brought before an annual or special meeting of stockholders.

Under these procedural requirements, in order to bring a proposal before a meeting of stockholders, a stockholder must deliver timely notice of a proposal pertaining to a proper subject for presentation at the meeting to our corporate secretary along with the following:

- a description of the business or nomination to be brought before the meeting and the reasons for conducting such business at the meeting;

- the stockholder’s name and address;

- any material interest of the stockholder in the proposal;

- the number of shares beneficially owned by the stockholder and evidence of such ownership; and

- the names and addresses of all persons with whom the stockholder is acting in concert and a description of all arrangements and understandings with those persons, and the number of shares such persons beneficially own.

To be timely, a stockholder must generally deliver notice:

- in connection with an annual meeting of stockholders, not less than 120 nor more than 180 days prior to the date on which the annual meeting of stockholders was held in the immediately preceding year, but in the event that the date of the annual meeting is more than 30 days before or more than 60 days after the anniversary date of the preceding annual meeting of stockholders, a stockholder notice will be timely if received by us not later than the close of business on the later of (1) the 120th day prior to the annual meeting and (2) the 10th day following the day on which we first publicly announce the date of the annual meeting; or

- in connection with the election of a director at a special meeting of stockholders, not less than 40 nor more than 60 days prior to the date of the special meeting, but in the event that less than 55 days' notice or prior public disclosure of the date of the special meeting of the stockholders is given or made to the stockholders, a stockholder notice will be timely if received by us not later than the close of business on the 10th day following the day on which a notice of the date of the special meeting was mailed to the stockholders or the public disclosure of that date was made.

In order to submit a nomination for our board of directors, a stockholder must also submit any information with respect to the nominee that we would be required to include in a proxy statement, as well as some other information. If a stockholder fails to follow the required procedures, the stockholder's proposal or nominee will be ineligible and will not be voted on by our stockholders.

Limitation of Liability of Directors and Officers

Our restated certificate of incorporation provides that we may indemnify our directors and officers, in each case to the fullest extent permitted by Delaware law.

Forum Selection

The Court of Chancery of the State of Delaware is the sole and exclusive forum for (i) any derivative action or proceeding brought on behalf of the company, (ii) any action asserting a claim of breach of fiduciary duty owed by any director, officer or other employee of the company to the company or the company's stockholders, (iii) any action asserting a claim arising pursuant to any provision of the Delaware General Corporation Law or (iv) any action asserting a claim governed by the internal affairs doctrine. Any person or entity purchasing or otherwise acquiring any interest in shares of capital stock of the company shall be deemed to have notice of and consented to the foregoing forum selection provisions. The provision would not apply to suits brought to enforce a duty or liability created by the Securities Act and the Securities Exchange Act of 1934, as amended. In addition, our amended and restated bylaws provides that unless we consent in writing to the selection of an alternative forum, the federal district courts of the United States shall be the exclusive forum for the resolution of any complaint asserting a cause of action arising under the Securities Act.

Delaware Business Combination Statute

We have elected to be subject to Section 203 of the Delaware General Corporation Law, which regulates corporate acquisitions. Section 203 prevents an "interested stockholder," which is defined generally as a person owning 15% or more of a corporation's voting stock, or any affiliate or associate of that person, from engaging in a broad range of "business combinations" with the corporation for three years after becoming an interested stockholder unless:

- the board of directors of the corporation had previously approved either the business combination or the transaction that resulted in the stockholder's becoming an interested stockholder;

- upon completion of the transaction that resulted in the stockholder's becoming an interested stockholder, that person owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, other than statutorily excluded shares; o

- following the transaction in which that person became an interested stockholder, the business combination is approved by the board of directors of the corporation and holders of at least two-thirds of the outstanding voting stock not owned by the interested stockholder.

Under Section 203, the restrictions described above also do not apply to specific business combinations proposed by an interested stockholder following the announcement or notification of designated extraordinary transactions involving the corporation and a person who had not been an interested stockholder during the previous three years or who became an interested stockholder with the approval of a majority of the corporation's directors, if such extraordinary transaction is approved or not opposed by a majority of the directors who were directors prior to any person becoming an interested stockholder during the previous three years or were recommended for election or elected to succeed such directors by a majority of such directors.

Section 203 may make it more difficult for a person who would be an interested stockholder to effect various business combinations with a corporation for a three-year period. Section 203 also may have the effect of preventing changes in our management and could make it more difficult to accomplish transactions that our stockholders may otherwise deem to be in their best interests.

Anti-Takeover Effects of Some Provisions

Some provisions of our restated certificate of incorporation and bylaws could make the following more difficult:

- acquisition of control of us by means of a proxy contest or otherwise, or
- removal of our incumbent officers and directors.

These provisions, as well as our ability to issue preferred stock, are designed to discourage coercive takeover practices and inadequate takeover bids. These provisions are also designed to encourage persons seeking to acquire control of us to first negotiate with our board of directors. We believe that the benefits of increased protection give us the potential ability to negotiate with the proponent of an unfriendly or unsolicited proposal to acquire or restructure us, and that the benefits of this increased protection outweigh the disadvantages of discouraging those proposals, because negotiation of those proposals could result in an improvement of their terms.

Listing

Our common stock is listed on the Nasdaq Global Select Market under the symbol "SWAV."

Transfer Agent and Registrar

The transfer agent and registrar for the common stock is Computershare Trust Company, N.A. The transfer agent and registrar's address is 250 Royall St., Canton, Massachusetts 02021.

Exhibit 10.2

Execution Version

OFFICE LEASE (NET)

BETWEEN

BETSY ROSS PROPERTY, LLC,

a Delaware limited liability company,

AS LANDLORD,

AND

SHOCKWAVE MEDICAL, INC.,

a Delaware corporation,

AS TENANT,

FOR

GREAT AMERICA TECH CENTER

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SUMMARY OF BASIC LEASE INFORMATION

This Summary of Basic Lease Information (the "**Lease Summary**") is hereby incorporated into and made a part of the attached Office Lease (Net) (this Lease Summary and the Office Lease (Net) to be known collectively as the "**Lease**"). In the event of a conflict between the terms of this Lease Summary and the Office Lease (Net), the terms of the Office Lease (Net) shall prevail. Any capitalized terms used herein and not otherwise defined herein shall have the meaning as set forth in the Office Lease (Net).

1.	**Date:**	December 13, 2019.
2.	**Landlord:**	BETSY ROSS PROPERTY, LLC, a Delaware limited liability company
3.	**Address of Landlord:**	c/o Alhouse Deaton 230 South California Avenue, Suite 212 Palo Alto, CA 94306 Attention: Mya Smith Phone: 650-857-1793 Email: myasmith@alhousedeaton.com
4.	**Tenant:**	SHOCKWAVE MEDICAL, INC., a Delaware corporation
5.	**Address of Tenant:**	5403 Betsy Ross Drive, Santa Clara, California 95054 Attention: General Counsel Email: legal@shockwavemedical.com
6.	**Guarantor(s):**	None.
7.	**Phase 1:**	The building located at 5353 Betsy Ross Drive, Santa Clara, California, as shown on Exhibit B-1 (the "**5353 Building**") comprised of Fifty Thousand Two Hundred (50,200) rentable square feet. The 5353 Building includes two floors (each, a "**Floor**"): (a) the first (1st) floor is comprised of Twenty-Four Thousand One Hundred Thirty-Five (24,135) rentable square feet (the "**5353 First Floor**"); and the second (2nd) floor is comprised of Twenty-Six Thousand Sixty-Five (26,065) rentable square feet (the "**5353 Second Floor**").
8.	**Phase 2:**	The building located at 5403 Betsy Ross Drive, Santa Clara, California, as shown on Exhibit B-2 (the "**5403 Building**", collectively with the 5353 Building, the "**Buildings**" and each, a "**Building**") and which the parties agree contains thirty-five thousand (35,000) rentable square feet subject to remeasurement set forth in Section 2.31.3. Notwithstanding the foregoing, until the Phase 2 Commencement Date, all references to the "Building" or "Buildings" shall mean solely the 5353 Building.
9.	**Premises:**	Until the Phase 2 Commencement Date, the Premises shall mean Phase 1. From and after the Phase 2 Commencement Date, the Premises shall mean collectively Phase 1 and Phase 2.
10.	**Property:**	The Buildings are located on the real property described on Exhibit C (the "**Property**"). The Buildings are part of the three (3) building project known as "Great America Tech Center" (the "**Project**") The parties agree that the Project contains 120,200 rentable square feet as of the date hereof.

11. **Term:**

(a) Initial Lease Term:	Approximately ninety-six (96) complete calendar months from Phase 1 Commencement Date.
(b) Phase1 Commencement Date:	December 13, 2019
(c) Phase2 Commencement Date:	September 1, 2022 (except as provided in Section 30.35 below in the event of certain terminations of the Sublease).
(d) Expiration Date:	December 12, 2027
(e) Option Term:	One (1) term of sixty (60) months
(f) Option Term Notice Period	No earlier than twenty-seven (27) months nor later than eighteen (18) months prior to the Expiration Date.

12. **Base Rent:**

Rent Period	Months of Initial Lease Term	Monthly Base Rent per Rentable Square Foot of the Premises
12/13/19 - 8/31/20	1-9	$2.25
9/1/20 – 8/31/21	10-21	$2.32
9/1/21 – 8/31/22	22-33	$2.39
9/1/22 – 8/31/23	34-45	$2.46
9/1/23 – 8/31/24	46-57	$2.54
9/1/24 – 8/31/25	58-69	$2.62
9/1/25 – 8/31/26	70-81	$2.70
9/1/26 – 12/12/27	82-96	$2.78

Notwithstanding the foregoing, during the applicable Abatement Period (as defined below) for each Floor of Phase 1, the Base Rent attributable to such Floor shall be abated (the "**Abated Base Rent**"). If Landlord terminates this Leases as a result of a Default by Tenant beyond applicable notice and cure periods, then, without limiting any other rights and remedies of Landlord, (1) any remaining portion of the Abatement Period as of the date of such Lease termination shall automatically be extinguished and (2) the then unamortized Abated Base Rent to the date of such termination (amortized over the initial 96 months of the Initial Lease Term), shall immediately become due and payable. For the purposes of this Lease, the "**Abatement Period**" applicable to the 5353 First Floor shall be the first nineteen (19) months after the Phase 1 Commencement Date and the "**Abatement Period**" applicable to the 5353 Second Floor shall be the first four (4) months after the Phase 1 Commencement Date.

13. **Additional Rent:**

Tenant's Proportionate Share of Project Operating Costs:	Prior to the Phase 2 Commencement Date, Tenant's Proportionate Share of Project Operating Costs shall be the quotient of the rentable square footage of the 5353 Building divided by the total rentable square footage of the Project. From and after the Phase 2 Commencement Date, Tenant's Proportionate Share of Project Operating Costs shall be the quotient of the rentable square footage of both the 5353 Building and the 5403 Building divided by the total rentable square footage of the Project.

14. **Construction:**

(a) Allowance:	The Allowance is calculated based on the rentable square footage of the two Floors of Phase 1 and Phase 2 and is as follows: Phase 1: Twenty-Five Dollars ($25.00) per rentable square foot for the 5353 First Floor (the "**5353 First Floor Allowance**") and Thirty Dollars ($30.00) per rentable square foot for the 5353 Second Floor (the "**5353 Second Floor Allowance**"). Phase 2: Twelve and 50/100 Dollars ($12.50) per rentable square foot for Phase 2 (the "**5403 Allowance**").
(b) Landlord Supervision Fee:	Three percent (3%) of the Total Construction Costs with respect to the first One Million Dollars ($1,000,000) of Total Construction Costs, and one and five-tenths percent (1.5%) of the Total Construction Costs with respect to the Total Construction Costs in excess of One Million Dollars ($1,000,000), which Landlord Supervision Fee shall be deducted from the Allowance.

15. **Initial Payments:**

(a) LC Amount:	$1,000,000.00 prior to the Phase 2 Commencement Date, and an additional $500,000.00 on the Phase 2 Commencement Date (for a total of $1,500,000.00 on the Phase 2 Commencement Date). The LC Amount shall be subject to reduction as set forth in Addendum 1.
(b) Prepaid Rent:	$112,950

16. **Permitted Use:**	General office, research and development, light manufacturing, machine shop and lab uses (including, but not limited to, surgical equipment, electronic and wet labs) and other ancillary uses directly related thereto permitted under applicable zoning.
17. **Parking:**	Non-reserved Parking Spaces: Four (4) non-reserved parking spaces per 1,000 rentable square feet of each Phase upon the applicable Commencement Date for such Phase.

18. **Brokers:**

(a) Tenant's Broker: Transwestern

19. **Addenda and Exhibits:** The addenda and exhibits listed below are incorporated by reference in this Lease.

Addendum #1— Letter of Credit

Exhibit A	Intentionally Omitted
Exhibit B	Site Plan of Project
Exhibit C	Legal Description
Exhibit D	Term Certification
Exhibit E	Construction
Exhibit E-1	Tenant Improvement Work
Exhibit E-2	Construction Rules and Regulations
Exhibit F	Building Services
Exhibit G	Rules and Regulations
Exhibit H	Parking Agreement
Exhibit I	Environmental Disclosures
Exhibit J	Example Permitted Materials Index
Exhibit J-1	Example Hazardous Materials Procedures
Exhibit K	Form of Subordination, Non-Disturbance And Attornment Agreement

Landlord and Tenant hereby agree to the foregoing terms of this Lease Summary.

LANDLORD:

BETSY ROSS PROPERTY, LLC,
a Delaware limited liability company

By: /s/ Shaoyuan Wang

Printed Name: Shaoyuan Wang

Title: President

Date: December 13, 2019

TENANT:

SHOCKWAVE MEDICAL, INC.,
a Delaware corporation

By: s/ Douglas E. Godshall

Printed Name: Douglas E. Godshall

Title: CEO

Date: December 13, 2019

Taxpayer ID No. 27 - 0494101

OFFICE LEASE (NET)

THIS OFFICE LEASE (NET) (the "**Lease**") is made effective as of December 13, 2019 by and between BETSY ROSS PROPERTY, LLC, a Delaware limited liability company ("**Landlord**"), and SHOCKWAVE MEDICAL, INC., a Delaware corporation ("**Tenant**"), with reference to the following facts and circumstances:

A. Landlord is the owner of the Project, as defined herein.

B. The Premises covered by this Lease are defined on the Lease Summary and are comprised of Phase 1 located in the 5353 Building and Phase 2 located in the 5403 Building, as such terms are defined on the Lease Summary.

C. The parties desire to enter into this Lease, all on the terms and conditions set forth herein.

NOW, THEREFORE, in consideration of the foregoing facts and circumstances, the mutual covenants and promises contained herein and after good and valuable consideration, the receipt and sufficiency of which are acknowledged by each of the parties, the parties do hereby agree to the following:

ARTICLE 1
LEASE OF PREMISES

In consideration of the Rent and the provisions of this Lease, Landlord leases to Tenant and Tenant leases from Landlord the Premises. In addition, Tenant shall have the non-exclusive right (unless otherwise provided herein) in common with Landlord, other tenants, subtenants, and invitees to use the Common Areas.

ARTICLE 2
DEFINITIONS

Except as otherwise defined in this Lease, capitalized terms shall have the meanings set forth on the Lease Summary. As used in this Lease, the following terms shall have the following definitions:

2.1 Additional Rent. All amounts, costs and expenses that Tenant assumes, agrees or is otherwise obligated to pay to Landlord under this Lease other than Base Rent.

2.2 Affiliate. An entity that is controlled by, controls, or is under common control with a party. "**Control**" shall mean the ownership, directly or indirectly, of at least fifty-one percent (51%) of the voting securities of, or possession of the right to vote, in the ordinary direction of its affairs, of at least fifty-one percent (51%) of the voting interest in any entity.

2.3 Bankruptcy Code. Title 11 of the United States Code, as amended from time to time.

2.4 Base Rent. As set forth on the Lease Summary.

2.5 Building Services. As set forth in Exhibit F.

2.6 Building Systems. Any plant, machinery, transformers, duct work, cable, wires, and other equipment and facilities, and any systems designed to supply heat, ventilation, air conditioning and humidity or any other services or utilities, or comprising or serving as any component or portion of the electrical, gas, steam, plumbing, sprinkler, communications, alarm, security, or fire/life safety systems or equipment, any Telecommunications System serving each Building and any other mechanical, electrical, electronic, computer or other systems or equipment that serves each Building in whole or in part.

2.7 Business Days. Days other than Saturdays, Sundays and Holidays. If any item must be accomplished or delivered hereunder on a day that is not a Business Day, it shall be timely to accomplish or deliver the same on the next following Business Day.

2.8 Business Hours. Not applicable.

2.9 Claims. Actions, causes of action, charges, claims, contribution costs, damages, demands, expenses (including, without limitation, attorneys' fees and fees and costs of consultants and other professionals), fines, liabilities, liens, losses, obligations, penalties, proceedings, response costs, or suits. All references in this Lease to Landlord's "**attorneys' fees**" shall mean and refer to all of Landlord's fees and costs for attorneys, including in-house attorneys.

2.10 Commencement Date. Each of Phase 1 Commencement Date and Phase 2 Commencement Date set forth on the Lease Summary with respect to Phase 1 and Phase 2, as applicable.

2.11 Common Areas. The unrestricted parking areas, driveways and walkways, terraces and landscaped areas in and around each Building, and other public or common areas in the Project designated as such by Landlord.

2.12 Environmental Laws. All Laws regulating or controlling Hazardous Materials, including, without limitation, the Carpenter-Presley-Tanner Hazardous Substance Account Act, California Health and Safety Code Sections 25300-25395.15, the California Safe Drinking Water and Toxic Enforcement Act (Proposition 65) California Health and Safety Code Section 25249.5 et seq. and the Hazardous Waste Control Law, California Health and Safety Code Sections 25100-25250.25, the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. 9601, et seq.; the Hazardous Material Transportation Act, 49 U.S.C. 1801 et seq.; and the Resource Conservation and Recovery Act, 42 U.S.C. 6901 et seq.

2.13 Expiration Date. As set forth on the Lease Summary, unless otherwise sooner terminated in accordance with the provisions of this Lease.

2.14 Force Majeure. Strikes, labor disputes, lockouts, inability to obtain labor, materials, equipment, or reasonable substitutes therefor, acts of God, governmental restrictions, regulations, or controls, judicial orders, enemy or hostile government actions, civil commotion, war, terrorism (foreign or domestic), fire, accident, explosion, falling objects or other casualty, or other causes beyond the reasonable control of the party obligated to perform hereunder.

2.15 Intentionally deleted.

2.16 Hazardous Materials. Any hazardous waste or hazardous substance as defined in any Laws applicable to the Project, including, without limitation, the Environmental Laws. "**Hazardous Materials**" shall also include asbestos or asbestos-containing materials, radon gas, petroleum or petroleum fractions, urea formaldehyde foam insulation, transformers containing levels of polychlorinated biphenyls greater than 50 parts per million, medical waste, biological materials (including without limitation blood and blood products), electromagnetic fields, mold and chemicals known to cause cancer or reproductive toxicity, whether or not defined as a hazardous waste or hazardous substance in any statute, ordinance, rule or regulation.

2.17 Holidays. All federally observed holidays, including New Year's Day, Martin Luther King, Jr. Day, President's Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day and Christmas Day.

2.18 Insurance. All costs incurred by Landlord for insurance with respect to the Project, including but not limited to the insurance required under Section 18.1 below.

2.19 Interest Rate. The average prime loan rate published by the board of governors of the Federal Reserve System of the United States, as the same may change from time to time, plus three percent (3%) per annum, but not in excess of the maximum rate, if any, allowed by Law for the transaction on which interest is being calculated.

2.20 Landlord Related Parties. Landlord, Landlord's Affiliates, and the members, principals, beneficiaries, partners, trustees, shareholders, directors, officers, employees, mortgagees, investment managers, property managers, brokers, contractors, attorneys, and agents of Landlord and Landlord's Affiliates, and the successors of such parties.

2.21 Law or Laws. All federal, state, county and local governmental and municipal laws, statutes, ordinances, rules, regulations, requirements, codes, decrees, orders, and decisions by courts and cases, when the decisions are considered binding precedent in the State, and decisions of federal courts applying the Law of the State; including but not limited to The Americans With Disabilities Act of 1990 (42 U.S.C. § 12101 et seq.), the California Building Standards Law, Health and Safety Code Sections 18901-18949.1, Title 24 of the California Code of Regulations, and all seismic retrofit or other earthquake protection requirements, and any regulations and guidelines promulgated thereunder, as all of the same may be amended and supplemented from time to time.

2.22 Lease Year. Each twelve (12) month period or portion thereof during the Term, commencing with the Phase 1 Commencement Date, without regard to calendar years; provided, however, if the Phase 1 Commencement Date is not the first day of the month, then the first (1st) Lease Year shall commence on the first day of the first calendar month after the Phase 1 Commencement Date and be deemed to include the partial month at the beginning of the Term.

2.23 Mortgagee. The lessor under any present and future ground or underlying lease of the Property and the holder of any mortgage, deed to secure debt or trust deed now or hereafter in force against the Property or any Building.

2.24 Operating Costs. All costs reasonably incurred by Landlord or its agents in the ownership, management, maintenance, repair, replacement, improvement, alteration and operation of the Project, which may include, without limitation, any or all of the following: (a) utilities; (b) supplies, tools, equipment and materials used in the operation, repair and maintenance of the Project; (c) landscaping;(d) parking area repair, restoration, and maintenance, including, but not limited to, resurfacing, repainting, re-striping, and cleaning; (e) intentionally omitted; (f) fees, charges and other costs, including, without limitation, reasonable consulting fees, legal fees and accounting fees, of all contractors engaged by Landlord or otherwise reasonably incurred by Landlord in connection with the management, operation, maintenance and repair of the Project; (g) compensation (including, without limitation, employment taxes and fringe benefits) of all persons who perform duties in connection with the operation, maintenance, repair, or overhaul of the Project, and equipment, improvements, and facilities located within the Project; (h) operation and maintenance of a room for delivery and distribution of mail to tenants of the Project as required by the U. S. Postal Service, along with any space Landlord provides for non-exclusive use by tenants, such as conference centers, exercise facilities and other project amenities (including, without limitation, an amount equal to the fair market rental value of the space used for such purposes); (i) payments under any easement, license, operating agreement, declaration, restrictive covenant, underlying or ground lease (excluding rent), or instrument pertaining to the sharing of costs by the Project; (j) operation, repair and maintenance, but not replacement, of the Common Areas, the maintenance and repair, but not replacement, of the non-structural elements of each Building's roof (including the roof membrane), and the maintenance, but not repair and replacement, of each Building's structure; (k) janitorial service, alarm and security service, trash removal for the Common Areas; (1) intentionally omitted; (m) maintenance and replacement of curbs and walkways; (n) intentionally omitted; (o) intentionally omitted; (p) management of the Project, whether by Landlord or an independent contractor (including, without limitation, an amount equal to the fair market value of any manager's office; provided, that if such manager's office is located off-site, the fair market value of such office shall be equitably allocated among all buildings managed by such office); (q) rental expenses for (or a reasonable depreciation allowance on) personal property used in maintenance, operation or repair of the Project; (r) licenses, certificates, permits and inspections and the cost of contesting the validity or applicability of any governmental enactments that may affect Operating Costs; (s) intentionally omitted; (t) the costs incurred in connection with the implementation and operation of any transportation system management program or similar program; (u) any non-capital costs, expenditures, or charges required by any governmental or quasi-governmental authority; and (v) amortization of capital expenses (including, without limitation, financing costs) (A) that are intended as a

labor saving device or to effect other economies in the operation or maintenance of the Project, or any portion thereof, (B) that are required under any Law, or (C) that are in Landlord's opinion necessary to maintain the Project, or any portion thereof, in good condition and repair; provided that such cost shall be amortized (including interest on the unamortized cost) over its useful life as reasonably determined by Landlord in accordance with accounting practices generally consistent with generally accepted accounting principles consistently applied ("**GAAP**") and/or conforming to sound real estate management principles to the extent inconsistent with GAAP. Notwithstanding anything to the contrary in this Lease, "Project Operating Costs" shall not include all or any portion of the following:

2.24.1 Costs (including permit, license and inspection costs) incurred in renovating or otherwise improving, decorating or redecorating rentable space for other tenants or vacant rentable space;

2.24.2 Utilities or services sold to Tenant or others for which Landlord is entitled to reimbursement (other than through any operating cost reimbursement provision similar to the provisions set forth in this Lease);

2.24.3 Costs of alterations to the Project that are considered capital expenditures, capital improvements or replacements of such capital improvements under sound real estate management principles, except to the extent amortized as set forth in subsection (v) above;

2.24.4 Depreciation and amortization, except on materials, small tools and supplies purchased by Landlord to enable Landlord to supply services Landlord might otherwise contract for with a third party, where such depreciation and amortization would otherwise have been included in the charge for such third party services, all as determined in accordance with sound real estate management principles;

2.24.5 Costs attributable to services, improvements or other benefits that are not provided by Landlord to Tenant, but which are provided to other tenants of the Project;

2.24.6 Overhead or any profit increment paid to Landlord or to subsidiaries or affiliates of Landlord for services in or in connection with the Project to the extent the same exceeds the cost of such services that could be obtained from equally qualified third parties on a competitive basis or at market rates;

2.24.7 Except as otherwise specifically provided in subsection (v) above, interest on debt or amortization on any mortgages, other charges, costs and expenses payable under any mortgage, if any, and costs for financing and refinancing the Project;

2.24.8 Ground rents;

2.24.9 Compensation and employee benefits paid to clerks, attendants or other persons in any commercial concession operated by Landlord;

2.24.10 Rentals and other related expenses incurred in leasing equipment, the cost of which would otherwise be excluded capital expenses hereunder, except equipment used (a) in performing repairs and replacements and/or in providing janitorial or similar services and which is not affixed to the Project, or (b) in case of emergency;

2.24.11 Electrical power, or any other utility or service for which Tenant directly contracts with and pays an electrical service company, utility company or other service provider;

2.24.12 Marketing costs, including leasing commissions, attorneys' fees in connection with the negotiation and preparation of letters, deal memos, letters of intent, leases, subleases and/or assignments, space planning costs, and other costs and expenses incurred in connection with lease, sublease or assignment negotiations and transactions with present or prospective tenants or other occupants of the Project, including attorneys' fees and other costs and expenditures incurred in connection with disputes with present or prospective tenants or other occupants of the Project and costs arising from the violation by Landlord or any other occupant of the Project of the terms and conditions of any lease (including this Lease) or other agreement;

2.24.13 Costs covered by insurance maintained or required to be maintained by Landlord under this Lease;

2.24.14 Costs covered by warranties;

2.24.15 Any service provided directly to and paid directly by any tenant, including Tenant;

2.24.16 Wages and benefits of any employee who does not devote substantially all of his or her employed time to the Project unless such wages and benefits are prorated to reflect time spent on operating and managing the Project vis-à-vis time spent on matters unrelated to operating and managing the Project;

2.24.17 Penalties or fines occasioned by the violation of any Law by Landlord, any other occupant of the Project, or their respective agents, employees or contractors;

2.24.18 Costs of structural repairs and replacements (including structural roof repairs and replacements) to the Project or any part thereof, except as specifically permitted in Section 2.24(j), above;

2.24.19 Costs incurred in connection with the presence of any Hazardous Material;

2.24.20 Except for Landlord's commercially reasonable deductible amounts (which shall not exceed $25,000 (other than with respect to the earthquake deductible)), costs occasioned by casualties or condemnation, except that any commercially reasonable deductible in connection with an earthquake shall be amortized over the remainder of the useful life of the items repaired or reconstructed with such deductible and only the amortized portion of such deductible applicable to a given calendar year shall be included within Operating Costs for such calendar year;

2.24.21 Costs to correct any currently existing construction defect in the Premises or the Project (whether latent or patent), or costs to comply with any Law first applicable to the Project prior to the Phase 1 Commencement Date;

2.24.22 Increases in insurance costs caused by the activities of any occupant of the Project; and

2.24.23 Expense reserves.

2.25 Permitted Use. As set forth on the Lease Summary.

2.26 Permitted Transfer. "**Permitted Transfer**" shall mean an assignment or subletting of all or a portion of the Premises to (1) an Affiliate of Tenant, (2) any corporation or other business entity that succeeds to the business of Tenant as a result of a merger, consolidation or other business reorganization, or (3) any corporation or other business entity which acquires all or substantially all of the assets or ownership interests of Tenant, where (with respect to any party set forth in subsections (1) through (3)), (a) the transferee or successor (as applicable) assumes, in full, the obligations of Tenant under this Lease; (b) to the extent Tenant continues to exist, Tenant remains fully liable under this Lease; (c) the use of the Premises falls within the Permitted Use; (d) after such transaction is effected, the tangible net worth of the tenant hereunder is equal to or greater than the tangible net worth of Tenant as of the date immediately prior to the transaction; (e) Landlord shall have received an executed copy of all documentation effecting such transfer promptly after its effective date; and (f) the same is not a subterfuge by Tenant to avoid its obligations under this Lease.

Additionally, "Permitted Transfer" shall also include any Change of Control, where (a) Tenant remains fully liable under this Lease; (b) the use of the Premises falls within the Permitted Use; (c) after such transaction is effected, the tangible net worth of the tenant hereunder is equal to or greater than the tangible net worth of Tenant as of the date immediately prior to the Change of Control; (d) Landlord shall have received reasonable notice and documentation evidencing that such Change of Control satisfies the conditions in (a) through (d) of this paragraph on or before its effective date (except where prohibited by Law or commercially reasonable confidentiality restrictions appurtenant to the Change of Control transaction, in which case the same shall be provided promptly after such prohibition expires); and (e) the same is not a subterfuge by Tenant to avoid its obligations under this Lease.

2.27 Permitted Transferee. The Transferee pursuant to a Permitted Transfer.

2.28 Project. The Property, the Buildings and any other improvements on the Property.

2.29 Project Operating Costs. Operating Costs, Taxes and Insurance.

2.30 Rent. Base Rent and Additional Rent.

2.31 Rentable Area; Measurement. Rentable Area shall be the measurement of rentable area or rentable square feet as set forth in the Lease Summary. No representation or warranty of any kind, express or implied, is given to Tenant with respect to the Rentable Area of either Floor, Phase, Building or any other portion of the Project. Landlord shall have no liability to Tenant if the approximate square footages described in this Lease differs from the actual square footages.

2.32 Rules and Regulations. As set forth in Exhibit G.

2.33 State. The state in which the Project is located.

2.34 Taxes. All taxes and assessments (whether special or general, ad valorem or non-ad valorem, voluntary or non-voluntary, and regardless of whether the same are deductible for Landlord's income tax purposes), water and sewer charges, and other similar government charges levied on or attributable to any Building or the Project or their operation, including, without limitation (a) real property taxes or assessments levied or assessed against any Building or the Project; (b) assessments or charges levied or assessed against any Building or the Project by any redevelopment agency, municipality or governmental or quasi-governmental agency, including but not limited to any assessments or the Project's contribution towards a governmental or private cost-sharing agreement for the purpose of augmenting or improving the quality of services and amenities normally provided by governmental agencies, any assessments resulting from Landlord's participation in a "PACE" program, and any taxes or assessments levied by a Community Facilities District; (c) any tax, assessment, levy, license fee or charge measured by or based, in whole or in part, by Rent received from the leasing of the Premises, any Building, or the Project, or any portions thereof; (d) general or special, ad valorem, non-ad valorem or specific, excise, capital levy, or other tax, assessment, levy, or charge directly on the Rent received under this Lease or on the rent received under any other leases of space in any Building or the Project; (e) any transfer, transaction, or similar tax, assessment, levy, or charge based directly or indirectly upon the transaction represented by this Lease or other leases in the Project; (f) any franchise or margin tax imposed by any governmental entity; (g) any possessory interest, occupancy, use, per capita, or other tax, assessment, levy, or charge based directly or indirectly upon the use or occupancy of the Premises or other premises within any Building or the Project; (h) interest on installments as charged by the taxing authority; and (i) the reasonable costs and expenses of any reasonable contest or protest of Taxes prosecuted by Landlord, including, without limitation, any appraisal fees and attorneys' fees. Taxes and Project Operating Costs shall not include (i) any net income, capital stock, gift, transfer, estate or inheritance taxes imposed by the State or Federal Government or their agencies, branches, or departments; (ii) tax penalties, interest or late charges incurred as a result of Landlord's failure to make timely payment of Taxes; and (iii) any taxes or assessments imposed on land and improvements other than the Project. Notwithstanding the foregoing, if at any time during the Term, the present method of taxation or assessment shall be so changed that the whole or any part of the taxes, assessments, levies, impositions or charges now levied, assessed or imposed on the Project shall be discontinued or reduced and as a substitute therefor, or in lieu of or in addition thereto, taxes, assessments, levies, impositions or charges shall be levied, assessed or imposed, wholly or partially, as a capital levy or otherwise (a "Substitute Tax"), then such Substitute Tax shall be included within the definition of Taxes. Tenant hereby waives, and assigns, transfers and conveys to Landlord, any and all rights to contest or protest any Taxes For purposes of determining Taxes, Landlord shall be deemed to have paid assessments in installments over the longest period of time permitted by the applicable jurisdiction. Taxes with respect to any building in the Project other than Phase 1 and Phase 2 shall not be allocated to Tenant in any manner and shall be charged solely to such other buildings.

2.35 Telecommunications Systems. All telecommunications systems including but not limited to voice, video, data, and any other telecommunications services provided over wire, fiber optic, microwave, wireless, satellite and any other transmission systems, for part or all of any telecommunications within the Buildings or from the Buildings to any other location.

2.36 Tenant Related Parties. Tenant, its Affiliates, agents, contractors, subcontractors, employees, invitees (while in the Premises only), subtenants, transferees, and any other party claiming by, through or under Tenant.

2.37 Tenant's Cost Allocation. The sum of the following: (a) Tenant's Proportionate Share of Operating Costs for the year in question; (b) Tenant's Proportionate Share of Taxes for the year in question; and (c) Tenant's Proportionate Share of Insurance for the year in question. If at any time during the Term Operating Costs, Taxes and/or Insurance are not based on a completed and fully assessed Project having at least ninety-five percent (95%) of the Rentable Area occupied, then Operating Costs, Taxes and/or Insurance shall be adjusted by Landlord in order reasonably to approximate the variable components of Operating Costs, Taxes and/or Insurance for such year or applicable portion thereof, employing sound accounting and management principles, that would have been payable if the Project were completed, fully assessed and at least ninety-five percent (95%) occupied.

2.38 Tenant's Property. All movable partitions, business and trade fixtures, machinery and equipment, communications equipment, office equipment and other personal property located in the Premises and acquired by or for the account of Tenant, where the cost therefor was neither paid for or reimbursed by Landlord, that can be removed without structural damage to any Building, and all furniture, furnishings, records, files and other articles of movable personal property owned by Tenant and located in the Premises; however, in no event shall Tenant's Property include any equipment or other property that Landlord reasonably determines is a leasehold improvement (e.g., rooftop or supplemental air conditioning units).

2.39 Tenant's Proportionate Share. As set forth on the Lease Summary. Such share is a fraction, the numerator of which is the Rentable Area of the Premises, and the denominator of which shall be the Rentable Area of the Project, it being acknowledged and agreed that, notwithstanding anything to the contrary contained in this Lease, for purposes of determining Tenant's Cost Allocation, Landlord may, in its reasonable discretion but in accordance with sound accounting and management practices consistently applied, calculate all or any portion of Operating Costs, Taxes and Insurance for each Building separately from the Project, if and to the extent that the same solely benefit any Building, in which event Tenant's Proportionate Share shall be one hundred percent (100%) with respect to such items. In addition, Landlord shall not include in Tenant's Cost Allocation costs relating solely to other building(s) in the Project except the Buildings. Tenant's Proportionate Share is subject to recalculation in accordance with changes in the Rentable Area of the Premises or the Project resulting from a change in the physical size of the footprint of the Premises or the footprint of any other building in the Project. Landlord reserves the right to create pools of similarly situated tenants for the purpose of allocating certain Operating Costs that benefit only the tenants in such pool ("**Specialized Operating Costs**"). For the purpose of allocating Specialized Operating Costs for any pool of which Tenant is a member, Tenant's Proportionate Share shall be a fraction, the numerator of which shall be the Rentable Area of the Premises, and the denominator of which shall be the Rentable Area of the premises of all tenants in such pool.

2.40 Term. As set forth on the Lease Summary, as the same may be extended from time to time.

2.41 Transfer. An assignment, mortgage, pledge, hypothecation, encumbrance, lien or other transfer of this Lease or any interest hereunder, a transfer by operation of law, a sublease or license of the Premises or any part thereof, or the use of the Premises by any party other than Tenant and its employees (including any assignment, mortgage, pledge, hypothecation, encumbrance, lien or other transfer of this Lease or any interest hereunder or a sublease of the Premises or any part thereof by Tenant's heirs and/or executors). Except in the case of a Permitted Transfer as provided in Section 2.26 above, "Transfer" shall also include (a) if Tenant is a partnership, limited liability company or any other non-corporate entity, the withdrawal or change, voluntary, involuntary or by operation of law, of forty percent (40%) or more of the partners, members or owners, or transfer of forty percent (40%) or more of partnership, membership or ownership interests, within a twelve (12)-month period, or the

dissolution of the partnership or company without immediate reconstitution thereof and (b) if Tenant is a corporation, the dissolution, merger, consolidation or other reorganization of Tenant, the sale or other transfer of more than an aggregate of forty percent (40%) of the voting shares of Tenant (other than to immediate family members by reason of gift or death), within a twelve (12)-month period (each, under (a) and (b), above a "**Change of Control**"). Notwithstanding the foregoing or anything in this Lease to the contrary, the sale, issuance or transfer of Tenant's capital stock or other equity interests, or the issuance of debt, any of which occur in connection with an equity financing, debt financing or through the "over the counter" market or any recognized national or international securities exchange, including transfers and issuances as part of an initial public offering of Tenant's stock, shall not be included in determining whether a Change of Control has occurred and shall not be a Transfer.

2.42 Transferee. Any person or entity to whom or which any Transfer is made.

ARTICLE 3
PREMISES AND DELIVERY OF POSSESSION

3.1 Delivery of Possession. Landlord and Tenant acknowledge and agree that Tenant currently occupies, and as of the date immediately preceding the Phase 2 Commencement Date, will occupy Phase 2 pursuant to a sublease between Tenant and the current tenant of Phase 2 (the "**Sublease**"); consequently, Landlord shall have no obligation to deliver physical possession of Phase 2 to Tenant on the Phase 2 Commencement Date, and, except for Landlord's express obligations and warranties set forth in this Lease, Tenant hereby waives any and all Claims Tenant may have with respect to the condition of the Premises as of the applicable Commencement Date.

3.2 Commencement Date. If either Commencement Date is not fixed on the Lease Summary, once such Commencement Date is fixed, within ten (10) days following request by Landlord, Tenant will execute and deliver to Landlord a certificate substantially in the form of Exhibit D attached hereto and made a part hereof, indicating thereon any exceptions thereto that may exist at that time. Failure of Tenant to execute and deliver such certificate within ten (10) days following its request by Landlord shall constitute binding and conclusive acceptance of the Premises and acknowledgment by Tenant that the statements included in Exhibit D, as prepared by Landlord, are true and correct.

ARTICLE 4
RENT

Tenant agrees to pay to Landlord all Rent payable hereunder, without set-off or deduction, in lawful money of the United States of America. Tenant shall pay the Rent as follows:

4.1 Base Rent. Tenant shall pay to Landlord the Base Rent without notice, demand or offset, in installments due and payable in advance on the first (1st) day of each calendar month during the Term. Along with and in addition to each monthly Base Rent payment under the Lease, Tenant shall pay to Landlord any sales or privilege tax required under applicable Law. In the event of any fractional calendar month, Tenant shall pay a prorated amount of Base Rent for each day in such partial month based on the actual number of days in the month. Concurrent with Tenant's execution of this Lease, Tenant will deliver to Landlord the prepaid rent set forth in Section 13 of the Lease Summary, which Landlord shall apply to the first (1st) month's Base Rent and Tenant's Cost Allocation.

4.2 Tenant's Cost Allocation. In addition to the Base Rent and all other payments due under this Lease, Tenant shall pay Tenant's Cost Allocation, as follows:

4.2.1 Estimated Payments. Tenant shall pay Landlord's reasonable estimate of Tenant's Cost Allocation for each calendar year of the Term (the "**Estimated Payment**") in advance, in monthly installments, commencing on the first (1st) day of the month following the month in which Landlord notifies Tenant of the amount it is to pay hereunder and continuing until the first (1st) day of the month following the month in which Landlord notifies Tenant of any revised Estimated Payment, provided Tenant shall not be required to make such payments or adjustments thereto on less than thirty (30) days' notice. Landlord shall estimate from time to time the amount of Tenant's Cost Allocation for each calendar year of the Term, make an adjustment to the Estimated

Payment due for such calendar year and notify Tenant of the revised Estimated Payment in writing. Within thirty (30) days after Tenant's receipt of notice of such adjustment and the revised Estimated Payment, Tenant shall pay Landlord a fraction of such revised Estimated Payment for such calendar year (reduced by any amounts paid pursuant to the first sentence of this Section 4.2.1). Such fraction shall have as its numerator the number of months which have elapsed in such calendar year to the date of such payment, both months inclusive, and shall have twelve (12) as its denominator. All subsequent payments by Tenant for such calendar year shall be based upon such adjustment and the revised Estimated Payment. In the event of any fractional calendar month, Tenant shall pay a prorated Estimated Payment for each day in such partial month based on the actual number of days in such month.

4.2.2 Reconciliation. Within a reasonable period after the end of each calendar year, Landlord shall deliver to Tenant a statement (the "**Statement**") setting forth Tenant's Cost Allocation for such year. If Tenant's Cost Allocation for such year exceeds the total of the Estimated Payment made by Tenant for such year, Tenant shall pay Landlord the amount of the deficiency within thirty (30) days of the receipt of the Statement. At the end of the Term, any amount payable by Tenant that would not otherwise be due until after the termination of this Lease, shall, if the exact amount is uncertain at the time that this Lease terminates, be paid by Tenant to Landlord upon such termination in an amount to be estimated by Landlord with an adjustment to be made once the exact amount is known. If the Estimated Payment made by Tenant exceeds Tenant's Cost Allocation for such year, then Landlord shall credit against Tenant's next ensuing Estimated Payment(s) an amount equal to the difference until the credit is exhausted. If a credit is due from Landlord after the Expiration Date, Landlord shall pay Tenant the amount of the credit after deducting therefrom any amounts then owed by Tenant to Landlord within thirty (30) days of the date of the Statement indicating the credit due to Tenant. The obligations of Tenant and Landlord to make payments required under this Section shall survive the expiration or termination of this Lease, and Landlord's failure to deliver the Statement shall not be deemed a waiver of Landlord's right to collect additional amounts from Tenant as set forth herein unless Landlord has not delivered the Statement within eighteen (18) months after the expiration of any calendar year; provided, however, Landlord shall have the right to amend any Statement after Landlord's delivery thereof, regardless of such eighteen (18) month period, if Landlord receives additional tax bills relating to such calendar year after Landlord's delivery of the Statement, provided Landlord amends the Statement within three (3) months of Landlord's receipt of the additional tax bill.

4.3 Landlord's Records. Landlord shall maintain records respecting Project Operating Costs and determine the same in accordance with sound accounting and management practices, consistently applied. Tenant or its authorized representative experienced in auditing such records (which may not be an accountant or other consultant compensated on a contingency basis) shall have the right to examine such records (which shall in no event include any other tenants' leases or Landlord's tax returns or financial statements) upon reasonable prior notice (except that no such examination may occur during the months of December or April or during Landlord's fiscal year end, if other than December 31) by specifying the category of Project Operating Costs which records Tenant desires to examine, during normal business hours at a time mutually agreed upon by Landlord and Tenant and at the place or places where such records are normally kept, by sending such notice no later than sixty (60) days following the furnishing of the Statement. Notwithstanding the foregoing, Tenant shall only have the right to review Landlord's records one (1) time during any twelve (12) month period and may audit Landlord's records with respect to any given calendar year only once. Tenant may take exception to matters included in Project Operating Costs or Landlord's computation of Tenant's Proportionate Share by sending notice specifying such exception and the reasons therefor to Landlord (including any reports prepared by Tenant's representative and any accompanying data) no later than forty-five (45) days after Landlord makes such records available for examination. If Tenant takes exception to any matter contained in the Statement as provided herein, Landlord shall refer the matter to an independent certified public accountant of Landlord's choice, subject to Tenant's reasonable approval, whose certification as to the proper amount shall be final and conclusive as between Landlord and Tenant. If such certification determines that Project Operating Costs were overstated by less than five percent (5%) for the applicable year, Tenant shall promptly pay the cost of such certification. If such certification determines that Project Operating Costs were overstated by five percent (5%) or more for the applicable year, then Landlord shall pay the cost of such certification. Pending resolution of any such exceptions in the foregoing manner, Tenant shall continue paying Tenant's Cost Allocation in the amounts determined by Landlord, subject to adjustment after any such exceptions are so resolved. Tenant acknowledges that any information gathered through an audit is strictly

confidential and shall not disclose such confidential information to any person or entity other than Tenant's financial and legal consultants, or in connection with any proceeding contemplated by this Lease, or in accordance with Law. The Statement shall be considered final, except as to matters to which exception is taken in the manner and within the times specified herein.

4.4 Other Taxes Payable by Tenant. In addition to the Base Rent and any other charges to be paid by Tenant hereunder, Tenant shall, as an element of Rent, reimburse Landlord upon demand for any and all taxes payable by Landlord, where such taxes are assessed upon the cost or value of Tenant's equipment, furniture, fixtures, and other personal property located at the Premises, or the cost or value of any leasehold improvements made in or to the Premises by or for Tenant, regardless of whether title to such improvements is held by Tenant or Landlord. If it becomes unlawful for Tenant to reimburse Landlord for any taxes or other charges as required under this Lease, the Base Rent shall be revised to net Landlord the same net Rent after imposition of any tax or other charge upon Landlord as would have been payable to Landlord but for the reimbursement being unlawful.

4.5 Place of Payment. All Rent shall be paid at the address Landlord may from time to time designate in writing and in no event shall Landlord's acceptance of Rent from any party other than the Tenant named in the Lease Summary create a tenancy between Landlord and such party.

4.6 Interest and Late Charges. If Tenant fails to pay any Rent within five (5) days from when due, the unpaid amounts shall bear interest at the Interest Rate. Tenant acknowledges that the late payment of any Rent will cause Landlord to incur costs and expenses not contemplated under this Lease, including, without limitation, administrative and collection costs and processing and accounting expenses, the exact amount of which is extremely difficult to ascertain. Therefore, in addition to interest, if any such payment is not received by Landlord within five (5) days from when due, Tenant shall pay Landlord a late charge equal to five percent (5%) of such payment; provided, however, that Tenant shall be entitled to written notice of non-payment prior to the commencement of the foregoing five (5) day grace period and the application of such late charge and interest charge, on the first (1st) occasion in any consecutive twelve (12) month period on which Rent is not timely paid. Landlord and Tenant agree that this late charge represents a reasonable estimate of such costs and expenses and is fair compensation to Landlord for loss resulting from Tenant's nonpayment. The late charge shall be deemed Additional Rent and the right to require it shall be in addition to all of Landlord's other rights and remedies hereunder or at law and shall not be construed as liquidated damages for any default of Tenant or as limiting Landlord's remedies in any manner. In addition, any check returned by the bank for any reason will be considered late and will be subject to all late charges, plus a Fifty Dollar ($50.00) fee. Nothing contained herein shall be construed as to compel Landlord to accept any payment of Rent in arrears or late charges should Landlord elect to apply its rights and remedies available under this Lease or at law or in equity in the event of a Default.

ARTICLE 5
OPTION TO EXTEND THE LEASE TERM

5.1 Grant and Exercise of Option. Landlord grants to Tenant, subject to the terms and conditions set forth in this Article one (1) option (the "**Option**") to extend the Term as to Phase 1, Phase 2 or both for an additional term of sixty (60) months ("**Option Term**") and shall be exercised, if at all, by written notice ("**Option Notice**") to Landlord no earlier than twenty-seven (27) months prior to the date the Term would expire but for such exercise but no later than eighteen (18) months prior to the date the Term would expire but for such exercise, time being of the essence for the giving of such notice. If Tenant exercises the Option, all of the terms, covenants and conditions of this Lease shall apply except for the grant of any additional Option pursuant to this Article 5 and except for tenant improvements, improvement allowances or relocation allowances, free rent or other leasing concessions and inducements, and provided that (x) the Premises shall be deemed to exclude either Phase 1 or Phase 2 for which the Option is not exercised, and (y) Base Rent for the Premises payable by Tenant during the Option Term shall be the greater of (i) the Base Rent applicable to the period immediately prior to the commencement of the Option Term (without regard to temporary reductions or abatements or reductions then in effect), or (ii) ninety-five percent (95%) of the Fair Market Rental as hereinafter defined. Notwithstanding anything herein to the contrary, if Tenant is in monetary or material non-monetary Default under any of the terms, covenants or conditions of this Lease either at the time Tenant exercises the Option or at any time thereafter prior to the commencement date of Option

Term, then Landlord shall have, in addition to all of Landlord's other rights and remedies provided in this Lease, the right to terminate the Option upon notice to Tenant, in which event the Lease Term shall not be extended pursuant to this Section 5.1. As used herein, the term "**Fair Market Rental**" is defined as the rental and all other monetary payments, including three percent (3%) annual escalations in years two (2) through five (5) of the Option Term that Landlord could obtain during the Option Term from a third party desiring to lease the Premises, based upon the Permitted Use, as determined by the rents then obtainable for direct, non-equity leases of comparable length for space comparable in size, age and quality to the Premises in the Santa Clara submarket. In setting Fair Market Rental, the appraisers shall be instructed to take into account that there will be no: (i) brokerage commissions, and (ii) rent abatements.

5.2 Determination of Fair Market Rental. If Tenant exercises the Option, Landlord shall send Tenant a notice setting forth the Fair Market Rental for the Option Term within thirty (30) days following the date of exercise. If Tenant disputes Landlord's determination of Fair Market Rental for the Option Term, Tenant shall, within thirty (30) days after delivery to Tenant of Landlord's notice setting forth Fair Market Rental for the Option Term, send to Landlord a notice stating that Tenant either elects to terminate its exercise of the Option, in which event the Option shall lapse and this Lease shall terminate on the Expiration Date, or that Tenant disagrees with Landlord's determination of Fair Market Rental for the Option Term and elects to resolve the disagreement as provided in Section 5.3 below. If Tenant does not timely send Landlord a notice as provided in the previous sentence, Landlord's determination of Fair Market Rental shall be deemed the agreed upon Fair Market Rental amount to be used in computing Base Rent payable by Tenant during the Option Term. If Tenant elects to resolve the disagreement as provided in Section 5.3 below and such procedures are not concluded prior to the commencement date of the Option Term, Tenant shall pay to Landlord as Base Rent the greater of (i) the Base Rent in effect immediately before the start of the Option Term (without regard to temporary reductions or abatements then in effect, or (ii) ninety five percent (95%) of the Fair Market Rental as determined by Landlord in the manner provided above. If the Fair Market Rental as finally determined pursuant to Section 5.3 is greater than Landlord's determination, Tenant shall pay Landlord the difference between the amount paid by Tenant and the actual Base Rent due as so determined in this Article 5 within thirty (30) days after such determination. If the Fair Market Rental as finally determined in Section 5.3 is less than Landlord's determination, the difference between the amount paid by Tenant and the actual Base Rent due as so determined pursuant to this Article 5 shall be credited against the next installments of Base Rent due from Tenant to Landlord hereunder.

5.3 Resolution of a Disagreement over the Fair Market Rental. Any disagreement regarding Fair Market Rental shall be resolved as follows: within thirty (30) days after Tenant's response to Landlord's notice setting forth the Fair Market Rental, Landlord and Tenant shall meet at a mutually agreeable time and place, in an attempt to resolve the disagreement. If within the 30-day consultation period referred to above, Landlord and Tenant cannot reach agreement as to Fair Market Rental, each party shall select one appraiser to determine Fair Market Rental. Each such appraiser shall arrive at a determination of Fair Market Rental and submit their conclusions to Landlord and Tenant within thirty (30) days after the expiration of the 30-day consultation period described above. If only one appraisal is submitted within the requisite time period, it shall be deemed as Fair Market Rental. If both appraisals are submitted within such time period and the two (2) appraisals so submitted differ by less than ten percent (10%) of the higher appraisal, the average of the two shall be deemed as Fair Market Rental. If the two (2) appraisals differ by ten percent (10%) or more of the higher appraisal, the appraisers shall immediately select a third appraiser who shall, within thirty (30) days after this selection, make and submit to Landlord and Tenant a determination of Fair Market Rental. This third appraisal will then be averaged with the closer of the two (2) previous appraisals and the result shall be Fair Market Rental, or if it is exactly in the middle of the two (2) previous appraisals (i.e. not any closer to one than it is to the other) the third appraisal shall be the Fair Market Rental. All appraisers specified pursuant to this Section 5.3 shall be members of the American Institute of Real Estate Appraisers with not less than ten (10) years' experience appraising office and industrial properties in the Santa Clara submarket. Each party shall pay the cost of the appraiser selected by such party and one-half of the cost of the third appraiser.

5.4 Personal to Tenant. The Option provided to Tenant in this Article 5 are not exercisable by any other person or entity whether or not a Transfer has occurred unless Landlord consents to permit exercise of any Option by any assignee or subtenant in Landlord's sole and absolute discretion; provided, however, that Tenant may include such Option in a Transfer to an assignee of the Tenant's entire interest in this Lease approved by Landlord pursuant to Article 14 of this Lease or to a Permitted Transferee, and, in such case the Option would be exercisable by such assignee or Permitted Transferee. All Options provided to Tenant in this Lease shall terminate upon the expiration or sooner termination of this Lease and shall not apply during any holdover period.

5.5 Upset Right. Landlord and Tenant acknowledge and agree that Landlord has the right to pursue modification of the entitlements of the Project to permit the redevelopment thereof ("**Redevelopment Entitlements**"). In the event Landlord has secured final, non-appealable Redevelopment Entitlements and Tenant has delivered the Option Notice, on or prior to the date that is the later of eighteen (18) months prior to the commencement of the Option Term or sixty (60) days after Tenant has delivered the Option Notice, Landlord shall have the right, exercisable by delivering written notice to Tenant, to deem the Option Notice rescinded and the Option null and void, and the Term shall expire upon the initial Expiration Date as if no Option had been exercised.

ARTICLE 6
USE

6.1 Permitted Use. Tenant may use the Premises solely for the Permitted Use as shown on the Lease Summary, and for no other purpose without Landlord's consent (which consent may be withheld in Landlord's reasonable discretion). Tenant shall comply with all recorded covenants, conditions, and restrictions, and the provisions of all ground or underlying leases, now or, so long as the same do not materially interfere with Tenant's use of the Premises or parking or materially increase Tenant's obligations under this Lease, hereafter affecting the Project. Tenant shall, at Tenant's expense, comply with all insurance company and/or Mortgagee requirements pertaining to the use of the Premises. Tenant shall not (a) do or permit anything to be done in or about the Premises that would in any way obstruct or interfere with the rights of other tenants or occupants of any Building or the Project or violate any restrictions or exclusive uses set forth in any other tenants' leases; (b) injure, or unreasonably interfere with the business of any other tenants or occupants of the Project or any of their invitees; (c) cause, maintain or permit any nuisance arising out of Tenant's use or occupancy of the Premises; or (d) commit any waste in or upon the Premises, any Building or the Project. Tenant acknowledges that each Building and/or Project has, or in the future may seek, a USGBC or other "green agency" rating and, as a result, such Building and/or Project will be operated pursuant to Landlord's sustainable practices (as the same may be modified by Landlord from time to time) and, in connection therewith and so long as the same do not materially interfere with the operation of Tenant's business in the Premises, materially increase Tenant's obligations under this Lease or materially decrease Tenant's rights under this Lease, Tenant (i) shall comply with such practices, and (ii) shall not do or permit anything to be done in or about the Premises that would in any way jeopardize any such rating.

6.2 Compliance with Law. Tenant acknowledges and agrees that, except as may otherwise be specifically provided in this Lease, Landlord has made no representation or warranty as to whether the Premises, the Buildings or the Project conform to the requirements of Law. Tenant shall be responsible for the cost of any alterations (including structural alterations) in the Premises and/or any alterations to other portions of the Project to comply with Laws necessitated by any Alterations, Tenant Improvements or any change in the Permitted Use after the Phase 1 Commencement Date, provided that such obligations shall also apply to alterations necessitated by any Alterations, Tenant Improvements or change in the Permitted Use arising during the term of the Sublease. Tenant shall not use or occupy the Premises in violation of any Law or the certificate of occupancy issued for each Building or the Project and shall, upon notice from Landlord, immediately discontinue any use of the Premises that is declared by any governmental authority having jurisdiction to be a violation of Law or the certificate of occupancy. A judgment of any court of competent jurisdiction or the admission by Tenant in any action or proceeding against Tenant that Tenant has violated any such Laws in the use of the Premises shall be deemed to be a conclusive determination of that fact as between Landlord and Tenant. Should any obligation be imposed by Law, then Tenant agrees, at its sole cost and expense, to comply promptly with such obligations to the extent the same relate to the Premises or Tenant's use of the Premises, the Buildings or the Project; however, Tenant shall not be required to make alterations in connection with any such compliance except as set forth above. As of the date of this Lease, the Premises and the Project have not been inspected by a Certified Access Specialist.

Except as otherwise expressly set forth in this Section 6.2 and Exhibit E, to the extent that compliance is required under applicable Law (including the ADA), Landlord shall be responsible for all costs and expenses of making any and all changes, alterations or improvements necessary in order to put the Project in compliance with applicable Laws, subject to inclusion in Operating Costs.

6.3 Effect on Landlord's Insurance. Tenant shall not do or permit to be done anything that will invalidate or increase the cost of any property coverage, or other insurance policy covering any Building, the Project or any property located therein. Tenant shall promptly, upon demand, reimburse Landlord for any additional premium charged for such policy by reason of Tenant's failure to comply with the provisions of this Section.

6.4 Construction Related Accessibility Standards Notice. In accordance with California Civil Code Section 1938, Landlord hereby notifies Tenant that, except to the extent known by or previously disclosed to Tenant, as of the date hereof Landlord has no actual knowledge of the Premises having been inspected by a Certified Access Specialist (CASp). The following notice is also hereby inserted pursuant to California Civil Code Section 1938(e): "A Certified Access Specialist (CASp) can inspect the subject premises and determine whether the subject premises comply with all of the applicable construction-related accessibility standards under state law. Although state law does not require a CASp inspection of the subject premises, the commercial property owner or lessor may not prohibit the lessee or tenant from obtaining a CASp inspection of the subject premises for the occupancy or potential occupancy of the lessee or tenant, if requested by the lessee or tenant. The parties shall mutually agree on the arrangements for the time and manner of the CASp inspection, the payment of the fee for the CASp inspection, and the cost of making any repairs necessary to correct violations of construction-related accessibility standards within the premises." The notice set forth in the prior sentence is not intended to modify Landlord's or Tenant's respective obligations expressly set forth in this Lease. As used in this Lease, a "**Certified access specialist**" or "**CASp**" means any person who has been certified by the State of California as such pursuant to applicable California law (including without limitation Section 4459.5 of the California Government Code).

Notwithstanding this Section 6.4 above and/or anything to the contrary contained in this Lease, Landlord and Tenant hereby agree and acknowledge that, if Tenant desires to obtain a CASp inspection, it shall be limited to an inspection of the Premises, and in addition:

6.4.1 Tenant shall provide Landlord with written notice of its desire to conduct such CASp inspection ("**Tenant's CASp Inspection**"), identifying the CASp that will conduct the inspection and providing evidence reasonably satisfactory to Landlord that the CASp is licensed and certified as a Certified Access Specialist in accordance with applicable Laws. Landlord shall have the right to, among other things, (i) select the date and time at which such inspection shall occur, and (ii) have one (1) or more Landlord representatives present during such inspection. Subject to the foregoing, Tenant shall coordinate Tenant's CASp Inspection with Landlord before the inspection is conducted.

6.4.2 Tenant shall (x) provide Landlord with a copy of any and all findings, reports and/or other materials provided by the CASp performing Tenant's CASp Inspection (collectively, "**Tenant's CASp Report**") not later than two (2) business days following Tenant's receipt thereof, (y) at all times maintain (and cause to be maintained) Tenant's CASp Report and its findings (and any and all other materials related thereto) confidential and (z) pay for Tenant's CASp Inspection and Tenant's CASp Report prior to delinquency at Tenant's sole cost and expense. If Tenant receives a disability access inspection certificate, as described in subdivision (e) of California Civil Code Section 55.53, in connection with or following Tenant's CASp Inspection, then Tenant shall cause such certificate to be provided to Landlord not later than two (2) business days after received by Tenant.

6.4.3 If Tenant's CASp Report identifies any violation(s) of applicable construction-related accessibility standards ("**CASp Violation(s)**"), then not later than two (2) business days after Tenant's receipt of Tenant's CASp Report, Tenant shall provide written notice to Landlord of any and all such CASp Violation(s). In such event, Tenant shall, at Tenant's sole cost and expense, perform, or cause to be performed, all repairs, modifications and/or other work necessary to correct such CASp Violation(s) (such repairs, modifications and/or other work being collectively referred to herein as "**Tenant's CASp Work**", and Tenant's CASp Work also constituting Alterations (defined in Section 8) under this Lease). Tenant shall work diligently to prepare all plans

and specifications required for Tenant's CASp Work, to obtain Landlord's approval of Tenant's CASp Work and to obtain all permits required for Tenant's CASp Work, and to thereafter commence (or cause the commencement of) Tenant's CASp Work in accordance with the terms and conditions set forth in this Lease relating to Tenant's Alterations. Tenant shall diligently prosecute (or cause to be diligently prosecuted) to completion all of Tenant's CASp Work in a lien free, good and workmanlike manner, and, promptly following completion, obtain and deliver to Landlord an updated CASp Report ("**Tenant's Updated CASp Report**") showing that the Premises then comply with all applicable construction-related accessibility standards. Any and all costs and expenses associated with Tenant's CASp Work and/or Tenant's Updated CASp Report shall be at Tenant's sole cost and expense. The preceding to the contrary notwithstanding, if Tenant's CASp Report identifies any CASp Violation(s), Landlord may, at Landlord's option, perform, or cause to be performed by any of Landlord's agents, employees, contractors or consultants, the Tenant's CASp Work necessary to correct such CASp Violation(s) at Tenant's expense the entire cost of which shall be paid by Tenant to Landlord not later than ten (10) business days following Tenant's receipt of a written invoice from Landlord.

6.4.4 Without limiting the generality of the foregoing, Tenant hereby agrees and acknowledges that: Tenant assumes all risk of, and agrees that Landlord shall not be liable for, any and all loss, cost, damage, expense and liability (including, without limitation, court costs and reasonable attorneys' fees) sustained as a result of the Premises not having been inspected by a CASp. To the fullest extent permitted by law, Tenant hereby (A) waives and disclaims any objection to, cause of action based upon, or claim that its obligations hereunder should be reduced or limited as a result of, the lack of any CASp inspection of the Premises, and (B) agrees and acknowledges that the lack of such inspection shall in no event diminish or reduce Tenant's obligations under this Lease.

6.5 Use of Common Areas. Use of all Common Areas by any Tenant Related Parties shall at all times be subject to the Rules and Regulations and the exclusive control and management of Landlord.

ARTICLE 7
HAZARDOUS MATERIALS

7.1 Indemnity. Tenant shall indemnify, defend and hold harmless all Landlord Related Parties from and against all Claims directly or indirectly arising out of the existence, use generation, migration, storage, transportation, release, threatened release, or disposal of Hazardous Materials (including, without limitation, the Permitted Materials (hereinafter defined)) in, on, or under the Premises, any Building or the Project or in the groundwater under the Project and the migration or transportation of Hazardous Materials to or from the Premises, any Building or the Project or the groundwater underlying the Project, to the extent that any of the foregoing is caused, or alleged to be caused, by any Tenant Related Parties. This indemnity extends to the costs incurred by any Landlord Related Party to investigate, remediate, monitor, treat, repair, clean-up, dispose of, or remove such Hazardous Materials in order to comply with the Environmental Laws; provided that Landlord shall give Tenant not less than thirty (30) days' advance notice of Landlord's intention to incur such costs. Notwithstanding anything to the contrary in this Lease under no circumstance shall Tenant be liable for any Claims directly or indirectly arising out of the existence of any Hazardous Materials present in, on, or under the Premises, any Building or the Project or in the groundwater under the Project as of the Phase 1 Commencement Date ("**Pre-Existing Hazardous Materials**"), except to the extent due to the release or emission of any Hazardous Material by Tenant or its agents or employees in violation of applicable Environmental Laws.

7.2 Restriction on Hazardous Materials. Tenant shall not permit any Tenant Related Parties to use, generate, manufacture, store, transport, release, threaten release, or dispose of Hazardous Materials in, on, or about the Premises, any Building or the Project or transport Hazardous Materials from the Premises, any Building or the Project unless Tenant shall have received Landlord's prior consent therefor, and shall not cause or permit the release or disposal of Hazardous Materials from the Premises, any Building or the Project except in compliance with applicable Environmental Laws; provided, however, Tenant shall be permitted to use, store and dispose of (in accordance with applicable Laws and permits held by Tenant) at the Premises customary office and cleaning supplies and those materials contemplated by the Permitted Use (such as, but not limited to, isopropyl alcohol, acetone, cutting oil and the materials listed in Exhibit J), so long as the same are used in quantities contemplated by the Permitted Use and in compliance with applicable Environmental Laws and are listed in a Hazardous Materials Management Plan that is periodically updated as required by Law and provided to Landlord at least once

per year (the "**Permitted Materials**"). As part of the Hazardous Material Management Plan, Tenant shall maintain on the Premises a master list of the Permitted Materials, other than customary office and cleaning supplies, stored in the Premises (the "**Permitted Materials Index**," an example of which is attached hereto as Exhibit J) which shall include (a) the name of the substance containing such Hazardous Materials (including the Permitted Materials), (b) the amount of such substance typically stored therein, and (c) a reference to the location of any MSDS forms associated with such substance as is required to be kept by Law. In addition, Tenant shall maintain and update, to the extent doing so would be prudent and customary for tenants Tenant's business, written procedures for the safe storage, handling and disposal of such Hazardous Materials (including the Permitted Materials), and an example of Tenant's current Hazardous Materials management procedures is attached hereto as Exhibit J-1. Tenant shall promptly deliver notice to Landlord if Tenant obtains knowledge that Hazardous Materials are located on the Premises, any Building or the Project that are not in compliance with applicable Environmental Laws or if any third party, including without limitation, any governmental agency, claims a significant disposal of Hazardous Materials occurred on the Premises, any Building or the Project or is being or has been released from the Premises, any Building or the Project. Tenant shall post placards related to Hazardous Materials as required by Law, subject to Landlord's prior approval (not to be unreasonably withheld, conditioned or delayed) of the location and specifications of such placards.

7.3 Investigation of Contamination. Upon reasonable written request of Landlord, Tenant, through its appropriately qualified and licensed professional engineers, and at Tenant's cost, shall thoroughly investigate suspected Hazardous Materials contamination of the Premises, any Building or the Project that would come within the scope of Tenant's indemnification and hold harmless obligations as set forth above. Tenant, using duly licensed and insured contractors approved by Landlord, shall promptly commence and diligently complete the removal, repair, clean-up, and detoxification of any Hazardous Materials from the Premises, any Building and the Project as may be required by applicable Environmental Laws that comes within the scope of Tenant's indemnification and hold harmless obligations as set forth above. The provisions of this Article shall survive the expiration or earlier termination of this Lease.

7.4 Chemical Storage Equipment. Subject to the terms and conditions in this Article 7 and Landlord's reasonable approval, Tenant may install certain above ground chemical storage equipment on or adjacent to the Premises, provided that Tenant shall maintain such equipment and the location thereof in compliance with all applicable Laws.

ARTICLE 8
SERVICES AND UTILITIES

8.1 Furnishing of Building Services. Landlord agrees to furnish the Building Services as set forth on Exhibit F. Additionally, Tenant shall obtain and pay for all water, gas, electricity, heat, telephone, sewer, sprinkler charges and other utilities and services used at the Premises and separately metered to the Premises, including janitorial services, together with all taxes, penalties, surcharges, and maintenance charges pertaining thereto. All Common Area utilities shall be included in Operating Costs pursuant to Article 4 of this Lease. By executing this Lease, Tenant hereby authorizes Landlord, if required in connection with Landlord's energy usage disclosure obligations under applicable Laws, to obtain information regarding Tenant's utility and energy usage at the Premises directly from the applicable utility providers and Tenant shall execute, within thirty (30) days of Landlord's request, any additional documentation reasonably required by any applicable utility provider evidencing such authorization. Further, within thirty (30) days of Landlord's request, if required in connection with Landlord's energy usage disclosure obligations under applicable Laws, Tenant shall provide to Landlord all reasonably requested information regarding Tenant's utility and energy usage at the Premises (which may include copies of Tenant's utility bills).

8.2 Interruption in Services. Landlord shall not be in default hereunder nor be liable for any damages directly or indirectly resulting from, nor shall the Rent be abated (except as provided herein), for any interruption of or diminution in the quality or quantity of Building Services, including, without limitation, when the same is occasioned, in whole or in part, by (a) repairs, replacements, or improvements; (b) by inability to secure or limitation, curtailment, or rationing of, or restrictions on, use of electricity, gas, water, or other form of energy serving the Premises, any Building or the Project; (c) by any accident or casualty; (d) by act or Default by Tenant or other parties; or (e) by Force Majeure. No failure, delay or diminution in Building Services shall ever be deemed to constitute an eviction or disturbance of Tenant's use and possession of the Premises or relieve Tenant from paying Rent (except as provided herein) or performing any of its obligations under this Lease. Furthermore, Landlord shall not be liable under any circumstances for loss of, or injury to, property or for injury to, or interference with, Tenant's business, including, without limitation, loss of profits, however occurring, through or in connection with or incidental to a failure, delay or diminution of any Building Services.

Additionally, an "**Abatement Event**" shall be defined as an event that prevents Tenant from using the Premises or any portion thereof, as a result of any failure to provide Building Services to the Premises, where (i) Tenant does not actually use the Premises or such portion thereof, and (ii) such event is caused by (A) the negligence or willful misconduct of Landlord, its agents, employees or contractors, or (B) Landlord's exercise of its rights, or the performance of its obligations, under this Lease. Tenant shall give Landlord notice ("**Abatement Notice**") of any such Abatement Event, and if such Abatement Event continues beyond the "Eligibility Period" (as that term is defined below), then the Base Rent and Tenant's Cost Allocation shall be abated entirely or reduced, as the case may be, after expiration of the Eligibility Period for such time that Tenant continues to be so prevented from using, and does not use, the Premises or a portion thereof, in the proportion that the Rentable Area of the portion of the Premises that Tenant is prevented from using, and does not use, bears to the total Rentable Area of the Premises; provided, however, in the event that Tenant is prevented from using, and does not use, a portion of the Premises for a period of time in excess of the Eligibility Period and the remaining portion of the Premises is not sufficient to allow Tenant to effectively conduct its business therein, and if Tenant does not conduct its business from such remaining portion, then for such time after expiration of the Eligibility Period during which Tenant is so prevented from effectively conducting its business therein, the Base Rent and Tenant's Cost Allocation for the entire Premises shall be abated entirely for such time as Tenant continues to be so prevented from using, and does not use, the Premises. If, however, Tenant reoccupies any portion of the Premises during such period, the Base Rent and Tenant's Cost Allocation allocable to such reoccupied portion, based on the proportion that the Rentable Area of such reoccupied portion of the Premises bears to the total Rentable Area of the Premises, shall be payable by Tenant from the date Tenant reoccupies such portion of the Premises. Notwithstanding anything to the contrary contained herein, if Landlord is diligently pursuing the restoration of such Building Services and Landlord provides substitute services reasonably suitable for Tenant's purposes, for example bringing in portable air conditioning or heating equipment, then there shall be no abatement of Base Rent or Tenant's Cost Allocation. The term "**Eligibility Period**" shall mean a period of three (3) consecutive calendar days after Landlord's receipt of the applicable Abatement Notice. Such right to abate Base Rent and Tenant's Cost Allocation shall be Tenant's sole remedy for an Abatement Event. This paragraph shall not apply in case of damage to, or destruction of, the Premises or the Property, or any eminent domain proceedings which shall be governed by separate provisions of this Lease.

8.3 Intentionally Omitted.

8.4 Intentionally Omitted.

8.5 Intentionally Omitted.

8.6 Safety and Security Devices Services, and Programs. The parties acknowledge that safety and security devices, services, and programs provided by Landlord, if any, while intended to deter crime and ensure safety, may not in given instances prevent theft or other criminal acts or ensure safety of persons or property. The risk that any safety or security device, service, or program may not be effective, or may malfunction, or be circumvented by a criminal, is assumed by Tenant with respect to Tenant's property and interests; and Tenant shall obtain insurance coverage to the extent Tenant desires protection against such criminal acts and other losses. Tenant agrees to cooperate in any reasonable safety or security program developed by Landlord or required by Law.

8.7 Utility Deregulation. If permitted by applicable Law at any time in the future, Landlord shall have the right at any time and from time to time during the Term to contract for electricity service from different companies providing electricity service so long as such companies provide Tenant with commercially reasonable rates (each such company shall hereinafter be referred to as an "**Alternate Service Provider**"); provided, however, that Tenant shall not, under any circumstances, pay for any costs associated with Landlord's election to change providers. Tenant agrees to reasonably cooperate with Landlord and any Alternate Service Provider at all times and, as reasonably necessary, to provide reasonable access to any electric facilities within the Premises. Tenant may not elect to use any electricity service provider other than the one designated by Landlord for each Building without the prior consent of Landlord, which consent may be withheld in Landlord's sole discretion.

8.8 Government Energy or Utility Controls. In the event of imposition of any government controls, rules, regulations, or restrictions on the use or consumption of energy or other utilities during the Term, both Landlord and Tenant shall be bound thereby, and the same shall not constitute a constructive eviction of Tenant. In the event of a difference in interpretation by Landlord and Tenant of any such controls, Landlord's reasonable, good faith interpretation shall prevail, and Landlord shall have the right to enforce compliance therewith, including, without limitation, the right of entry into the Premises to effect compliance.

8.9 Telecommunications. Tenant and Tenant's telecommunications companies, including but not limited to local exchange telecommunications companies and alternative access vendor services companies ("**Telecommunications Companies**"), shall have no right of access to or within the Project (other than the Premises) for the installation and operation of Tenant's Telecommunications System without Landlord's prior consent, which consent is not to be unreasonably withheld or delayed. All work with respect to Tenant's Telecommunications System shall be subject to the terms of Article 11 of this Lease and such work shall be deemed to be an Alteration.

ARTICLE 9
CONDITION OF THE PREMISES

Except as expressly provided in this Lease, Tenant acknowledges that Tenant is leasing the Premises on an "AS IS, WHERE IS" basis. Subject to Landlord's express warranties elsewhere in this Lease, (a) Tenant's possession of Phase 2 pursuant to the Sublease immediately preceding the applicable Commencement Date, and (b) Tenant's acceptance of possession of Phase 1 as of the Phase 1 Commencement Date, shall be deemed conclusive evidence that, as of the applicable Commencement Date, the Premises were in good order and satisfactory condition. No promise of Landlord to alter, remodel, repair, or improve the Premises, the Buildings or the Project, and no representation, express or implied, respecting any matter or thing relating to the Premises, the Buildings, the Project or this Lease (including, without limitation, the condition thereof) have been made to Tenant by Landlord or its broker or sales agent, other than as may be expressly contained in this Lease. Following the full execution and delivery of this Lease, Tenant shall have the right, but not the obligation, to construct the initial tenant improvements in the Premises as described in Exhibits E and E-1.

ARTICLE 10
REPAIRS AND MAINTENANCE

10.1 Landlord's Obligations. This Lease is intended to be a net lease; accordingly, Landlord's maintenance obligations are limited to the repair and maintenance of each Building's structure (i.e., each Building's roof, foundation and exterior walls) and the Common Areas and as otherwise expressly set forth herein. Each Building's structure does not include skylights, windows, glass or plate glass, doors, special fronts, or office entries, mechanical systems, fire prevention systems, electrical systems, or plumbing systems, all of which shall be maintained by Tenant. Tenant shall give Landlord prompt notice of Tenant's knowledge of any damage or condition that Landlord is obligated to repair. Tenant hereby waives and relinquishes any right Tenant may have under any applicable Law now or hereafter in effect to make any repairs at Landlord's expense including, without limitation, under California Civil Code Sections 1941 and 1942, as the same may be amended or re-codified, or any similar or successor Law.

10.2 Tenant's Obligations. Except as provided in Section 10.1 above, Tenant, at Tenant's sole expense, shall maintain, repair and replace all non-structural portions of each Building and Premises, including the entire interior and exterior and all improvements now or hereafter located on the Premises, and keep same and all parts thereof in good condition order and repair, including without limitation, the following: (a) all HVAC, plumbing, electrical, sewerage and mechanical systems exclusively serving the Premises; (b) all fixtures, interior walls, floors (excluding subfloors and foundations), carpets, draperies, window coverings, and ceilings; (c) all windows, doors, entrances, and plate glass; (d) interior and exterior lighting; (e) any fire detection or extinguisher equipment; (f) interior walls, (f) public and private utility connections exclusively serving the Premises from the point of connection to the Premises, (j) pipes and mains exclusively serving the Premises from the point of connection to the Premises; and (k) all other fixtures, machinery, apparatus, equipment and appurtenances now or hereafter belonging to, connected with or used in conjunction with the Premises. Tenant's obligations shall include all necessary repairs and replacements. All such repairs and replacements shall be of reasonably similar quality as the item so replaced and sufficient for the proper maintenance and operation of the Premises. Tenant shall not permit anything to be done upon the Premises (and shall perform all maintenance and repairs thereto so as not) to invalidate, in whole or in part any warranties, or prevent the procurement of any insurance policies that may, at any time, be required under the provisions of this Lease. Tenant shall not obstruct or permit the obstruction of any adjoining street or sidewalk. Notwithstanding anything to the contrary herein, Landlord shall perform and construct, and Tenant shall have no responsibility to perform or construct, any repair, maintenance or improvements necessitated by the acts or omissions of Landlord or any other occupant of the Project, or their respective agents, employees or contractors.

Without limiting the generality of the foregoing, Tenant agrees as follows:

10.2.1 Tenant shall enter into a maintenance contract or contracts, in form and substance and with a firm reasonably satisfactory to Landlord and with Landlord's prior consent, for the maintenance and regular repair of the mechanical systems, including but not limited to the heating, ventilating and air conditioning systems (the "**HVAC**"), including exhaust fans. Said maintenance contract(s) shall provide, at a minimum, for quarterly inspections, service and cleaning of said units and systems and shall include (but not be limited to) those requirements appearing on Exhibit I attached hereto and made a part hereof. Tenant's maintenance obligation shall specifically include such adjustments and servicing as each such inspection discloses to be required, and all repairs, testing and servicing as shall be necessary or reasonably required by Landlord or Landlord's insurance underwriter. If replacement of the HVAC and any equipment, fixtures, units, systems and appurtenances thereto are necessary, Tenant shall replace the same with equipment, fixtures, units, systems and appurtenances of the same quality, and repair all damage done in or by such replacement. Tenant shall provide Landlord with a current copy of such maintenance contract and the scope of work to be performed thereunder. Landlord, at its election, may enter into such contract in place of Tenant and charge Tenant for the cost thereof. Further, at Landlord's option, Landlord may perform routine filter changes and other preventative maintenance required to be performed by Tenant hereunder and in such case, Tenant shall reimburse Landlord the costs therefor.

Further notwithstanding anything to the contrary herein, if any other replacements for which Tenant is responsible under this Section 10.2 would be considered capital expenditures under GAAP (which for the avoidance of doubt shall not include the HVAC and any other replacements made by Tenant pursuant to Exhibit E and E-1 with respect to Tenant's initial Tenant Improvements), then Tenant shall not be obligated to make such replacement and such replacement shall be the sole responsibility of Landlord, in which case the entire cost of such replacement shall be amortized over the useful life of such replacement (as Landlord shall reasonably determine in accordance with generally accepted accounting practices) and Landlord and Tenant shall proportionately share the cost of such replacement, with Tenant's share (1) based on the proportion that the number of months left in the Term bears to the number of months in the useful life of such replacement, and (2) paid within thirty (30) days of Tenant's receipt of Landlord's invoice therefor; however, any such calculation shall not include any available extension terms, unless Tenant validly exercises any available extension option, in which case Tenant's share shall be recalculated upon Tenant's exercise of any such option (or, if Tenant does not have any available extension terms and this Lease is renewed or extended by mutual agreement of the parties, upon Landlord and Tenant agreeing in writing to an extension of this Lease beyond the then-current Term) and Tenant shall pay to Landlord the difference between Tenant's share as recalculated and Tenant's share as originally calculated ("Landlord's Capital Replacement Obligation").

10.2.2 Tenant shall be responsible for the maintenance and upkeep of the entire fire sprinkler system, including but not limited to microbiologically influenced corrosion testing and remediation. Tenant shall conduct quarterly flow checks on the sprinkler system. In addition, Tenant shall be responsible for fire pump inspection and testing on an annual basis.

10.2.3 Tenant shall keep and maintain written reports of the maintenance and repair to the mechanical systems, and the fire sprinkler system and forward copies of each inspection report to Landlord within ten (10) days of each inspection. Tenant shall also provide information and backup for major repairs to any Building systems, including any warranties on the work, that occurred at any time during the Term.

10.2.4 Tenant shall maintain the lighting in the Premises (including replacement of bulbs and batteries). Tenant shall conduct quarterly tests on emergency lighting and provide Landlord a copy of each such test. Bulbs, ballasts and light fixtures shall be replaced whenever they fail.

10.3 Damage by Tenant. Except for ordinary wear and tear and subject to the provisions of Section 18.7 below, Tenant shall promptly reimburse Landlord for any costs that Landlord may incur in making repairs and alterations in and to the Project or facilities, systems or equipment of the Project, where the need for such repairs or alterations is caused by any of the following: (a) Tenant's use or occupancy of the Premises in a fashion that contravenes any provision of this Lease; (b) the installation, removal, use, or operation of Tenant's Property; (c) the moving of Tenant's Property into or out of any Building; or (d) any misuse, tortious act, omission, or negligence of any Tenant Related Parties.

10.4 Load and Equipment Limits. Tenant shall not without Landlord's consent place a load upon the Premises that exceeds the load per square foot that the structural portions of the Premises were designed to carry, as determined by Landlord or Landlord's structural engineer, which load is 200 pounds per square foot; provided, however, Landlord shall not withhold its consent if (A) in the opinion of a qualified structural engineer (selected by Tenant, but reasonably approved by Landlord), the placement and arrangement of the proposed load is within the load capacity of any Building, and (B) Landlord's structural engineer reasonably concurs with such opinion. Landlord hereby approves of ATM Engineering as structural engineer to determine the placement and arrangement of Tenant's fixtures and equipment. Upon demand Tenant shall pay the reasonable cost of any such determination for items other than the equipment, library, files, and furniture originally approved by Landlord or by Landlord's structural engineer.

ARTICLE 11
ALTERATIONS AND ADDITIONS

11.1 Tenant's Alterations. Tenant shall not make any additions, alterations, or improvements (the "**Alterations**") to the Premises without the prior consent of Landlord, which consent shall be requested by Tenant at least thirty (30) days prior to the commencement of any work and such request for consent shall include (A) Tenant's proposed plans and specifications for the Alterations, (B) a detailed critical path construction schedule containing the major components of the Alterations and the time required for each, including the scheduled construction commencement date, milestone dates and the estimated completion date, (C) an itemized statement of estimated construction costs, including fees for permits and architectural and engineering fees, (D) for Alterations anticipated to cost in excess of $50,000, evidence satisfactory to Landlord of Tenant's ability to pay the cost of the Alterations, (E) the names and addresses of Tenant's contractors (and said contractors' subcontractors) and materialmen providing specialty materials to be engaged by Tenant for the Alterations (individually, a "**Tenant Contractor**," and collectively, "**Tenant's Contractors**"); however, Landlord may designate a list of pre-approved contractors for any portions of the Alterations involving any Building's structure or the Building Systems, and (F) certificates of insurance, evidencing the insurance required under this Article 11. Landlord's consent to the Alterations (and Landlord's approval of Tenant's plans and specifications therefor) shall not be unreasonably withheld, conditioned or delayed and any changes or modifications to the Alterations or such plans or specifications thereafter shall require Landlord's approval (which shall not be unreasonably withheld). Landlord's review and approval of the plans and specifications for the Alterations shall create no responsibility or liability on the part of Landlord for their completeness, design sufficiency, or compliance with all Laws. Notwithstanding the foregoing, Tenant shall have the right during the Term to make cosmetic alterations as Tenant may reasonably deem desirable or necessary (the **"Cosmetic Alterations"**), without Landlord's consent, provided that such Alterations (i) are not visible from outside of the Premises; (ii) do not adversely affect any Building's structure or any Building System; (iii) do not trigger any legal requirement which would require any alteration or improvements to any Building or Project; (iv) do not, in the aggregate, exceed $50,000 (for Alterations other than floor and wall covering) in any twelve (12) month period; and (v) do not require any license, permit or approval under applicable Law and do not result in the voiding of Landlord's insurance, the increasing of Landlord's insurance risk or the disallowance of sprinkler credits. Tenant shall give Landlord at least ten (10) days prior written notice of such Cosmetic Alterations, which notice shall be accompanied by reasonably adequate evidence that such changes meet the foregoing criteria. Except as otherwise provided, the term "Alterations" shall include Cosmetic Alterations. In addition, Tenant's repairs, modifications and replacement of the HVAC systems in accordance with Exhibit E and Exhibit E-1 with respect to Tenant's initial Tenant Improvements shall not require Landlord's consent except as otherwise provided in Exhibit E and Exhibit E-1.

11.2 Construction Requirements. All Alterations shall be (a) performed under a valid permit when required, a copy of which shall be furnished to Landlord before commencement of construction, (b) performed in a good and workmanlike manner using only new, first class materials and Tenant shall obtain contractors' warranties for a period of at least one (1) year against defects in materials and workmanship; (c) performed in compliance with all applicable Laws, all applicable standards of the American Insurance Association (formerly, the National Board of Fire Underwriters), the National Electrical Code, manufacturer's specifications and Landlord's construction rules and regulations attached hereto as Exhibit E-2 (the "**Construction Rules**"); (d) intentionally omitted; (e) performed in such manner as not to unreasonably obstruct access to the Project or the Common Areas or the conduct of business by Landlord or other tenants in the Project and coordinated with any other work in the Project by Landlord or its tenants in order to minimize interference with such work; (f) diligently prosecuted to completion; (g) if applicable, performed in a manner that will not adversely affect any Building's and or Project's "LEED" certification, Energy Star rating or other "green agency" rating, and (i) performed (A) in compliance with USGBC indoor air quality standards and waste management specifications, and (B) if to the extent applicable, utilizing plumbing fixtures that comply with the EPA's "Water Sense" program and Energy Star compliant equipment, and (h) as to Alterations other than Cosmetic Alterations, performed by Tenant's Contractors that are approved by Landlord and, at Landlord's election, Landlord shall have the right to have at least one (1) additional contractor selected by Landlord ("**Landlord's Contractors**"), submit a bid for the Alterations (other than Alterations that involve the installation of Tenant's specialty equipment) and Landlord shall notify Tenant of any Landlord's Contractors it elects to have submit a bid for the Alterations at the time Landlord approves Tenant's Contractors. If Landlord elects to have any Landlord's Contractors submit a bid for the Alterations, then promptly

after Tenant receives all bids, and based upon the bids submitted by Tenant's Contractors and Landlord's Contractor(s), Tenant shall notify Landlord in writing of its recommendation for the contractor to perform the Alterations, which notice shall include copies of all bids (the "**Bid Package**"). If Tenant's recommendation for a contractor for the Alterations is not a Landlord's Contractor, then within five (5) Business Days after Landlord's receipt of the Bid Package, Landlord shall either (A) allow Tenant to use its recommended contractor for the Alterations, or (B) require Tenant to use a Landlord's Contractor for the Alterations. If Landlord elects to proceed under subsection (B) and the bid of the required Landlord's Contractor for the Alterations exceeds one hundred percent (100%) of the bid of Tenant's recommended contractor for the Alterations, then Landlord shall reimburse Tenant for the cost of the work performed by Landlord's Contractor (excluding costs incurred for any change orders) in excess of one hundred percent (100%) of the bid of Tenant's recommended contractor within thirty (30) days of Tenant's completion of the Alterations and Landlord's receipt of unconditional lien releases therefor.

Tenant agrees to (1) carry (or cause its general contractor to carry) Causes of Loss-Special Form Builder's Risk or Installation Floater insurance with a limit of not less than the total cost of the Alterations, in such form and including such terms, conditions and deductibles as are acceptable to Landlord in its sole but reasonable discretion, covering the construction of such Alterations, and (2) cause all of Tenant's Contractors to agree, in their construction contracts with Tenant, to meet all of the insurance requirements applicable to Tenant pursuant to Article 18 (including providing the certificates of insurance required thereunder). For Alterations other than Cosmetic Alterations performed after the initial Tenant Improvements, Tenant shall pay to Landlord a percentage of the cost of the Alterations (such percentage, which shall vary depending upon whether or not Tenant orders the work directly from Landlord, to be established by Landlord on a uniform basis for the Project; however, in no event shall such percentage exceed five percent (5%)), sufficient to compensate Landlord for all overhead, general conditions, fees and other costs and expenses arising from Landlord's supervision of or involvement with the Alterations. For Alterations estimated to cost in excess of $250,000, Landlord may require, at Landlord's sole option, that Tenant provide to Landlord such security as reasonably determined by Landlord to protect Landlord against any liability in connection with the Alterations, including but not limited to a lien and completion bond naming Landlord as a co-obligee (however, Landlord and Tenant agree that the provisions of this sentence shall not apply to the initial Tenant Improvements, such that Tenant shall have no obligation to provide any security (other than the Excess Costs Deposit, if applicable) in connection with the initial Tenant Improvements). Promptly after completion of any Alterations (other than Cosmetic Alterations), Tenant shall deliver to Landlord "as-built" plans and specifications (including all working drawings) for the Alterations.

Landlord shall have the right to inspect the construction of the Alterations; however, Landlord's failure to inspect any portion of the Alterations shall in no event constitute a waiver of any of Landlord's rights under this Article 11, nor shall Landlord's inspection of any portion of the Alterations constitute Landlord's approval thereof. If, as a result of Landlord's inspection, Landlord disapproves of any portion of the construction of the Alterations, Landlord shall notify Tenant in writing of such disapproval and shall specify the items disapproved. In the event Landlord disapproves of any matter that might adversely affect any Building System, the structure or exterior appearance of any Building or any other tenant, Landlord may take such action as Landlord deems necessary, at Tenant's expense and without incurring any liability on Landlord's part, to correct any such matter, including, without limitation, causing the cessation of the applicable work.

11.3 Landlord's Property; Removal. All fixtures, equipment, leasehold improvements (including the Tenant Improvements and any Alterations), and appurtenances attached to or built into the Premises from and after the date of this Lease by or on behalf of Tenant, whether or not by or at the expense of Tenant, other than Tenant's Property, shall be and remain a part of the Premises, shall be the property of Landlord, and shall not be removed by Tenant, unless: (i) such removal is necessary to ensure that the Premises and any Building comply with applicable code at the time of surrender, including but not limited to removal of wires located in risers and plenums without raceways or conduits; or (ii) if Tenant, as part of its request for Landlord's consent to any Alterations or its notice of Cosmetic Alterations, as applicable, requested Landlord's determination as to whether Landlord will require Tenant to remove such Alterations upon the expiration or earlier termination of this Lease and, in response to such request, Landlord required removal of such Alterations at the time of Landlord's consent or, in the case of Cosmetic Alterations, within fifteen (15) days of receipt of such request; or (iii) if Tenant does not request Landlord's designation as to whether Landlord will require Tenant to remove such Alterations upon the expiration or earlier termination of this Lease as part of its request for Landlord's consent to any Alterations or its notice of Cosmetic Alterations, as applicable, and Landlord notified Tenant in writing that removal would be required at

least ninety (90) days prior to the Expiration Date (however, if this Lease terminates prior to the Expiration Date, such ninety (90) day period shall not apply). In each of the foregoing circumstances, Tenant shall perform such removal and repair any damage caused thereby at Tenant's sole cost and expense prior to the expiration or earlier termination of this Lease.

11.4 Notwithstanding the foregoing, (1) Tenant shall have no obligation to remove any of the improvements existing in the Premises as of the date of this Lease, and (2) Landlord may only require Tenant to remove improvements that are not customary general office improvements (which shall include, without limitation, private bathrooms and/or showers, fitness center, all equipment in any server room (including, without limitation, raised flooring, racking, wiring and cabling), fish tanks, supplemental HVAC units, vaults, internal stairwells, rolling file systems, space converted to lab space or other non-office uses, overhead roll-up doors and/or additional single or double-door exterior entrances (to the extent removal of an exterior door is required hereunder, Tenant shall restore the wall affected by such removal to the prior condition)). With respect to any of the foregoing included in the Tenant Improvements, Landlord shall notify Tenant as to whether or not Landlord will require any such removal and restoration at least ninety (90) days prior to the Expiration Date (however, if this Lease terminates prior to the Expiration Date, such ninety (90) day period shall not apply). Except with respect to the restoration of any walls in connection with the removal of exterior doors, as indicated above, Tenant shall only be required to remove the improvements as requested by Landlord in accordance with this Section and repair damages caused by such removal. Both Landlord and Tenant acknowledge that all interior walls (including electrical, telephone cabling, and other lines therein, but excluding Telecom Wiring install by or on behalf of Tenant (which shall be removed as set forth in Article 24)), interior doors, wall and floor finishes and trim, and general duct-work (as opposed to duct-work related to Tenant's special systems) installed or modified by Tenant as depicted in the Final Space Plan and approved in the Approved Working Drawings constitute (without limitation) general office improvements.

11.5 Lien Free Completion. Tenant shall cause each of Tenant's contractors to agree, in their construction contracts with Tenant, to satisfy and release (by bond or otherwise) any mechanic's or materialman's liens filed against the Project by any of the subcontractors engaged by such contractor within ten (10) days of such filing. Upon completion of the Alterations, (other than Cosmetic Alterations), Tenant shall furnish Landlord with full and final waivers of liens and contractors' affidavits and statements, in such form as may be required by Landlord, Landlord's title insurance company and any Mortgagee, from all parties performing labor or supplying materials or services in connection with the Alterations showing that all of said parties have been compensated in full. Before commencement of the Alterations, Tenant shall notify Landlord of the proposed date of commencement of the Alterations, and shall prepare and deliver to Landlord for Landlord's signature a notice of non-responsibility and allow Landlord no less than seven (7) days to record and post the same. Additionally, if Tenant fails to make any payment relating to the Alterations, Landlord, at its option, may complete the Alterations and/or make such payment and Tenant shall reimburse Landlord for all costs incurred therefor within five (5) days of Landlord's demand.

11.6 Notices and Liens. Tenant agrees not to suffer or permit any lien of any mechanic or materialman to be placed or filed against the Premises, any Building or the Project due to work performed by or on behalf of Tenant. In case any such lien shall be filed, Tenant shall satisfy and release such lien of record within twenty (20) days (or such shorter period as may be required by any Mortgagee) after the earlier to occur of (a) receipt of notice thereof from Landlord; or (b) Tenant's actual knowledge or notice of such lien filing. If Tenant shall fail to have such lien satisfied and released of record as provided herein, Landlord may, on behalf of Tenant, without being responsible for making any investigation as to the validity of such lien and without limiting or affecting any other remedies Landlord may have, pay the same and Tenant shall reimburse Landlord on demand for such amount together with any other reasonable costs of Landlord, including, without limitation, reasonable attorneys' fees and/or Landlord shall have the right to deduct such costs from the Allowance (if any). Notwithstanding the foregoing, Tenant shall have the right to contest any such lien claim diligently and in good faith, and during such contest shall not be obligated to pay such lien claim, provided that Tenant, at its sole cost and expense, bonds the lien, or transfers the lien from the Property to a bond, thereby freeing the Property from any claim of lien. Notwithstanding any such contest or title insurance, Tenant shall pay any such claim in full within five (5) days following the entry of an unstayed judgment or order of sale. All materialmen, contractors, artisans, mechanics, laborers and any other person now or thereafter furnishing any labor, services, materials, supplies or equipment to Tenant with respect to Premises or any portion thereof, are hereby charged with notice that they must look

exclusively to Tenant to obtain payment for the same. Notice is hereby given that Landlord shall not be liable for any labor, services, materials, supplies, skill, machinery, fixtures or equipment furnished to or to be furnished to Tenant upon credit and that no mechanic's lien or any other lien for any such labor, services, materials, supplies, machinery, fixtures or equipment shall attach to or affect the estate or interest of Landlord in and to the Premises or the Project, or any portion thereof. Before the actual commencement of any work for which a claim or lien may be filed, Tenant shall give Landlord notice of the intended commencement date a sufficient time before that date to enable Landlord to post notices of nonresponsibility or any other notices that Landlord deems necessary for the protection of Landlord's interest in the Premises, any Building or the Project, and Landlord shall have the right to enter the Premises and post such notices at any reasonable time.

The provisions of this Article 11 do not apply to the initial Tenant Improvements, which are governed by the terms of Exhibit E and Exhibit E-1 attached hereto.

ARTICLE 12
CERTAIN RIGHTS RESERVED BY LANDLORD

Landlord reserves the following rights, exercisable without liability to Tenant for (a) damage or injury to property, person, or business; (b) causing an actual or constructive eviction from the Premises; or (c) disturbing Tenant's use, possession, or beneficial and quiet enjoyment of the Premises:

12.1 Name. To change the name or street address of any Building or the Project; however, Landlord shall not change the address of any Building unless required by any governmental authority.

12.2 Signage. To install and maintain signs on the exterior of the Project, but not on any Building.

12.3 Keys. To have passkeys to the Premises and all doors within the Premises, excluding Tenant's vaults and safes.

12.4 Inspection and Entry. Landlord may enter the Premises on reasonable prior notice, of not less than one (1) Business Day, to Tenant (except in the event of an emergency, in which case no notice shall be required) (a) to inspect the Premises; (b) to show the Premises to any prospective purchaser or Mortgagee of the Project, or to others having an interest in the Project or Landlord; (c) during the existence of a Default; (d) during the last six (6) months of the Term, to show the Premises to prospective tenants; (e) to make inspections, repairs, alterations, additions, or improvements to the Premises or any Building (including, without limitation, checking, calibrating, adjusting, or balancing controls and other parts of the heating, ventilation and air-conditioning system); and (f) to take all steps as may be necessary or desirable for the safety, protection, maintenance, or preservation of the Premises or any Building or Landlord's interest therein, or as may be necessary or desirable for the operation or improvement of any Building or in order to comply with Laws. Notwithstanding anything to the contrary in this Lease, any entry by Landlord and Landlord's agents shall be subject to the following restrictions: (x) for entry into the Premises generally, except in the case of an emergency, any entry shall be in accordance with Tenant's keycode procedures; (y) for entry into areas designated by Tenant for use as a machine shop or other manufacturing areas, any entry shall be in accordance with Tenant's safety and security procedures surrounding the operation of machinery and manufacture of Tenant's products while such machinery is in operation; and (z) for entry into any areas used by Tenant for the storage, use or testing of biological materials (such as the surgical suite) or any room subject to HIPAA compliance requirements, access at any time shall only be provided in accordance with Tenant's safety and security procedures for such areas.

12.5 Renovations. Landlord may during the Term renovate, improve, alter, or modify (collectively, the "**Renovations**") any Building, the Premises, or the Project, including without limitation, Common Areas, Building Systems, roof, and structural portions of any Building, so long as such Renovations do not, on a permanent basis, materially and adversely interfere with the use of or access to the Premises or parking areas utilized by Tenant, unless such Renovations are required to comply with applicable Law. Renovations may include, without limitation, (a) modifying the Common Areas and tenant spaces to comply with applicable Laws, including, without limitation, regulations relating to the physically disabled, seismic conditions, and building safety and security; and (b) installing new carpeting, lighting, and wall coverings in the Common Areas. In connection with such Renovations,

Landlord may, among other things, erect scaffolding or other necessary structures in any Building, limit or eliminate access to portions of any Building or the Project, including, without limitation, portions of the Common Areas, or perform work in any Building that may create noise, dust or leave debris. Tenant hereby agrees that such Renovations and Landlord's actions in connection with such Renovations shall in no way constitute a constructive eviction of Tenant nor entitle Tenant to any abatement of Rent, except as provided in Section 12.7 below. Landlord shall have no responsibility or for any reason be liable to Tenant for any direct or indirect injury to or interference with Tenant's business arising from the Renovations, nor shall Tenant be entitled to any compensation or damages from Landlord for inconvenience, annoyance or loss of the use of any part of the Premises or of Tenant's Property resulting from the Renovations.

12.6 Common Areas. So long as the same do not, on a permanent basis, materially and adversely interfere with the use of or access to the Premises or parking areas utilized by Tenant, unless the same are required to comply with applicable Law. Landlord shall have the right to eliminate or change the size, location and arrangement of the Common Areas; to enter into, modify and terminate easements and other agreements pertaining to the use and maintenance of the Common Areas; to close all or any portion of the Common Areas as may be necessary to prevent a dedication thereof or the accrual of any rights to any person or to the public therein; to close temporarily any or all portions of the Common Areas; and to do and perform such other acts in and to the Common Areas as Landlord shall determine to be advisable for the convenience and use thereof by owners, occupants, tenants and invitees of the Project.

12.7 Minimize Interference. In the exercise of the rights set forth in this Article 12, including Section 12.4 above, including any entry in the Premises pursuant to Section 12.4, Landlord shall (except in an emergency) take commercially reasonable steps to minimize any interference with Tenant's business. Notwithstanding anything to the contrary contained in Sections 12.5 and/or 12.6 above, if any Renovations or changes to the Common Area pursuant to Section 12.6 materially and adversely affect Tenant's ability to operate its business from the Premises (and Tenant does not in fact operate its business from the Premises) for more than two (2) Business Days, then, after the expiration of such two (2) Business Day period, the Base Rent shall be abated entirely until such time as Tenant's ability to operate its business from the Premises is no longer materially and adversely affected. Such right to abate Base Rent shall be Tenant's sole remedy therefor. The foregoing shall not apply in case of damage to, or destruction of, the Premises or the Project, or any eminent domain proceedings which shall be governed by separate provisions of this Lease.

ARTICLE 13
RULES AND REGULATIONS

Tenant shall comply with (and cause all Tenant Related Parties to comply with) the Rules and Regulations. Landlord shall not be responsible for any violation of the Rules and Regulations by other tenants or occupants of the Project. All Rules and Regulations, whether now existing or hereafter adopted by Landlord, shall be nondiscriminatory in nature. Notwithstanding anything to the contrary in this Lease, Tenant shall not be required to comply with any new Rule or Regulation that would unreasonably interfere with Tenant's use of the Premises or parking areas or that would materially increase the obligations, or materially decrease the rights, of Tenant under this Lease.

ARTICLE 14
TRANSFERS

Except as provided in this Article, Tenant shall not, without the prior consent of Landlord, make any Transfer.

14.1 Notice. Tenant shall notify Landlord of any proposed Transfer (a "**Transfer Notice**"). The date of the proposed Transfer must be not less than thirty (30) days or more than one hundred eighty (180) days after the date of the Transfer Notice. The Transfer Notice shall include (a) the proposed effective date of the Transfer; (b) a description of the portion of the Premises to be transferred (the "**Subject Space**"); (c) all of the terms of the

proposed Transfer and the consideration therefor, including, without limitation, a calculation of the Transfer Premium (as defined below); (d) the name and address of the Transferee; (e) current financial statements of the Transferee certified by an officer, partner or owner thereof; (f) any other reasonable information that will enable Landlord to determine the financial responsibility, character, and reputation of the Transferee and the nature of such Transferee's business; and (g) the proposed use of the Subject Space. Landlord shall respond to any properly delivered Transfer Notice within thirty (30) days.

14.2 Fees. Whether or not Landlord shall grant consent, Tenant shall pay Landlord, concurrently with any request for consent a $1,000 administrative review and processing fee, and Tenant shall reimburse Landlord, within thirty (30) days after written request by Landlord for any legal fees incurred by Landlord in connection with any request for consent (which legal fees shall not exceed $1,000 per request for consent).

14.3 Consent. Notwithstanding anything to the contrary in this Lease, Landlord's consent shall not be required for any Permitted Transfer, nor shall Sections 14.2, 14.4, 14.5 or 14.6 of this Lease apply to Permitted Transferees. Landlord shall not unreasonably withhold or delay its consent to any other proposed Transfer. It shall be reasonable under this Lease and under any applicable Law for Landlord to withhold consent to any proposed Transfer where one or more of the following apply, without limitation as to other reasonable grounds for withholding consent:

14.3.1 The Transferee is of a character or reputation or engaged in a business that is not consistent with the quality of the tenants in the Project at the time such Transfer is proposed.

14.3.2 The Transferee intends to use the Subject Space for purposes that are not permitted under this Lease.

14.3.3 The Transferee is either a governmental agency or instrumentality thereof.

14.3.4 The Transfer will result in more than a reasonable and safe number of occupants per floor within the Subject Space.

14.3.5 The Transferee is not a party of acceptable financial worth or financial stability in light of the responsibilities involved under the Lease (or sublease, as applicable) on the date consent is requested, as determined by Landlord.

14.3.6 The Transfer would cause a violation of another lease or any agreement to which Landlord is a party, or would give an occupant of the Project a right to cancel its lease.

14.3.7 Intentionally Omitted.

14.3.8 Either the Transferee or an Affiliate of the Transferee (a) occupies space in the Project at the time of the request for consent and Landlord has space available to accommodate the proposed Transferee's needs that is substantially similar in layout and size as the Subject Space; or (b) commenced negotiations with Landlord to lease space in the Project prior to any negotiations with Tenant.

14.4 Completion of Transfer. If Landlord consents to any Transfer (and does not exercise any recapture rights Landlord may have under this Lease), Tenant may within six (6) months after Landlord's consent, enter into the approved Transfer, upon substantially the same terms and conditions as are set forth in the Transfer Notice. If there are any material changes in the terms and conditions from those specified in the Transfer Notice (a) such that Landlord would initially have been entitled to refuse its consent to such Transfer; or (b) that would cause the proposed Transfer to be more favorable to the Transferee than the terms set forth in the Transfer Notice, Tenant shall again submit the Transfer to Landlord for its approval and other action under this Article (including, without limitation, exercise any of recapture rights Landlord may have under this Lease).

14.5 Transfer Premium. If Landlord consents to a Transfer, Tenant shall pay to Landlord fifty percent (50%) of any Transfer Premium received by Tenant. "**Transfer Premium**" shall mean (a) all rent, additional rent or other consideration payable by such Transferee in excess of the Rent payable by Tenant under this Lease on a per rentable square foot basis; (b) all key money and bonus money paid by Transferee; and (c) any payment in excess of fair market value for services or furniture rental rendered by Tenant to Transferee. The "Transfer Premium" shall (i) be reduced by all out-of-pocket expenses incurred by Tenant in connection with the Transfer, such as customary brokerage commissions and reasonable attorneys' fees and the cost of any alterations made by Tenant as consideration for such Transfer; and (ii) shall not include any compensation for the fair market value of Tenant's Property nor reasonable compensation for the sale of Tenant's business that is not attributable to the value of Tenant's leasehold interest hereunder. Such reductions and exclusions in clauses (i) and (ii) are referred to hereafter as ("**Transfer Premium Reductions**"). Tenant shall pay the Transfer Premium to Landlord within five (5) days following receipt by Tenant. Tenant shall furnish upon Landlord's request a complete statement setting forth in detail the computation of any Transfer Premium. Within ninety (90) days following the date of the Transfer, Landlord shall have the right at all reasonable times to audit the books, records and papers of Tenant relating to any Transfer as necessary to confirm the calculation of the Transfer Premium. If the Transfer Premium shall be found understated, Tenant shall, within thirty (30) days after demand, pay the deficiency, together with interest thereon at the Interest Rate and, if understated by more than five percent (5%), Landlord's costs of such audit. Notwithstanding the foregoing, Tenant shall not be required to pay any Transfer Premium (a) in connection with any Permitted Transfer or Space Share, and (b) with respect to any sublease of all or any portion of the 5353 First Floor, the Transfer Premium shall not include any Transfer Premium for the sublease of the 5353 First Floor (and no Transfer Premium Reduction equitably attributable to the 5353 First Floor shall be applied to the Transfer Premium payable by Tenant in connection with such Transfer).

14.6 Recapture. Notwithstanding anything to the contrary contained in this Article, Landlord shall have the option, by giving notice to Tenant within twenty (20) days after receipt of any Transfer Notice, to recapture the Subject Space; provided, however, in the case of a subletting, Landlord may not exercise such recapture right unless the Subject Space is comprised of all of the applicable Building. Such recapture notice shall cancel and terminate this Lease with respect to the Subject Space as of the effective date of the proposed Transfer. In the event of a recapture by Landlord, if this Lease shall be canceled with respect to less than the entire Premises, the Rent reserved herein shall be prorated on the basis of the Rentable Area retained by Tenant in proportion to the Rentable Area of the Premises, and this Lease as so amended shall continue thereafter in full force and effect. Notwithstanding anything to the contrary in this Section 14.6, Landlord shall not have the right to recapture the Premises with respect to any Permitted Transfer, Space Share, or sublease of the 5353 First Floor. Upon request of either party, the parties shall execute written confirmation of the foregoing.

Notwithstanding the foregoing, if Landlord elects to recapture the Subject Space, Tenant may, within ten (10) days after Tenant's receipt of Landlord's notice thereof, deliver written notice to Landlord indicating that Tenant is rescinding its request for consent to the proposed Transfer, in which case such Transfer shall not be consummated and this Lease shall remain in full force and effect as to the portion of the Premises that was the subject of the Transfer. Tenant's failure to so notify Landlord in writing within said ten (10) day period shall be deemed to constitute Tenant's election to allow Landlord to recapture the Subject Space.

14.7 Effect of Transfer. If Landlord consents to a Transfer, (a) no terms or conditions of this Lease shall be deemed to have been waived or modified; (b) such consent shall not be deemed consent to any further Transfer; (c) no Transfer shall be valid, and no Transferee shall take possession of the Premises, until an executed counterpart of all documentation pertaining to the Transfer has been delivered to Landlord; and (d) no Transfer shall relieve Tenant or any Guarantor from primary liability under this Lease. The acceptance of Rent by Landlord from any party shall not be deemed to be a waiver of Landlord of any provision hereof. In the event of Default by a Transferee in the performance of any of the terms hereof, Landlord may proceed directly against Tenant without the necessity of exhausting remedies against such Transferee. Landlord may consent to subsequent assignments of the Lease or sublettings or amendments or modifications to the Lease by Transferees without notifying Tenant, and without obtaining its consent thereto, and any such actions shall not relieve Tenant of liability under this Lease and Tenant hereby consents to all or any of the foregoing. Any Transfer for which Landlord's consent is required but not obtained pursuant hereto shall constitute a Default under this Lease (i.e., beyond any applicable notice and cure period) and shall be void.

14.8 Tenant Remedy for Landlord Refusal to Consent. Landlord and Tenant expressly agree that if the arbitrator (pursuant to the arbitration provision below) determines that Landlord unreasonably withheld consent to a proposed Transfer, Tenant's sole and exclusive remedies therefor shall be (A) the consummation of such proposed Transfer (subject to the parties' execution of a consent agreement in a form and substance reasonably acceptable to the parties), and/or (B) seeking compensatory (but not consequential) monetary damages. Except as provided in the immediately preceding sentence, Tenant hereby waives, relinquishes and releases any and all rights to damages of any kind (other than attorneys' fees to which Tenant is entitled under Section 30.6 below), or the right to terminate this Lease under Section 1995.310 of the California Civil Code, and under all similar Laws now or hereafter in effect.

If Tenant disputes the reasonableness of Landlord's withholding of consent to any Transfer, then, Tenant may, as the sole method for resolving such dispute, submit such dispute to the American Arbitration Association ("**AAA**") for resolution in Santa Clara, California in accordance with the Commercial Arbitration Rules (Expedited Procedures) of the AAA (except that the terms of this Article shall supersede any conflicting or otherwise inconsistent rules) within fifteen (15) days after Tenant's receipt of Landlord's notice of its withholding of consent to the Transfer in question. If Tenant does not submit such dispute to arbitration within such fifteen (15) day period, Tenant shall be deemed to have accepted Landlord's withholding of consent to the Transfer in question as reasonable. Provided the rules and regulations of the AAA so permit the following time periods shall apply (and if such rules and regulations do not so permit, the applicable time period set forth in such rules and regulations shall apply): (A) the AAA shall, within two (2) Business Days after such submission or application, select a single arbitrator having at least ten (10) years' experience in leasing and management of commercial properties similar to the Buildings; (B) the arbitration shall commence two (2) Business Days thereafter and shall be limited to a total of seven (7) hours on the date of commencement until completion, with each party having no more than a total of two (2) hours to present its case and to cross-examine or interrogate persons supplying information or documentation on behalf of the other party; and (C) the arbitrator shall make a determination within three (3) Business Days after the conclusion of the presentation of Landlord's and Tenant's cases, which determination shall be limited solely to a decision as to whether or not Landlord acted reasonably in withholding its consent to the Transfer in question. The arbitrator's determination shall be final and binding upon the parties, whether or not a judgment shall be entered in any court. All actions necessary to implement such decision shall be undertaken as soon as possible, but in no event later than ten (10) Business Days after the rendering of such decision. The arbitrator's determination may be entered by either party in any court having jurisdiction thereof. All fees payable to the AAA for services rendered in connection with the resolution of the dispute shall be paid by the unsuccessful party. Tenant hereby expressly acknowledges and agrees that (i) arbitration under this paragraph shall apply only to the issue of whether or not Landlord reasonably withheld consent to a Transfer, and (ii) in no event shall any other issue or dispute under this Lease, including without limitation, a Default, be subject to resolution by arbitration pursuant to this paragraph.

14.9 Space Sharing. Tenant shall have the right to allow up to twenty percent (20%) of each of Phase 1 and Phase 2 to be used by third parties with whom Tenant has a bona fide business relationship (each, a "**Permitted User**"). Notwithstanding anything to the contrary set forth in this Article 14, each Permitted User shall be allowed such use ("**Space Share**"), without Landlord's consent, upon at least three (3) days' prior written notice to Landlord, subject to the following conditions: (i) the Permitted User shall not be entitled, directly or indirectly, to diplomatic or sovereign immunity and shall be subject to service of process in and subject to the jurisdiction of; the courts of the State; (ii) there will be no separate entrances or demising walls for any Permitted User; (iii) the Permitted User shall operate in a manner consistent with the character of the Buildings as a first-class office project and in compliance with all applicable Laws, including zoning ordinances, to which the Buildings are subject; (iv) concurrent with Tenant's delivery of its notice of a Permitted User, Tenant shall supply Landlord with a certificate of insurance from the Permitted User evidencing that the Permitted User carries the liability insurance required of Tenant under this Lease; (v) no such occupancy by a Permitted User shall be deemed to be a tenancy or subtenancy hereunder and any such occupancy shall be pursuant to a license which shall be automatically revoked upon the expiration or sooner termination of the Term of this Lease; and (vi) any Permitted User shall be considered a Tenant Related Party for all purposes under this Lease. The provisions of Sections 14.5 and 14.6 shall not apply to any Space Share.

ARTICLE 15
DESTRUCTION OR DAMAGE

15.1 Landlord Termination Rights. If the Premises or any portion of the Project necessary for Tenant's occupancy is damaged by fire, earthquake, terrorism, act of war, act of God, the elements or other casualty, then Landlord may terminate this Lease upon notice given to Tenant within sixty (60) days after the date of such casualty, effective as of the date of the casualty if (a) in Landlord's opinion, repairs cannot be completed within one hundred eighty (180) days; (b) the Premises or any portion of the Project necessary for Tenant's occupancy is damaged during the final twelve (12) months of the Term to the extent that, in Landlord's opinion, repair thereof cannot be completed within sixty (60) days, unless Tenant shall exercise its next available extension option (if any) within ten (10) days following receipt of Landlord's termination notice and Landlord does not elect to terminate this Lease pursuant to one of the other subsections herein within ten (10) days of such exercise; (c) the insurance proceeds available to Landlord (with any deductibles thereunder considered "available") are not sufficient to complete repair or restoration; or (d) Tenant is in Default under this Lease. Notwithstanding the foregoing, Landlord shall not have the right to terminate the Lease pursuant to subsection (c) above if the cost to repair the damage to the Premises would be more than the amount of the available insurance proceeds plus $300,000.

15.2 Repairs. If this Lease is not terminated as provided above, it shall continue in full force and effect, and Landlord shall promptly and diligently, subject to reasonable delays for insurance adjustment, and subject to all other terms of this Article, restore the Premises, the Common Areas and the portions of the Project serving the Premises and Tenant shall assign to Landlord all insurance proceeds payable to Tenant as to the Tenant Improvements and any Alterations to be used solely for restoring such Tenant Improvements and Alterations (and not the Buildings or Project in general); provided that if the cost of the restoration of the Tenant Improvements and any Alterations by Landlord exceeds the amount of Tenant's insurance proceeds therefor, as assigned by Tenant to Landlord, such excess shall be paid by Tenant ("**Tenant's Contribution**") to Landlord prior to Landlord's restoration thereof. Notwithstanding the foregoing, Tenant may elect to modify or otherwise reduce the scope of such Tenant Improvements or Alterations so as to minimize any Tenant's Contribution. Subject to the foregoing, such restoration shall be to substantially the same condition of such items as prior to the casualty, except for modifications (a) required by Law; or (b) to the Common Areas reasonably deemed desirable by Landlord, and which are consistent with the character of the Project. No such modifications shall materially impair use of or access to the Premises and any Common Areas serving the Premises. Tenant shall be responsible, at its sole cost and expense, for the repair, restoration, and replacement of Tenant's Property. Landlord shall not be liable for any loss of business, inconvenience, or annoyance arising from any casualty or any repair or restoration of any portion of the Premises or the Project as a result of any damage from any casualty. All work by Tenant shall be subject to the terms and conditions of Article 11.

15.3 Tenant's Termination Rights. If Landlord does not elect to terminate this Lease pursuant to Landlord's termination right as provided above, and the repairs cannot be completed within one hundred eighty (180) days after being commenced (the "**Repair Period**") as determined by an architect or contractor designated by Landlord, Tenant may elect, no earlier than sixty (60) days after the date of the casualty and not later than ninety (90) days after the date of such casualty, to terminate this Lease by notice to Landlord, effective as of the date specified in the notice, which date shall not be less than thirty (30) days nor more than sixty (60) days after such notice. In addition, in the event that the Premises is destroyed or damaged to any substantial extent during the last twelve (12) months of the Term, then Tenant shall have the option to terminate this Lease by giving notice to Landlord within thirty (30) days after such casualty, in which event this Lease shall cease and terminate as of the date of such notice. Tenant shall also have the right to terminate this Lease if Landlord does not complete repairs within the Repair Period by thirty (30) days' notice to Landlord after the expiration of the Repair Period; provided however, if Landlord completes repair within such thirty (30) day period, such termination shall be nullified and this Lease shall continue in full force and effect. If this Lease is terminated pursuant to Section 15.1 above or this Section 15.3, Tenant shall have no obligation to pay for any repairs or insurance deductibles nor shall Tenant have any obligation to restore any portion of the Premises.

15.4 Apportionment of Rent. Upon any termination of this Lease pursuant to this Article, Tenant shall pay the Rent, properly apportioned up to such date of termination, and both parties hereto shall thereafter be freed and discharged of all further obligations hereunder, except as provided for in provisions of this Lease that by their terms survive the expiration or earlier termination of this Lease.

15.5 Abatement. The Rent shall abate on an equitable basis to the extent Tenant's use of the Premises is impaired, commencing with the date of the casualty and continuing until completion of the repairs required of Landlord; provided that if the damage is due to the gross negligence or willful misconduct of any Tenant Related Party, Rent shall only abate to the extent the same is covered by rent loss insurance, if any, carried by Landlord.

15.6 Express Agreement. This Lease shall be considered an express agreement governing any case of damage to or destruction of the Premises, any Building, or the Project by fire or other casualty; and any present or future Law that purports to govern the rights of Landlord and Tenant in such circumstances in the absence of express agreement is hereby waived by the parties and shall have no application. As a material inducement to Landlord's entering into this Lease, Tenant irrevocably waives and releases the provisions of California Civil Code Sections 1932(2) or 1933(4), as the same may be amended or re-codified or any similar or successor Law now or hereafter in effect, that would permit termination or automatically terminate this Lease or otherwise be contrary to the provisions of this Article in the event of any damage or destruction.

ARTICLE 16
EMINENT DOMAIN

16.1 Entire Premises. If the whole of the Premises is lawfully taken by condemnation or in any other manner for any public or quasi-public purpose, this Lease shall terminate as of the earlier of the date of the date title vests or the date possession is given, and Rent shall be prorated to such date.

16.2 Partial Condemnation. If less than the whole of the Premises is so taken, this Lease shall be unaffected by such taking, except that (a) Landlord and Tenant shall each have the right to terminate this Lease by notice to the other given within ninety (90) days after the date of such taking if twenty-five percent (25%) or more of the Premises is taken and the remaining area of the Premises is not reasonably sufficient for Tenant to continue operation of its business; and (b) Landlord shall have the right to terminate this Lease by notice to Tenant given within ninety (90) days after the date of such taking if such taking renders the remainder of the Project unusable as a multi-tenant office park. If either Landlord or Tenant so elects to terminate this Lease, this Lease shall terminate on the thirtieth (30th) day after either such notice. Rent shall be prorated to the date of such termination. If this Lease continues in force upon such partial taking, the Base Rent and Tenant's Proportionate Share shall be equitably adjusted according to the remaining Rentable Area of the Premises and the Project. This Lease shall be considered an express agreement governing any condemnation of the Premises, any Building or the Project, and Tenant agrees that its rights to terminate this Lease are governed by this Article. Tenant hereby waives, releases and relinquishes all rights it may have to terminate this Lease following a condemnation under Section 1265.130 of the California Code of Civil Procedure, or any similar Laws now or hereafter in effect.

16.3 Proceeds of Award. In the event of any taking, partial or whole, all of the proceeds of any award, judgment, or settlement payable by the condemning authority shall be the exclusive property of Landlord, whether awarded as compensation for the damages to Landlord's or Tenant's interest in the Premises and whether or not awarded as compensation for diminution in value of the leasehold or to the fee of the Premises, and Tenant hereby assigns to Landlord all of its right, title, and interest in any award, judgment, or settlement from the condemning authority. Tenant, however, shall have the right, to the extent that Landlord's award is not reduced or prejudiced, to claim from the condemning authority (but not from Landlord) such compensation as may be recoverable by Tenant in its own right for relocation expenses and damage to Tenant's Property.

16.4 Repairs. In the event of a partial taking of the Premises that does not result in a termination of this Lease, Landlord shall restore the remaining portion of the Premises as nearly as practicable to its condition prior to the condemnation or taking. Tenant shall be responsible at its sole cost and expense for the repair, restoration, and replacement of Tenant's Property.

ARTICLE 17
INDEMNIFICATION, WAIVER, RELEASE AND LIMITATION OF LIABILITY

17.1 Tenant's Indemnity. Except for any injury or damage to persons or property on the Premises that is proximately caused by or results proximately from negligence or willful misconduct of Landlord, Tenant will and does hereby indemnify, defend and hold harmless the Landlord Related Parties against and from any and all Claims that may be imposed upon, incurred by, or asserted against Landlord or any of the Landlord Related Parties and arising, directly or indirectly, out of or in connection with: (a) any occurrence in the Premises; (b) any failure on the part of Tenant to perform or comply with any of the covenants, agreements, terms or conditions contained in this Lease; and (c) the negligence or willful misconduct of any Tenant Related Party. At Landlord's request, Tenant shall, at Tenant's expense and by counsel selected by Landlord, defend Landlord in any action or proceeding arising from any such Claim and shall indemnify Landlord against all costs, reasonable attorneys' fees, expert witness fees, and any other expenses incurred in such action or proceeding.

17.2 Assumption of Risk. Tenant hereby assumes all risk of damage or injury to any person or property in, on, or about the Premises from any cause other than the negligence or willful misconduct of Landlord. Tenant agrees that no Landlord Related Parties will be liable for any loss, injury, death, or damage to persons or property resulting from any of the following, except to the extent the same is due to the negligence or willful misconduct of any Landlord Related Party: (a) theft; (b) Force Majeure; (c) any accident or occurrence in the Premises or any other portion of the Project caused by the Premises or any other portion of the Project being or becoming out of repair or by the obstruction, breakage or defect in or failure of equipment, pipes, sprinklers, wiring, plumbing, heating, ventilation and air-conditioning or lighting fixtures of any Building or the Project or by broken glass or by the backing up of drains, or by gas, water, steam, electricity or oil leaking, escaping or flowing into or out of the Premises; (d) construction, repair or alteration of any other premises in the Project or the Premises; (e) business interruption or loss of use of the Premises; (f) any diminution or shutting off of light, air or view by any structure erected on the Land or any land adjacent to the Project, even if Landlord is the adjacent land owner; (g) mold or indoor air quality; or (h) any acts or omissions of any other tenant, occupant or visitor of the Project. In no event shall Landlord be liable for indirect, consequential, or punitive damages, including, without limitation, any damages based on lost profits. None of the foregoing shall be considered a constructive eviction of Tenant, nor shall the same entitle Tenant to an abatement of Rent.

17.3 Limitation of Landlord Liability. No Landlord Related Party shall have any personal liability with respect to any of the provisions of the Lease, or the Premises. If Landlord is in breach or default with respect to Landlord's obligations under the Lease, Tenant shall look solely to the amount of the equity interest of Landlord in the Project, including rent, insurance, condemnation and sales proceeds, for the satisfaction of Tenant's remedies or judgments. No other real, personal, or mixed property of any Landlord Related Parties, wherever situated, shall be subject to levy to satisfy such judgment. Upon any Transfer of Landlord's interest in this Lease or in the Project, and the written assumption of such transfer of Landlord's obligations hereunder by the transferee, the transferring Landlord shall have no liability or obligation for matters arising under this Lease from and after the date of such Transfer.

ARTICLE 18
INSURANCE

18.1 Landlord Required Coverage. Landlord shall procure and maintain during the Term, (i) a policy or policies of "all risk" property insurance covering the Project in the amount of the full replacement value thereof (excluding portions of the Project Tenant is required to insure under Section 18.2.2), (ii) commercial general liability insurance, (iii) business income/rental value insurance, and (iv) any other insurance deemed appropriate by Landlord or its Mortgagee. Such insurance shall be in such amounts, from such companies, and on such terms and conditions as Landlord or its Mortgagee may deem appropriate from time to time, so long as such amounts, terms and conditions shall be generally consistent with the amounts, terms and conditions carried by other institutional landlords of projects similar to the Project in the greater Santa Clara area. All insurance maintained by Landlord shall be in addition to, and not in lieu of, the insurance required to be maintained by Tenant hereunder. Landlord shall cause its respective insurance policy(ies) to be endorsed, if necessary, to waive subrogation.

18.2 Tenant Required Coverage. Tenant shall maintain the following coverages in the following amounts.

18.2.1 Commercial General Liability Insurance covering Tenant against any claims or suits arising out of bodily injury, death, personal injury or property damage arising out of Tenant's operations, assumed liabilities or use of the Premises, for limits of liability not less than Two Million and No/100 Dollars ($2,000,000.00) per occurrence and Five Million and No/100 Dollars ($5,000,000.00) annual general aggregate (these limits may be achieved by a combination of a primary policy and a "follow form" excess or umbrella liability policy).

18.2.2 Commercial Property Insurance covering (a) Tenant's Property, and (b) any improvements and Alterations, including the Tenant Improvements, made by Tenant or at Tenant's request. Such insurance shall include a waiver of subrogation endorsement in favor of Landlord and shall be written on a "Causes of Loss — Special Form" basis (or its equivalent), for the full replacement cost (as reasonably approved by Landlord) without deduction for depreciation, and shall include coverage for theft, vandalism, malicious mischief and sprinkler leakage. Such policy shall have a deductible not greater than Thirty Five Thousand and No/100 Dollars ($35,000.00). The proceeds of such insurance may be used for the repair or replacement of the property so insured. Upon termination of this Lease following a casualty as set forth herein any proceeds under (a) shall be paid to Tenant and any proceeds under (b) in excess of Tenant's unamortized cost associated therewith shall be paid by Tenant to Landlord. Tenant shall have no obligation to carry earthquake insurance covering Tenant's Property or any improvements and Alterations, including the Tenant Improvements, made by Tenant or at Tenant's request.

18.2.3 Business Income and Extra Expense insurance (or its equivalent) in such amounts as will reimburse Tenant for direct or indirect loss of earnings attributable to all perils commonly insured against by prudent tenants or attributable to prevention of access to the Premises or to the Project as a result of such perils, for a period of not less than twelve (12) months. Such insurance shall include a waiver of subrogation endorsement in favor of Landlord.

18.2.4 Statutory worker's compensation (which policy shall include a waiver of subrogation endorsement in favor of Landlord. Tenant shall provide Landlord with a copy of such endorsement concurrent with providing its evidence of insurance required under Section 18.4 below), together with employer's liability/employer's indemnity coverage at limits of:

$1,000,000 Each Accident
$1,000,000 Each Employee by Disease
$1,000,000 Policy Limit by Disease

18.3 Form of Policies. The insurance required by Section 18.2.1 above shall (a) name Landlord, Landlord's property management agent, and at Landlord's request, any Mortgagee, each as an additional insured by endorsement(s) reasonably acceptable to Landlord; (b) cover, to the extent insurable, Tenant's indemnity obligations under this Lease; (c) be issued by an insurance company having an A.M. Best rating of not less than A- VII or that is otherwise reasonably acceptable to Landlord; (d) be primary, not contributing with, and not in excess of, coverage that Landlord may carry; and (e) contain a separation of insureds provision and no insured vs. insured exclusion or limitation. Tenant agrees that it shall (x) cause such policies to be endorsed to provide thirty (30) days' prior written notice by the insurer(s) to Landlord in the event said insurance is cancelled (ten (10) days' prior written notice in the event of cancellation for non-payment of premium), and (y) provide thirty (30) days' prior written notice to Landlord in the event said insurance shall be canceled, non-renewed or coverage reduced.

18.4 Evidence of Insurance. Tenant shall deliver a certificate of insurance, together with additional insured and waiver of subrogation endorsements, all of which shall be reasonably acceptable to Landlord, evidencing the existence and amount of each insurance policy required hereunder on or before the Phase 1 Commencement Date. Tenant shall furnish Landlord with renewals, certificates, or "binders" at least ten (10) days prior to the expiration thereof. Tenant agrees that, if Tenant does not obtain and maintain such insurance, Landlord

may (but shall not be required to) after five (5) Business Days' notice to Tenant during which time Tenant does not supply Landlord evidence of the required insurance, at Landlord's option, procure said insurance on Tenant's behalf and charge Tenant the premiums therefor, payable upon demand. Tenant shall have the right to provide the insurance required hereunder pursuant to blanket policies obtained by Tenant, provided such blanket policies afford coverage as required by this Lease.

18.5 Intentionally Omitted.

18.6 Independent Obligations. Tenant acknowledges and agrees that Tenant's insurance obligations under this Lease are independent of Tenant's indemnity obligations, liabilities and duties under this Lease.

18.7 Waiver of Subrogation. Anything in this Lease to the contrary notwithstanding, Landlord and Tenant each hereby waives any and all rights of recovery, claim, action or cause of action against the other for any loss or damage to any property of Landlord or Tenant, arising from any cause that (a) would be insured against under the terms of any property insurance or business interruption insurance required to be carried hereunder; or (b) is insured against under the terms of any property insurance or business interruption insurance actually carried, regardless of whether the same is required hereunder. The foregoing waiver shall apply regardless of the cause or origin of such claim, including but not limited to the negligence of a party, or such party's agents, officers, employees or contractors. The foregoing waiver shall not apply if it would have the effect, but only to the extent of such effect, of invalidating any insurance coverage of Landlord or Tenant. The foregoing waiver shall also apply to any deductible and/or self-insured retention, as if the same were a part of the insurance recovery.

ARTICLE 19
DEFAULT

19.1 Tenant's Default. A "**Default**" shall mean the occurrence of any one or more of the following events:

19.1.1 Tenant's failure to pay any Rent when due, where such failure shall continue for a period of three (3) Business Days after notice thereof from Landlord to Tenant. In the event that Landlord serves Tenant with a Notice to Pay Rent or Quit pursuant to applicable Unlawful Detainer statutes, such Notice to Pay Rent or Quit shall also constitute the notice required by this subsection.

19.1.2 If any representation or warranty made by Tenant to Landlord in this Lease is false in any material respect when made.

19.1.3 Tenant fails to deliver any estoppel certificates or subordination agreements within five (5) days after Tenant's receipt of written notice that Tenant failed to deliver such estoppel certificates or subordination agreements within the periods set forth in this Lease.

19.1.4 The levy of a writ of attachment or execution on this Lease.

19.1.5 Tenant's general assignment for the benefit of creditors or arrangement, composition, extension, or adjustment with its creditors.

19.1.6 Tenant becomes insolvent or bankrupt or admits in writing its inability to pay its debts as they mature.

19.1.7 Proceedings for the appointment of a trustee, custodian or receiver of Tenant or for all or a part of Tenant's property are filed by or against Tenant and, if filed against Tenant involuntarily, are not dismissed within sixty (60) days of filing.

19.1.8 Proceedings in bankruptcy, or other proceedings for relief under any law for the relief of debtors, are instituted by or against Tenant, and, if instituted against Tenant involuntarily, are not dismissed within sixty (60) days of filing.

19.1.9 Intentionally Omitted.

19.1.10 Tenant fails to perform any other covenant, condition or agreement contained in this Lease not covered by the preceding subsections, where such failure continues for thirty (30) days after notice thereof from Landlord to Tenant, or such additional period as is reasonably necessary to effect cure, provided Tenant commences cure within such thirty (30) day period and diligently pursues the same to completion.

19.1.11 Tenant shall repeatedly fail to pay Rent when due, whether or not Tenant shall timely cure any such payment default. For the purposes of this subsection, the failure of Tenant to pay Rent when due three (3) times during any Lease Year shall constitute a repeated default.

Any notice periods provided for under this Section shall run concurrently with any statutory notice periods and any notice given hereunder may be given simultaneously with or incorporated into any such statutory notice.

19.2 Landlord's Default. Tenant shall promptly notify Landlord of the need for any repairs or action with respect to other matters that are Landlord's obligation under this Lease. If Landlord fails to perform any covenant, condition, or agreement contained in this Lease within thirty (30) days after receipt of notice from Tenant, or if such default cannot reasonably be cured within thirty (30) days, and if Landlord fails to commence to cure within such thirty (30) day period or to diligently prosecute the same to completion, then subject to the other limitations set forth elsewhere in this Lease, Landlord shall be liable to Tenant for any damages sustained by Tenant as a result of Landlord's breach; provided that in no event shall (a) Landlord be liable for indirect, consequential or punitive damages, including without limitation, any damages based on lost profits; or (b) Tenant have the right to terminate this Lease on account of a Landlord default. Tenant shall have the right to withhold, reduce or offset any amount resulting from Landlord's default against any payments of Rent or any other charges due and payable under this Lease only after Tenant has obtained a final, non-appealable judgment against Landlord for the amount due.

In addition, if Landlord has not timely paid to Tenant all or any portion of the Allowance as and when required under Exhibit E and any such amounts remain unpaid thirty (30) days after such amounts were due, then provided Tenant has given Landlord at least ten (10) days prior written notice of the failure to timely pay such amounts, Tenant shall have the right to offset such unpaid amounts against Tenant's Base Rent and Tenant's Cost Allocation obligations accruing under this Lease (or as provided in Landlord's consent to Tenant's obligations under the Sublease, if applicable) until the entire Allowance payable to Tenant has been fully received by Tenant (either by way of payment from Landlord or credited against Tenant's Base Rent and Tenant's Cost Allocation or Tenant's obligations under the Sublease, if applicable).

ARTICLE 20
LANDLORD REMEDIES AND DAMAGES

20.1 Remedies. In the event of a Default, then in addition to any other rights or remedies Landlord may have at law or in equity, Landlord shall have the right, at Landlord's option, without further notice or demand of any kind, to do any or all of the following without prejudice to any other remedy that Landlord may have:

20.1.1 Terminate this Lease and Tenant's right to possession of the Premises by giving notice to Tenant. Tenant shall immediately surrender the Premises to Landlord, and if Tenant fails to do so, Landlord may re-enter the Premises and take possession thereof and expel or remove Tenant and any other party who may be occupying the Premises, or any part, thereof, whereupon Tenant shall have no further claim to the Premises or under this Lease.

20.1.2 Landlord shall have the remedy described in California Civil Code Section 1951.4 (lessor may continue lease in effect after lessee's breach and abandonment and recover rent as it becomes due, if lessee has the right to sublet or assign, subject only to reasonable limitations). Accordingly, if Landlord does not elect to terminate this Lease on account of any Default, Landlord may, from time to time, without terminating this Lease, enforce all of its rights and remedies under this Lease, including the right to recover all Rent as it becomes due.

20.1.3 Without any further notice or demand, Landlord may enter upon the Premises, if necessary, without being liable for prosecution or claim for damages therefor, and do whatever Tenant is obligated to do under the terms of the Lease. Tenant agrees to reimburse Landlord on demand for any reasonable expenses that Landlord may incur in effecting compliance with Tenant's obligations under the Lease. Tenant further agrees that Landlord shall not be liable for any damages resulting to Tenant from such action, unless caused by the gross negligence or willful misconduct of Landlord (but subject to the other limitations on Landlord's liability set forth in this Lease). Notwithstanding anything herein to the contrary, Landlord will have no obligation to cure any Default of Tenant.

20.1.4 Landlord shall at all times have the right, without prior demand or notice except as required by Law, to seek any declaratory, injunctive or other equitable relief, and specifically enforce this Lease, or restrain or enjoin a violation or breach of any provision hereof, without the necessity of proving the inadequacy of any legal remedy or irreparable harm.

20.1.5 To the extent permitted by applicable Law, Landlord shall have the right, without notice to Tenant, to change or re-key all locks to entrances to the Premises, and Landlord shall have no obligation to give Tenant notice thereof or to provide Tenant with a key to the Premises.

20.1.6 The rights given to Landlord in this Article are cumulative and shall be in addition and supplemental to all other rights or remedies that Landlord may have under this Lease and under applicable Laws or in equity.

20.2 Damages. Should Landlord elect to terminate this Lease or Tenant's right to possession under the provisions above, Landlord may recover the following damages from Tenant:

20.2.1 Past Rent. The worth at the time of the award of any unpaid Rent that had been earned at the time of termination; plus

20.2.2 Rent Prior to Award. The worth at the time of the award of the amount by which unpaid Rent that would have been earned after termination until the time of the award exceeds the amount of the rental loss that Tenant proves could have been reasonably avoided; plus

20.2.3 Rent After Award. The worth at the time of the award of the amount by which the unpaid Rent for the balance of the Term after the time of award exceeds the amount of the rental loss that Tenant proves could have been reasonably avoided, if any; plus

20.2.4 Proximately Caused Damages. Any other amount necessary to compensate Landlord for all detriment proximately caused by Tenant's failure to perform its obligations under this Lease or that in the ordinary course of things would be likely to result therefrom, including, but not limited to, any costs or expenses (including, without limitation, reasonable attorneys' fees), incurred by Landlord in (a) retaking possession of the Premises; (b) maintaining the Premises after Default; (c) preparing the Premises or any portion thereof for reletting to a new tenant, including, without limitation, any repairs or alterations, whether for the same or a different use; and (d) reletting the Premises, including but not limited to, advertising expenses, brokers' commissions and fees, but only to the extent allocable to the remaining Term of this Lease).

20.2.5 Other Damages. At Landlord's election, such other amounts in addition to or in lieu of the foregoing as may be permitted from time to time by Law.

As used in Sections 20.2.1 and 20.2.2, the phrase "worth at the time of the award" shall be computed by adding interest on all such sums from the date when originally due at the Interest Rate. As used in Section 20.2.3, the phrase "worth at the time of the award" shall be computed by discounting the sum in question at the Federal Reserve rate promulgated by the Federal Reserve office for the district in which the Project is located, plus one percent (1%).

20.3 Intentionally Omitted.

20.4 No Termination. A termination of this Lease by Landlord or the recovery of possession of the Premises by Landlord or any voluntary or other surrender of this Lease by Tenant or a mutual cancellation thereof, shall not work a merger and shall at the option of Landlord, terminate all or any existing franchises or concessions, licenses, permits, subleases, subtenancies or the like between Tenant and any third party with respect to the Premises, or may, at the option of Landlord, operate as an assignment to Landlord of Tenant's interest in same. Following a Default, Landlord shall have the right to require any subtenants to pay all sums due under their subleases directly to Landlord.

20.5 Waiver of Demand and Notice. All demands for Rent and all other demands, notices and entries, whether provided for under common law or otherwise, that are not expressly required by the terms hereof, are hereby waived by Tenant. Notwithstanding the foregoing waiver of notices, Landlord may elect to serve such notices (including statutory notices) and combine such notices with any notices required under the provisions of this Lease.

20.6 Waiver of Redemption. Tenant hereby waives, relinquishes and releases for itself and for all those claiming under Tenant any right of occupancy of the Premises following termination of this Lease as a result of Tenant's Default, and any right to redeem or reinstate this Lease by order or judgment of any court or by any legal process or writ under present or future Laws, including without limitation, California Code of Civil Procedure Sections 473 and 1179, and California Civil Code Section 3275.

20.7 Deficiency. If it is necessary for Landlord to bring suit in order to collect any deficiency, Landlord shall have the right to allow such deficiencies to accumulate and to bring an action on several or all of the accrued deficiencies at one time. Any such suit shall not prejudice in any way the right of Landlord to bring a similar action for any subsequent deficiency or deficiencies.

20.8 Counterclaim. Tenant hereby waives any right to plead any non-mandatory counterclaim, non-mandatory offset or non-mandatory affirmative defense in any action or proceedings brought by Landlord against Tenant for the recovery of possession based upon the non-payment of Rent or any other Default. The foregoing shall not, however, be construed as a waiver of Tenant's right to assert any claim in a separate action brought by Tenant against Landlord.

ARTICLE 21
BANKRUPTCY

21.1 In the event a petition is filed by or against Tenant under the Bankruptcy Code, Tenant, as debtor and debtor in possession, and any trustee who may be appointed agree to adequately protect Landlord as follows:

21.1.1 to pay monthly in advance on the first day of each month as reasonable compensation for use and occupancy of the Premises an amount equal to all Rent due pursuant to this Lease;

21.1.2 to perform each and every obligation of Tenant under this Lease until such time as this Lease is either rejected or assumed by order of a court of competent jurisdiction;

21.1.3 to determine within one hundred twenty (120) days after the filing of such petition whether to assume or reject this Lease;

21.1.4 to give Landlord at least thirty (30) days' prior notice, unless a shorter period is agreed to in writing by the parties, of any proceeding relating to any assumption of this Lease;

21.1.5 to give at least thirty (30) days' prior notice of any vacation or abandonment of the Premises, any such vacation or abandonment to be deemed a rejection of this Lease; and

21.1.6 to do all other things to benefit Landlord otherwise required under the Bankruptcy Code. This Lease shall be deemed rejected in the event of the failure to comply with any of the above.

21.2 In order to provide Landlord with the assurance contemplated by the Bankruptcy Code, the following obligations must be fulfilled, in addition to any other reasonable obligations that Landlord may require, before any assumption of this Lease is effective: (a) all monetary Defaults under this Lease must be cured within ten (10) days after the date of assumption; (b) all other Defaults (other than those arising solely on account of the bankruptcy filing) must be cured within fifteen (15) days after the date of assumption; (c) all actual monetary losses incurred by Landlord (including, but not limited to, reasonable attorneys' fees) must be paid to Landlord within ten (10) days after the date of assumption; and (d) Landlord must receive within ten (10) days after the date of assumption a security deposit in the amount of six (6) months' Base Rent and an advance prepayment of three (3) months' Base Rent.

21.3 In the event this Lease is assumed in accordance with the requirements of the Bankruptcy Code and this Lease, and is subsequently assigned, then, in addition to any other reasonable obligations that Landlord may require and in order to provide Landlord with the assurances contemplated by the Bankruptcy Code, Landlord must be provided with (a) a financial statement of the proposed assignee prepared in accordance with generally accepted accounting principles consistently applied, though on a cash basis, which reveals a net worth in an amount sufficient, in Landlord's reasonable judgment, to assure the future performance by the proposed assignee of Tenant's obligations under this Lease; or (b) a written guaranty by one or more guarantors with financial ability sufficient to assure the future performance of Tenant's obligations under this Lease, such guaranty to be in form and content satisfactory to Landlord and to cover the performance of all of Tenant's obligations under the Lease.

21.4 Neither Tenant nor any trustee who may be appointed in the event of the filing of a petition under the Bankruptcy Code shall conduct or permit the conduct of any "fire," "bankruptcy," "going out of business" or auction sale in or from the Premises.

ARTICLE 22
INTENTIONALLY OMITTED

ARTICLE 23
HOLDING OVER

If, after expiration of the Term, Tenant remains in possession of the Premises, Landlord may, at its option, serve notice upon Tenant that such hold over constitutes either: (a) a month-to-month tenancy upon all the provisions of this Lease (except as to Term and Base Rent); or (b) a tenancy at sufferance. If Landlord does not give said notice, Tenant's hold over shall create a tenancy at sufferance, subjecting Tenant to all the covenants and obligations of this Lease. In either event, the monthly installments of Base Rent shall be increased to one hundred twenty-five percent (125%) of the monthly installments of Base Rent in effect at the expiration of the Term and, if such hold over continues past the date that is three (3) months after the expiration of the Term, the monthly installments of Base Rent shall be increased to one hundred fifty percent (150%) of the Base Rent in effect at the expiration of the Term. If a month-to-month tenancy is created, either party may terminate such tenancy by giving the other party at least thirty (30) days advance notice of the date of termination. Additionally, if Tenant shall hold over without the consent of Landlord, then Tenant shall also protect, defend, indemnify and hold Landlord harmless from all Claims resulting from retention of possession by Tenant, including, without limiting

the generality of the foregoing, any Claims made by any succeeding tenant founded upon such failure to surrender and any lost rents and profits to Landlord resulting therefrom. The provisions of this Article shall not constitute a waiver by Landlord of any right of re-entry as otherwise available to Landlord, nor shall receipt of any rent or any other act appearing to affirm the tenancy operate as a waiver of the right to terminate this Lease for a breach by Tenant hereof.

ARTICLE 24
SURRENDER OF PREMISES

Upon the expiration or earlier termination of this Lease, Tenant shall peaceably surrender the Premises to Landlord broom-clean and in the same condition as on the date Tenant took possession (a) except for reasonable wear and tear, loss by fire or other casualty and loss by condemnation, the presence of Hazardous Materials (other than those released or emitted by Tenant or any Tenant Related Party) and repairs for which Tenant is not responsible under this Lease; and (b) with all removal, restoration and/or repairs required pursuant to Section 11.3 above and this Article 24 completed. Tenant's Property shall be and shall remain the property of Tenant and may be removed by Tenant at any time during the Term; provided that, if any of Tenant's Property is removed, Tenant shall promptly repair any damage to the Premises or to any Building resulting from such removal. If Tenant abandons or surrenders the Premises or is dispossessed by process of law or otherwise, any of Tenant's Property left on the Premises shall be stored and/or disposed of in accordance with Section 1980 et seq. of the California Civil Code, or any similar Laws now or hereafter in effect. If Landlord elects to remove all or any part of such Tenant's Property, the reasonable cost of removal, storage and disposal of Tenant's Property, including, without limitation, repairing any damage to the Premises or any Building caused by such removal, shall be paid by Tenant. On the Expiration Date, Tenant shall surrender all keys, parking cards and other means of entry to the Premises, the Buildings and the Project, and shall inform Landlord of the combinations and access codes for any locks and safes located in the Premises. It is specifically agreed that any and all telephonic, coaxial, ethernet, or other computer, word processing, facsimile, or electronic wiring ("**Telecom Wiring**") and any other components of Tenant's Telecommunications System shall be removed at Tenant's cost at the expiration of the Term, unless Landlord has specifically requested in writing that the Telecom Wiring shall remain, whereupon the Telecom Wiring shall be surrendered with the Premises as Landlord's property.

ARTICLE 25
BROKERAGE FEES

Tenant warrants and represents that it has not dealt with any real estate broker or agent in connection with this Lease or its negotiation except as set forth on the Lease Summary. Tenant shall indemnify, defend and hold Landlord harmless from any Claims for any compensation, commission, or fees claimed by any other real estate broker or agent claiming to represent Tenant in connection with this Lease (including but not limited to any expansions of the Premises and extensions) or its negotiation.

ARTICLE 26
NOTICES

Any notice, demand, request, consent, covenant, approval or other communication to be given by one party to the other must be in writing and (except for statements and invoices to be given in the ordinary course hereunder, which may be sent by regular U.S. Mail) (a) delivered personally; (b) mailed by certified United States mail, postage prepaid, return receipt requested (except for statements and invoices to be given in the ordinary course hereunder, which may be sent by regular U.S. Mail); or (c) sent by nationally recognized overnight courier. The effective date of notice shall be (i) for any notice delivered in person, the date of delivery; (ii) for any notice by U.S. mail, three (3) Business Days after the date of certification thereof; and (iii) for any notice by overnight courier, the next Business Day after deposit with the courier. All notices shall be delivered or addressed to the parties at their respective addresses set forth on the Lease Summary. Either party may change the address at which it desires to receive notice upon giving notice of such request to the other party in the manner provided herein. When this Lease requires service of a notice, that notice shall replace rather than supplement any equivalent or similar statutory notice, including, without limitation, any notices required under Section 1161 of the California

Code of Civil Procedure, or any similar Laws now or hereafter in effect. When a statute requires service of a notice in a particular manner, service of that notice (or the replacement notice required by this Lease) as provided in this Article shall replace and satisfy, to the maximum extent permitted by law, the statutory service procedures, including, without limitation, those set forth in Section 1162 of the California Code of Civil Procedure, or any similar Laws now or hereafter in effect.

ARTICLE 27
INTENTIONALLY OMITTED

ARTICLE 28
SIGNAGE

28.1 Subject to this Section 28.1, Tenant shall be entitled to install, at its sole cost and expense, one (1) sign on the exterior of the 5353 Building identifying the name of Tenant (the "**Signage**") in a location to be mutually agreed upon by Landlord and Tenant. The graphics, materials, size, color, design, lettering, lighting (if any) and specifications of the Signage (collectively, the "**Signage Specifications**") shall be subject to the prior written approval of Landlord, which approval shall not be unreasonably withheld. In addition, the Signage and all Signage Specifications therefor shall be subject to Tenant's receipt of all required governmental permits and approvals, shall be subject to all applicable governmental laws and ordinances, and all covenants, conditions and restrictions affecting the Project. Tenant hereby acknowledges that, notwithstanding Landlord's approval of the Signage and/or the Signage Specifications therefor, Landlord has made no representations or warranty to Tenant with respect to the probability of obtaining such approvals and permits. In the event Tenant does not receive the necessary permits and approvals for the Signage, Tenant's and Landlord's rights and obligations under the remaining provisions of this Lease shall not be affected. The cost of installation of the Signage, as well as all costs of design and construction of such Signage and all other costs associated with such Signage, including, without limitation, permits, maintenance and repair, shall be the sole responsibility of Tenant. The rights to the Signage shall be personal to the Named Tenant, any Permitted Transferee, any assignee approved by Landlord pursuant to Article 14 above and/or any subtenant leasing the entire Premises (or all of Phase 1 or Phase 2)approved by Landlord pursuant to Article 14 above, and may not be otherwise transferred. Should the Signage require maintenance or repairs as determined in Landlord's reasonable judgment, Landlord shall have the right to provide written notice thereof to Tenant and Tenant shall cause such repairs and/or maintenance to be performed within thirty (30) days after receipt of such notice from Landlord at Tenant's sole cost and expense. Should Tenant fail to perform such maintenance and repairs within the period described in the immediately preceding sentence, Landlord shall have the right to cause such work to be performed and to charge Tenant for the cost of such work.

Should the name of the Named Tenant change or should the Signage be transferred as set forth above, then the Signage may be modified at Tenant's sole cost and expense to reflect the new name or the name of such Permitted Transferee, provided that such name is reasonably acceptable to Landlord, and without limiting other reasonable grounds for which Landlord may disapprove such name, Landlord may disapprove such name if it (i) relates to an entity that is of a character or reputation, or associated with a political orientation or a faction, that is inconsistent with the quality of the Project or would otherwise reasonably offend an institutional landlord of an office project comparable to the Project, taking into consideration the level and visibility of such signage or (ii) causes Landlord to be in default under any lease or license with another tenant of the Project.

28.2 Subject to this Section 28.2, Tenant shall be entitled, at Tenant's sole cost and expense, install a sign panel on any of the Buildings' monument sign (the "**Monument Sign**") identifying the name of Tenant (the "**Sign Panel**"). The graphics, materials, size, color, design, lettering, lighting (if any), specifications of the Sign Panel (collectively, the "**Sign Panel Specifications**") shall be subject to the prior written approval of Landlord, which approval shall not be unreasonably withheld. In addition, the Sign Panel and all Sign Panel Specifications therefor shall be subject to Tenant's receipt of all required governmental permits and approvals, shall be subject to all applicable Laws, and all covenants, conditions and restrictions affecting the Project. Tenant hereby acknowledges that, notwithstanding Landlord's approval of the Sign Panel and/or the Sign Panel Specifications therefor, Landlord has made no representations or warranty to Tenant with respect to the

probability of obtaining such approvals and permits. In the event Tenant does not receive the necessary permits and approvals for the Sign Panel, Tenant's and Landlord's rights and obligations under the remaining provisions of this Lease shall not be affected. The cost of installation of the Sign Panel, as well as all costs of design and construction of such Sign Panel and all other costs associated with such Sign Panel, including, without limitation, permits, maintenance and repair, shall be the sole responsibility of Tenant. The rights to the Sign Panel shall be personal to the Named Tenant, any Permitted Transferee, any assignee approved by Landlord pursuant to Article 14 above and/or any subtenant leasing the entire Premises approved by Landlord pursuant to Article 14 above, and may not be otherwise transferred. Should the Monument Sign or the Sign Panel require maintenance or repairs as determined in Landlord's reasonable judgment, Landlord shall have the right to provide written notice thereof to Tenant and Tenant shall cause such repairs and/or maintenance to be performed within thirty (30) days after receipt of such notice from Landlord at Tenant's sole cost and expense. Should Tenant fail to perform such maintenance and repairs within the period described in the immediately preceding sentence, Landlord shall have the right to cause such work to be performed and to charge Tenant for the cost of such work. Notwithstanding the foregoing, Landlord hereby approves the existing Sign Panel of Tenant on the 5403 Building's Monument Sign as it appears on the Effective Date.

Should the name of the Named Tenant change or should the Sign Panel be transferred as set forth above, then the Sign Panel may be modified at Tenant's sole cost and expense to reflect the new name or the name of such Permitted Transferee, provided that such name is reasonably acceptable to Landlord, and without limiting other reasonable grounds for which Landlord may disapprove such name, Landlord may disapprove such name if it (i) relates to an entity that is of a character or reputation, or associated with a political orientation or a faction, that is inconsistent with the quality of the Project or would otherwise reasonably offend an institutional landlord of an office project comparable to the Project, taking into consideration the level and visibility of such Sign Panel or (ii) causes Landlord to be in default under any lease or license with another tenant of the Project.

28.3 No other signage shall be permitted without the prior consent of Landlord, which consent may be withheld in Landlord's reasonable discretion. If Landlord grants such consent, the signage will be at Tenant's expense. Tenant shall not affix, paint, erect, or inscribe any sign, projection, awning, signal, or advertisement of any kind to any part of the Premises, any Building or the Project, including, without limitation, the inside or outside of windows or doors, without the consent of Landlord, which consent may be withheld in Landlord's reasonable discretion. Landlord shall have the right to remove any signs or other matter installed without Landlord's permission without being liable to Tenant by reason of such removal and to charge the reasonable cost of removal to Tenant, payable within ten (10) days of written demand by Landlord.

28.4 Any damage to any portion of the Project upon installation, maintenance, or removal of Tenant signage shall be Tenant's sole responsibility. Upon removal of Tenant's signage, the area affected thereby shall be repaired and restored pursuant to Landlord's specifications to a condition acceptable to Landlord, at Tenant's sole expense. Upon the expiration or earlier termination of this Lease, Tenant will remove all of its signage. More specifically, with respect to the Signage and the Sign Panel (at such time as the same are removed), Tenant shall repair and/or replace, in a manner satisfactory to Landlord, the portion of any Building (and the building materials) affected by the applicable sign and its removal, so that such areas and materials are restored to a condition consistent with the remainder of the exterior of such Building.

ARTICLE 29
LENDER PROVISIONS

29.1 Subordination. This Lease is subject and subordinate to all present and future ground or underlying leases of the Property and to the lien of any mortgages, deeds to secure debt or trust deeds, now or hereafter in force against the Property or any Building, if any, and to all renewals, extensions, modifications, consolidations and replacements thereof (collectively, "**Mortgages**"), and to all advances made or hereafter to be made upon the security of such Mortgages. In the event any proceedings are brought for the foreclosure of any mortgage, deed to secure debt or trust deed, or if any ground or underlying lease is terminated, Tenant shall attorn to the purchaser upon any such foreclosure sale, or to the lessor of such ground or underlying lease, as the case

may be (the "**Purchaser**"), and recognize the Purchaser as the lessor under this Lease, which attornment shall be effective as of the date that the Purchaser acquires title to the Property, and provided that Purchaser assumes all the obligations of Landlord under this Lease; however, the Purchaser shall have the right to accept or reject such attornment upon written notice to Tenant and in no event shall such attornment be negated by a foreclosure. In no event shall Tenant have a right of offset against amounts due any Purchaser on account of any defaults by Landlord under this Lease that pre-date the time the Purchaser becomes the lessor hereunder (other than those offset rights expressly permitted under, or expressly set forth in, this Lease, including Section 19.2 above), nor shall any Purchaser be liable for any such defaults by Landlord (other than non-monetary defaults of a continuing nature). Tenant shall, within ten (10) Business Days of request by Landlord or the Purchaser (as applicable), execute such further instruments or assurances as Landlord may reasonably deem necessary to evidence or confirm the subordination or superiority of this Lease to any Mortgages or Tenant's attornment to the Purchaser (as applicable). Tenant waives the provisions of any current or future statute, rule or law that may give or purport to give Tenant any right or election to terminate or otherwise adversely affect this Lease and the obligations of Tenant hereunder in the event of any foreclosure proceeding or sale. Notwithstanding the provisions hereof, should any Mortgagee require that this Lease be prior rather than subordinate to its Mortgage, or require that Tenant attorn to any Purchaser, then in such event, this Lease shall become prior and superior to such Mortgage, or Tenant shall so attorn under the same conditions stated above, upon notice to that effect to Tenant from such Mortgagee. The aforesaid superiority of this Lease to any Mortgage shall be self-operative upon the giving of such notice and no further documentation other than such notice shall be required to effectuate such superiority or attornment. In the event Landlord or such Mortgagee desires confirmation of such superiority or attornment, Tenant shall, promptly upon request therefor by Landlord or such Mortgagee, and without charge therefor, execute a document acknowledging such priority or attornment obligation to the Mortgagee as Landlord in the event of foreclosure or deed in lieu thereof or termination of a ground lease. Notwithstanding anything herein to the contrary, Tenant's subordination to any future holder of a Mortgage on the Project shall be subject to and conditioned upon such future holder executing and delivering a subordination, non-disturbance and attornment agreement in a commercially reasonable form. Within sixty (60) days after execution of this Lease, Landlord shall provide Tenant with a subordination, non-disturbance and attornment agreement from its current Mortgagee in a form attached hereto as Exhibit K.

29.2 Estoppel Certificates. Within ten (10) days after written request from Landlord, Tenant shall execute and deliver to Landlord, or Landlord's designee, a written statement certifying (a) that this Lease is unmodified and in full force and effect or is in full force and effect as modified and stating the modifications; (b) the amount of Base Rent and the date to which Base Rent and Additional Rent have been paid in advance; (c) the amount of any security deposit with Landlord; (d) whether to Tenant's current actual knowledge Landlord is not in default hereunder and, if Landlord is claimed to be in default, stating the nature of any claimed default; and (e) such other matters as may be requested. Landlord and, any purchaser, assignee or Mortgagee may rely upon any such statement. Tenant's failure to execute and deliver such statement within the time required shall be conclusive against Tenant (1) that this Lease is in full force and effect and has not been modified except as represented by Landlord; (2) that there are no uncured defaults in Landlord's performance and that Tenant has no right of offset, counterclaim, or deduction against Rent; (3) not more than one (1) month's Rent has been paid in advance; and (4) as to the truth and accuracy of any other matters set forth in the statement as submitted to Tenant.

29.3 Notice and Cure Rights. Tenant agrees to notify any Mortgagee whose address has been furnished to Tenant, of any notice of default served by Tenant on Landlord. If Landlord fails to cure such default within the time provided for in this Lease, such Mortgagee shall have an additional thirty (30) days to cure such default; provided that, if such default cannot reasonably be cured within that thirty (30) day period, then such Mortgagee shall have such additional time to cure the default as is reasonably necessary under the circumstances.

29.4 Changes Requested by Mortgagee. Tenant shall not unreasonably withhold its consent to changes or amendments to this Lease requested by a Mortgagee, so long as such changes do not alter this Article, the basic business terms of this Lease or otherwise materially diminish any rights or materially increase any obligations of Tenant or materially interfere with Tenant's occupancy of the Premises.

ARTICLE 30
MISCELLANEOUS

30.1 Parking. Tenant shall be permitted to park automobiles as set forth in Exhibit H. In addition to the provisions of Exhibit H, Tenant shall comply with all parking rules and regulations established by Landlord for the Project, as the same may be revised from time to time; provided, however, Tenant shall not be required to comply with any new rule or regulation unless the same does not unreasonably interfere with Tenant' use of the Premises or the parking areas and does not materially increase the obligations, or materially decrease the rights, of Tenant under this Lease.

30.2 Quiet Enjoyment. Tenant, upon paying the Rent and performing all of its obligations under this Lease, shall peaceably and quietly enjoy the Premises, subject to the terms of this Lease and to any mortgage, deed of trust, lease, or other agreement to which this Lease may be subordinated.

30.3 No Air Rights. This Lease does not grant Tenant any rights to any view or to light or air over any property, whether belonging to Landlord or any other person. If at any time any windows of the Premises are temporarily darkened or the light or view therefrom is obstructed by reason of any repairs, improvements, maintenance or cleaning in or about the Project,, the same shall be without liability to Landlord and without any reduction or diminution of Tenant's obligations under this Lease.

30.4 Force Majeure. Any prevention, delay, or stoppage of work to be performed by Landlord or Tenant that is due to Force Majeure shall excuse performance of the work by that party for a period equal to the duration of that prevention, delay, or stoppage. Nothing in this Section shall excuse or delay Tenant's obligation to pay Rent or other charges under this Lease or, except as set forth in Section 3.1, delay any of Tenant's express termination or Rent abatement rights.

30.5 Accord and Satisfaction; Allocation of Payment. No payment by Tenant or receipt by Landlord of a lesser amount than the Rent provided for in this Lease shall be deemed to be other than on account of the earliest due Rent; nor shall any endorsement or statement on any check or letter accompanying any check or payment as Rent be deemed an accord and satisfaction. Landlord may accept such check or payment without prejudice to Landlord's right to recover the balance of the Rent or pursue any other remedy provided for in this Lease. In connection with the foregoing, Landlord shall have the absolute right in its sole discretion to apply any payment received from Tenant to any account or other payment of Tenant then not current and due or delinquent. Pursuant to the requirements of California Code of Civil Procedure Section 1161.1(c), as the same may be amended or re-codified or any similar or successor Law, Tenant is hereby placed on actual notice that Landlord's acceptance of rent shall not constitute a waiver by Landlord of (a) any preceding breach by Tenant of any provision of this Lease, other than the failure of Tenant to pay the particular rent so accepted; or (b) any of Landlord's rights, including but not limited to any rights Landlord may have to recover possession of the Premises or to sue for any remaining rent owed by Tenant.

30.6 Attorneys' and Other Fees. Should either party institute any action or proceeding to enforce or interpret this Lease or any provision hereof, for damages by reason of any alleged breach of this Lease or of any provision hereof, or for a declaration of rights hereunder, the prevailing party in any such action or proceeding shall be awarded from the other party all costs and expenses, including, without limitation, attorneys' and other fees, reasonably incurred in good faith by the prevailing party in connection with such action or proceeding. The term "attorneys' and other fees" shall mean and include reasonable attorneys' fees, accountants fees, expert witness fees and any and all consultants and other similar fees incurred in connection with the action or proceeding and preparations therefor. The term "action or proceeding" shall mean and include actions, proceedings, suits, arbitrations, appeals and other similar proceedings.

30.7 Construction. Headings at the beginning of each Article, Section and subsection are solely for the convenience of the parties only and in no way define, limit, or enlarge the scope or meaning of this Lease. Except as otherwise provided in this Lease, all exhibits referred to herein are attached hereto and are incorporated herein by this reference. This Lease shall not be construed as if either Landlord or Tenant had prepared it, but rather as if both Landlord and Tenant had prepared it and Tenant hereby waives the provisions of California Civil Code Section 1654, as the same may be amended or re-codified or any similar or successor Law now or hereafter in effect. Any deletion of language from this Lease prior to its execution by Landlord and Tenant shall not be construed to raise any presumption, canon of construction or implication, including, without limitation, any implication that the parties intended thereby to state the converse of the deleted language.

30.8 Intentionally Deleted.

30.9 Governing Law. This Lease shall be governed by, interpreted under, and construed and enforced in accordance with the Laws of the State applicable to agreements made and to be performed wholly within the State.

30.10 Consent. Unless otherwise expressly set forth herein, all consents and decisions required or permitted of Landlord hereunder shall be granted, withheld and made in Landlord's reasonable discretion. Except for consent to a Transfer, which shall be governed by the provisions of Article 14 above, all consents and approvals required from Landlord hereunder or any request by Tenant which causes Landlord to actually incur attorneys' and/or consultants' fees shall be subject to the requirement that Landlord be reimbursed within thirty (30) days of Landlord's written demand for attorneys' and consultants' fees and costs incurred in connection therewith, not to exceed $1,500.00 in each instance. Except for consent to a Transfer, which shall be governed by Article 14 above, Tenant shall have no claim and hereby waives the right to any claim against Landlord for money damages by reason of any refusal, withholding, or delaying by Landlord of any consent, approval, statement, or satisfaction that Landlord has agreed shall be subject to a standard of reasonableness. In such event, Tenant's only remedy therefor shall be an action for specific performance, injunction, or declaratory judgment to enforce any right to such consent, approval, statement, or satisfaction.

30.11 Authority. Tenant hereby represents and warrants to Landlord that the individual(s) executing this Lease on Tenant's behalf are authorized to execute this Lease on Tenant's behalf

30.12 Duplicate Originals; Counterparts; Fax/Email Signatures. This Lease may be executed in any number of duplicate originals, all of which shall be of equal legal force and effect. Additionally, this Lease may be executed in counterparts, but shall become effective only after each party has executed a counterpart hereof; all said counterparts, when taken together, shall constitute the entire single agreement between the parties. This Lease may be executed by a party's signature transmitted by facsimile ("fax") or email, and copies of this Lease executed and delivered by means of faxed or emailed copies of signatures shall have the same force and effect as copies hereof executed and delivered with original wet signatures. All parties hereto may rely upon faxed or emailed signatures as if such signatures were original wet signatures. Any party executing and delivering this Lease by fax or email shall promptly thereafter deliver a counterpart signature page of this Lease containing said party's original signature. All parties hereto agree that a faxed or emailed signature page may be introduced into evidence in any proceeding arising out of or related to this Lease as if it were an original wet signature page.

30.13 Offer. The submission and negotiation of this Lease shall not be deemed an offer to enter the same by Landlord but the solicitation of such an offer by Tenant. Tenant agrees that its execution of this Lease constitutes a firm offer to enter the same which may not be withdrawn for a period of five (5) Business Days after delivery to Landlord (or such other period as may be expressly provided in any other agreement signed by the parties). During such period and in reliance on the foregoing, Landlord may, at Landlord's option, proceed with any plans, specifications, alterations, or improvements, and permit Tenant to enter the Premises; but such acts shall not be deemed an acceptance of Tenant's offer to enter this Lease, and such acceptance shall be evidenced only by Landlord's signing and delivering this Lease to Tenant.

30.14 Further Assurances. Landlord and Tenant each agree to execute any and all other documents and to take any further actions reasonably necessary to consummate the transactions contemplated hereby.

30.15 Financial Statements. In order to induce Landlord to enter into this Lease, Tenant agrees that it shall promptly furnish Landlord, from time to time (but no more than once per calendar year), upon Landlord's written request, with Tenant's most recent financial statements reflecting Tenant's financial condition. Tenant represents and warrants that all financial statements, records, and information furnished by Tenant to Landlord in connection with this Lease are true, correct, and complete in all material respects. Landlord shall keep any financial statements provided to Landlord under this Section 30.15 confidential and shall not disclose the same, other than to (i) Landlord's legal and accounting consultants, Landlord's property and asset managers or any prospective purchasers or lenders of the Project (and Landlord shall use commercially reasonable efforts to cause such parties to keep such financial statements confidential), or (ii) as required by Law or as may reasonably be required in the course of any judicial or governmental proceeding (including in response to a subpoena). Notwithstanding anything to the contrary herein, so long as Tenant or its direct or indirect parent company is a publicly traded corporation on a nationally recognized stock exchange, the foregoing obligation to deliver the statements shall be waived.

30.16 Recording. Tenant shall not record this Lease without the prior consent of Landlord, which consent may be withheld in Landlord's sole discretion.

30.17 Right to Lease. Landlord reserves the absolute right to create such other tenancies in the Project as Landlord shall determine to best promote the interests of the Project. Tenant does not rely on the fact, nor does Landlord represent, that any specific tenant or type or number of tenants shall, during the Term, occupy any space in the Project.

30.18 Severability. In the event any portion of this Lease shall be declared by any court of competent jurisdiction to be invalid, illegal or unenforceable, such portion shall be deemed severed from this Lease, and the remaining parts hereof shall remain in full force and effect, as fully as though such invalid, illegal or unenforceable portion had never been part of this Lease.

30.19 Survival. All indemnity and other unsatisfied obligations set forth in this Lease shall survive the termination or expiration hereof.

30.20 WAIVER OF TRIAL BY JURY. **TO THE EXTENT PERMITTED BY APPLICABLE LAW, THE PARTIES HEREBY IRREVOCABLY WAIVE ANY AND ALL RIGHT TO TRIAL BY JURY IN ANY LEGAL PROCEEDING ARISING OUT OF OR RELATING TO THIS LEASE, OR THE TRANSACTIONS OR MATTERS RELATED HERETO OR CONTEMPLATED HEREBY. THE PARTIES FURTHER HEREBY WAIVE THE RIGHT TO CONSOLIDATE ANY ACTION IN WHICH A JURY HAS BEEN WAIVED WITH ANY OTHER ACTION IN WHICH A JURY TRIAL HAS NOT BEEN WAIVED.**

30.21 Successors and Assigns. Subject to the terms and conditions of Article 14 of this Lease, this Lease shall apply to and bind the heirs, personal representatives, and permitted successors and assigns of the parties.

30.22 Integration of Other Agreements; Amendments. This Lease sets forth the entire agreement and understanding of the parties with respect to the matters set forth herein and supersedes all previous written or oral understandings, agreements, contracts, correspondence and documentation with respect thereto. Any oral representations or modifications concerning this Lease shall be of no force or effect. No provisions of this Lease may be amended or added to except by an agreement in writing signed by the parties or their respective successors in interest.

30.23 TIME OF THE ESSENCE. TIME IS OF THE ESSENCE OF THIS LEASE AND EACH AND EVERY TERM AND PROVISION HEREOF.

30.24 Waiver. The waiver by a party of any breach of any term, covenant, or condition of this Lease shall not be deemed a waiver of such term, covenant, or condition or of any subsequent breach of the same or any other term, covenant, or condition. No delay or omission in the exercise of any right or remedy of a party shall impair such right or remedy or be construed as a waiver of any default of the other party. Consent to or approval of any act by a party requiring consent or approval of the other party shall not be deemed to waive or render unnecessary such consent to or approval of any subsequent act. Any waiver must be in writing and shall not be a waiver of any other matter concerning the same or any other provision of this Lease.

30.25 No Surrender. No act or conduct of Landlord, including, without limitation, the acceptance of keys to the Premises, shall constitute an acceptance of the surrender of the Premises by Tenant before the expiration of the Term. Only a written notice from Landlord to Tenant shall constitute acceptance of the surrender of the Premises and accomplish a termination of the Lease.

30.26 Number and Gender. As used in this Lease, the neuter includes masculine and feminine, the singular includes the plural and use of the word "including" shall mean "including without limitation."

30.27 Days. The term "days," as used herein, unless otherwise specifically noted, shall mean actual days occurring, including Saturdays, Sundays and Holidays.

30.28 Joint and Several Liability. If Tenant consists of two (2) or more parties, each of such parties shall be liable for Tenant's obligations under this Lease, and all documents executed in connection herewith, and the liability of such parties shall be joint and several. Additionally, the act or signature of; or notice from or to, any one or more of such parties with respect to this Lease shall be binding upon each and all of the parties executing this Lease as Tenant with the same force and effect as if each and all of them had so acted or signed, or given or received such notice and, in the event more than one (1) entity comprising Tenant so acts, signs or gives or receives such notice, Landlord shall be entitled to rely on the first such act, signature, or giving or receiving of notice and any subsequent act, signature or giving or receiving of notice by any additional Tenant entity(ies) shall be null and void.

30.29 No Third Party Beneficiaries. Except as otherwise provided herein, no person or entity shall be deemed to be a third party beneficiary hereof, including but not limited to any brokers, and nothing in this Lease (either expressed or implied) is intended to confer upon any person or entity, other than Landlord and Tenant (and their respective nominees, successors and assigns), any rights, remedies, obligations or liabilities under or by reason of this Lease.

30.30 No Other Inducements. It is expressly warranted by each of the undersigned parties that no promise or inducement has been offered except as herein set forth and that this Lease is executed without reliance upon any statement or representation of any person or party or its representatives concerning the nature and extent of damages, costs and/or legal liability therefor.

30.31 Independent Covenants. This Lease shall be construed as though the covenants herein between Landlord and Tenant are independent and not dependent. Tenant hereby expressly waives the benefit of any Laws to the contrary and agrees that if Landlord fails to perform any of its obligations set forth herein, Tenant shall not be entitled to make any repairs or perform any acts hereunder at Landlord's expense or to any setoff of Rent, except as otherwise expressly set forth herein.

30.32 Intentionally Omitted.

30.33 OFAC Compliance.

30.33.1 As used herein "**Blocked Party**" shall mean any party or nation that (a) is listed on the Specially Designated Nationals and Blocked Persons List maintained by the Office of Foreign Asset Control, Department of the U.S. Treasury ("**OFAC**") pursuant to Executive Order No. 13224, 66 Fed. Reg. 49079 (Sept. 25, 2001) or other similar requirements contained in the rules and regulations of OFAC (the "**Order**") or in any enabling legislation or other Executive Orders in respect thereof (the Order and such other rules, regulations,

legislation, or orders are collectively called the "**Orders**") or on any other list of terrorists or terrorist organizations maintained pursuant to any of the rules and regulations of OFAC or pursuant to any other applicable Orders (such lists are collectively referred to as the "**Lists**"); or (b) has been determined by competent authority to be subject to the prohibitions contained in the Orders.

30.33.2 As a material inducement for Landlord entering into this Lease, Tenant warrants and represents that none of Tenant, any Affiliate of Tenant, or, to Tenant's knowledge, any beneficial owner of Tenant or any Affiliate of Tenant, other than owners of Tenant's publicly available stock who purchased such stock on open market (collectively, a "**Tenant Owner**"): (a) is a Blocked Party; (b) is owned or controlled by, or is acting, directly or indirectly, for or on behalf of, any Blocked Party; or (c) has instigated, negotiated, facilitated, executed or otherwise engaged in this Lease, directly or indirectly, on behalf of any Blocked Party. Tenant shall immediately notify Landlord if any of the foregoing warranties and representations becomes untrue during the Term.

30.33.3 Tenant shall not knowingly: (a) transfer any interest in Tenant or any Tenant Owner to any Blocked Party; or (b) make a Transfer to any Blocked Party.

30.33.4 If at any time during the Term (a) Tenant or any Tenant Owner becomes a Blocked Party or is convicted, pleads nolo contendere, or is indicted, arraigned, or custodially detained on charges involving money laundering or predicate crimes to money laundering; (b) any of the representations or warranties set forth in this Section become untrue; or (c) Tenant breaches any of the covenants set forth in this Section, the same shall constitute a Default. In addition to any other remedies to which Landlord may be entitled on account of such Default, Landlord may immediately terminate this Lease and refuse to pay any Allowance or other disbursements due to Tenant under this Lease.

30.34 Landlord's Disclosure Regarding Hazardous Materials. By signing this Lease, Tenant represents that Tenant has read and understood the statutorily required disclosures, if any, of Landlord set forth in Exhibit I to this Lease, which disclosures relate to certain hazardous substances, including without limitation Hazardous Materials, known or suspected to exist at the Premises, any Building or the Project. Landlord represents and warrants to Tenant that, to Landlord's actual knowledge (without investigation) as of the date of this Lease, Landlord has not received any written notice that the Premises is currently in violation of any applicable Environmental Laws. Additionally, if and to the extent required by applicable Environmental Laws, Landlord shall be responsible for the removal or remediation of any Hazardous Materials on the Property in violation of any applicable Environmental Laws, except where such removal or remediation is Tenant's responsibility pursuant to Article 7.

30.35 Existing Sublease. Landlord agrees that if the Master Lease (as defined in the Sublease) is terminated prior to its expiration for any reason other than a casualty or condemnation or a default by Tenant under the Sublease, then the Phase 2 Commencement Date shall occur concurrently with the occurrence of such termination. If the Master Lease (as defined in the Sublease) is terminated due to a casualty or condemnation, then the provisions of this Lease shall be deemed to apply as between Landlord and Tenant with respect to such casualty or condemnation as if both the Phase 1 Commencement Date and the Phase 2 Commencement Date had occurred as of the date of such casualty or condemnation (e.g., Landlord and Tenant will have the same restoration obligations and termination rights as to the entire Premises upon the occurrence of such casualty or condemnation affecting Phase 2).

[SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF the panics have executed this Lease, under seal, as of the date first• above written.

LANDLORD:

BETSY ROSS PROPERTY, LLC,
a Delaware limited liability company

Witness: _____

Date: _____

By: /s/ Shaoyuan Wang

Printed Name: Shaoyuan Wang

Title: President

Date: December 13, 2019

TENANT:

SHOCKWAVE MEDICAL, INC.,
a Delaware corporation

Witness: _____

Date: _____

By: /s/ Douglas E. Godshall

Printed Name: Douglas E. Godshall

Title: CEO

Date: December 13, 2019

Taxpayer ID No.: 27-0494101

ADDENDUM #1

LETTER OF CREDIT

A. Upon execution of this Lease, Tenant shall deliver to Landlord a letter of credit which provides by its terms that it may be drawn in Santa Clara, California, in the amount of $1,000,000 (the **"Initial LC Amount"**), issued by a bank approved by Landlord. On or prior to the Phase 2 Commencement Date, Tenant shall deliver to Landlord another letter of credit (or an amendment to the original letter of credit) which provides by its terms that it may be drawn in Santa Clara, California, in the amount of $500,000 (the **"Additional LC Amount"**, together with the Initial LC Amount, the "LC Amount", which for the avoidance of doubt, shall mean the Initial LC Amount prior to the Phase 2 Commencement Date and shall mean collectively, the Initial LC Amount and the Additional LC Amount on and after the Phase 2 Commencement Date). Landlord hereby approves of Silicon Valley Bank as the issuing bank. Such letters of credit, together with any additional letters of credit required herein, and any renewals or replacements thereof (collectively, the **"Letter of Credit"**) shall be clean, unconditional, transferable, irrevocable, contain "evergreen provisions" requiring annual automatic renewal with a final expiration date not earlier than forty-five (45) days after the end of the Term and otherwise in the form attached as Appendix 1, and, in any event, subject to Landlord's prior written approval (as determined in Landlord's reasonable discretion).

B. Tenant shall keep the Letter of Credit in full force and effect at all times during the Term, as the same may be extended (and during any holding over by Tenant after the Term) and for not less than forty-five (45) days after the end of the Term (and any hold-over period). The Letter of Credit shall have an initial expiration date not sooner than twelve (12) months from the issuance thereof. The Letter of Credit must by its express terms automatically renew on an annual basis for additional terms of twelve (12) months with a final expiration date not earlier than forty-five (45) days after the end of the Term. If, at any time prior to the end of the Term, (i) the Letter of Credit then held by Landlord would by its terms expire, or (ii) the issuer shall notify Landlord that the Letter of Credit then held by Landlord will not be renewed, Tenant shall deliver a replacement letter of credit to Landlord in form and content identical to the Letter of Credit except as to expiration and renewal dates not later than thirty (30) days prior to the expiration of the then current Letter of Credit. Tenant shall be responsible for obtaining such replacement Letter of Credit at its sole expense. If Tenant shall fail to deliver a replacement letter of credit in strict accordance with the foregoing requirements, Landlord shall thereupon be authorized, without notice to Tenant or providing any opportunity to cure to Tenant, each and all of which are hereby irrevocably waived, to immediately draw the entire amount then remaining available under the Letter of Credit.

C. The Letter of Credit shall be issued by a commercial bank acceptable to Landlord (1) that is chartered under the laws of the United States, any State thereof or the District of Columbia, and which maintains deposits insured by the Federal Deposit Insurance Corporation; and (2) whose long-term, unsecured and unsubordinated debt obligations are rated "investment grade" by Moody's Investors Service, Inc. (Moody's) or Standard & Poor's Ratings Services (S&P) or their respective successors (the "Rating Agencies") (which shall mean Baa3 or higher by Moody's and BBB- or higher by Standard & Poor's), or, if not rated by the Rating Agencies, having a BauerFinancial, Inc. rating of at least four (4) stars (collectively, the **"LC Issuer Requirements"**). If at any time the LC Issuer Requirements are not met, Tenant shall, within ten (10) Business Days after transmittal of written notice by Landlord to Tenant, deliver to Landlord a replacement Letter of Credit in form and content identical to the Letter of Credit issued by a bank that then satisfies the LC Issuer Requirements (and Tenant's failure to do so shall entitle Landlord to draw upon the Letter of Credit). In addition to and not in limitation or derogation of all rights and remedies accorded to Landlord upon the occurrence of a Default under this Lease and/or by applicable Law, Landlord shall thereupon be authorized, without notice to Tenant or providing any opportunity to cure to Tenant, each and all of which are hereby irrevocably waived, to immediately draw the entire amount then remaining available under the Letter of Credit.

D. If the issuer of any letter of credit held by Landlord is insolvent or is placed into receivership or conservatorship by the Federal Deposit Insurance Corporation, or any successor or similar entity, or if a trustee, receiver or liquidator is appointed for the issuer, then, effective as of the date of such occurrence, said Letter of Credit shall be deemed to not satisfy the LC Issuer Requirements, and Tenant shall, within ten (10) Business Days after transmittal of written notice by Landlord to Tenant, (i) deposit with Landlord in an amount equal to the LC Amount or (ii) deliver to Landlord a replacement Letter of Credit in form and content identical to the Letter of Credit issued by a bank that then satisfies the LC Issuer Requirements (and Tenant's failure to do so shall, notwithstanding anything in this Lease to the contrary, constitute a Default for which there shall be no notice or grace or cure periods being applicable thereto other than the aforesaid ten (10) Business Day period).

E. In the event of a transfer of Landlord's interest in the Premises, Landlord shall transfer the Letter of Credit to the transferee and, provided the transferee assumes in writing all of Landlord's obligations hereunder, Landlord shall thereupon and without any further agreement between the parties, be forever released by Tenant from all liability therefor, and it is agreed that the provisions hereof shall apply to every transfer of said Letter of Credit to a new landlord.

F. In the event of the occurrence of a Default, in addition to and not in limitation or derogation of any or all of its other remedies contained in this Lease and/or applicable Law, Landlord shall have the right (but not the obligation) to immediately draw all or any part of the amount then remaining available under the Letter of Credit. In the event of any such draw, Tenant shall forthwith provide Landlord with an additional letter of credit in an amount sufficient to restore the aggregate amounts of the Letter(s) of Credit and LC Proceeds (if any) held by Landlord to the LC Amount.

G. Landlord may use or apply the whole or any part of the amounts drawn on the Letter of Credit (the **"LC Proceeds"**) for the payment of Tenant's obligations under this Lease. At Landlord's election, any LC Proceeds not otherwise applied to amounts then due Landlord shall be held to secure the prompt, full, and faithful payment and performance by Tenant of each and all of the obligations of Tenant under this Lease. Tenant's obligation to furnish the Letter of Credit and any use, application or retention by Landlord of all or any part of the LC Proceeds shall not be deemed in any way to constitute liquidated damages for any default by Tenant, or to limit the remedies to which Landlord is otherwise entitled under the terms of this Lease and/or applicable Law. In the event the LC Proceeds are reduced below the LC Amount by any such use or application, Tenant shall deposit with Landlord, within ten (10) days after notice, an amount sufficient to restore the amount of the LC Proceeds to the LC Amount. Landlord shall not be required to keep the LC Proceeds separate from Landlord's general funds or pay interest on the LC Proceeds. Provided Tenant has performed all of its obligations under this Lease, any remaining portion of the LC Proceeds shall be returned to Tenant within thirty (30) days subsequent to the Expiration Date. No trust or fiduciary relationship is created herein between Landlord and Tenant with respect to the LC Proceeds. If Landlord transfers the Premises during the Term of this Lease, Landlord shall pay the LC Proceeds to Landlord's successor-in-interest, in which event the transferring Landlord shall be released from all liability for the return of the LC Proceeds.

H. Landlord shall return the Letter of Credit to Tenant within forty-five (45) days following the expiration of the Term.

I. Notwithstanding the foregoing, provided that no Default then exists, Tenant shall have the right to reduce the LC Amount as follows:

Date	1st LOC	2nd LOC	Total
12/13/2019 – 8/31/2022	$1,000,000.00	$0.00	$1,000,000.00
9/1/2022 – 8/31/2023	$1,000,000.00	$500,000.00	$1,500,000.00
9/1/2023 – 8/31/2024	$887,542.40	$400,000.00	$1,287,542.40
9/1/2024 – 8/31/2025	$775,084.80	$300,000.00	$1,075,084.80
9/1/2025 – 8/31/2026	$662,627.20	$200,000.00	$862,627.20
9/1/2026 – 8/31/2027	$550,169.60	$100,000.00	$650,169.60
9/1/2027 – 12/12/2027	$437,712.00	$0.00	$437,712.00

Any such reduction of the LC Amount may be accomplished by Tenant's delivery to Landlord of a new Letter of Credit or an amendment to the existing Letter of Credit. If Tenant elects to deliver a new Letter of Credit as aforesaid, then Landlord will promptly return to Tenant the original Letter of Credit and will use commercially reasonable efforts to coopete with Tenant in effecting the termination of such original Letter of Credit. Landlord shall also reasonably cooperate with Tenant and the issuing bank to execute any further documents required to accommodate the foregoing reductions in the LC Amount.

APPENDIX 1

IRREVOCABLE STANDBY LETTER OF CREDIT NUMBER_____

ISSUE DATE:_____

ISSUING BANK:
SILICON VALLEY BANK
3003 TASMAN DRIVE
2ND FLOOR, MAIL SORT HF210
SANTA CLARA, CALIFORNIA 95054

BENEFICIARY:
BETSY ROSS PROPERTYS, LLC
C/O ALHOUSE DEATON
230 SOUTH CALIFORNIA AVENUE, SUITE 212
PALO ALTO, CA 94306

APPLICANT:
SHOCKWAVE MEDICAL, INC.
5403 BETSY ROSS DRIVE
SANTA CLARA, CA 95054

AMOUNT:	US$[1,000,000.00(ONE MILLION AND 00/100 U.S. DOLLARS)]
EXPIRATION DATE:	SVB WILL PUT A SPECIFIC DATE HERE THAT'S 1 YEAR ISSUANCE HERE
PLACE OF EXPIRATION:	-SANTA CLARA, CALIFORNIA

DEAR SIR/MADAM:

WE HEREBY ESTABLISH IN YOUR FAVOR OUR IRREVOCABLE LETTER OF CREDIT NO._____ IN THE MAXIMUM AGGREGATE AMOUNT OF [ONE MILLION AND 00/100 US DOLLARS ($1,000,000.00)] FOR THE ACCOUNT OF SHOCKWAVE MEDICAL, INC. (TENANT). DEMANDS FOR PAYMENT UP TO THE MAXIMUM AGGREGATE AMOUNT AVAILABLE UNDER THIS LETTER OF CREDIT UPON PRESENTATION OF BENEFICIARY'S ONE OR MORE DRAFTS IN THE FORM OF ANNEX A ATTACHED HERETO SIGNED BY YOUR BENEFICIARY'S OFFICER OR IF THIS LETTER OF CREDIT IS TRANSFERRED, BY AN OFFICER OF ANY TRANSFEREE BENEFICIARY.

EACH DRAFT DRAWN HEREON SHALL BE ADDRESSED TO US, REFERENCE THIS LETTER OF CREDIT NO. _____, SPECIFY THE AMOUNT OF SUCH DRAFT AND OTHERWISE BE IN THE FORM OF ANNEX A ATTACHED HERETO AND BE PRESENTED TOGETHER WITH THE FOLLOWING STATEMENT (WITH THE AMOUNT OF THE PAYMENT REQUEST AND WIRE TRANSFER INSTRUCTIONS COMPLETED):

"BENEFICIARY HEREBY DRAWS ON LETTER OF CREDIT NO. _____ IN THE AMOUNT OF FUNDS IN RESPECT OF THIS DRAWING SHALL BE TRANSMITTED BY WIRE TRANSFER TO _____ ROUTING NO. _____, ACCOUNT NO. FOR CREDIT TO THE ACCOUNT OF _____ (INSERT BENEFICIARY OR TRANSFEREE) ."

NO FURTHER INFORMATION SHALL BE REQUIRED FOR ANY SUCH PAYMENT DEMAND HEREON.

PARTIAL AND MULTIPLE DRAWS ARE PERMITTED.

PAYMENT AGAINST CONFORMING PRESENTATIONS HEREUNDER PRIOR TO 10:00 A.M. CALIFORNIA TIME, ON A BUSINESS DAY SHALL BE MADE BY BANK DURING NORMAL BUSINESS HOURS OF THE BANK'S OFFICE ON THE NEXT SUCCEEDING BUSINESS DAY. PAYMENT AGAINST CONFORMING PRESENTATIONS HEREUNDER AFTER 10:00 A.M. CALIFORNIA TIME, ON A BUSINESS DAY SHALL BE MADE BY BANK DURING NORMAL BUSINESS HOURS OF THE BANK'S OFFICE ON THE SECOND SUCCEEDING BUSINESS DAY.

AS USED HEREIN, THE PERM "BUSINESS DAY" MEANS A DAY ON WHICH WE ARE OPEN AT OUR ABOVE ADDRESS IN SANTA CLARA, CALIFORNIA TO CONDUCT OUR LETTER OF CREDIT BUSINESS AND "BUSINESS DAY" MEANS ANY DAY ON WHICH BANKS IN SANTA CLARA, CA ARE NOT AUTHORIZED OR REQUIRED BY LAW TO CLOSE.

THIS LETTER OF CREDIT SHALL INITIALLY EXPIRE ON _____, 20 ___SUCH EXPIRATION DATE SHALL BE AUTOMATICALLY EXTENDED WITHOUT NOTICE OR AMENDMENT FOR PERIODS OF ONE (1) YEAR, BUT IN NO EVENT LATER THAN _____20 __, UNLESS AT LEAST SIXTY (60) DAYS BEFORE ANY EXPIRATION DATE, WE NOTIFY YOU BY REGISTERED MAIL OR OVERNIGHT COURIER SERVICE AT YOUR ADDRESS ABOVE, THAT THIS LETTER OF CREDIT WILL NOT BE EXTENDED BEYOND THE THEN-CURRENT EXPIRATION DATE. UPON RECEIPT BY YOU OF SUCH NOTIFICATION, YOU MAY DRAW ON THIS LETTER OF CREDIT AS SET FORTH ABOVE, PROVIDED THAT THE AMOUNT OF YOUR DRAW SHALL NOT EXCEED THE TOTAL AMOUNT THEN AVAILABLE FOR PAYMENT HEREUNDER.

DRAW REQUESTS MAY BE SUBMITTED IN PERSON, BY COURIER, OR BY MAIL TO OUR ADDRESS STATED ABOVE.

THIS LETTER OF CREDIT IS TRANSFERABLE ONE OR MORE TIMES, BUT IN EACH INSTANCE ONLY TO A SINGLE BENEFICIARY AS TRANSFEREE AND ONLY UP TO THE THEN AVAILABLE AMOUNT, ASSUMING SUCH TRANSFER TO SUCH TRANSFEREE WOULD BE IN COMPLIANCE WITH THEN APPLICABLE LAW AND REGULATION, INCLUDING BUT NOT LIMITED TO THE REGULATIONS OF THE U. S. DEPARTMENT OF TREASURY AND U. S. DEPARTMENT OF COMMERCE. AT THE TIME OF TRANSFER, THE ORIGINAL LETTER OF CREDIT AND ORIGINAL AMENDMENT(S), IF ANY, MUST BE SURRENDERED TO US AT OUR ADDRESS INDICATED IN THIS LETTER OF CREDIT TOGETHER WITH OUR TRANSFER FORM ATTACHED HERETO AS ANNEX "B" DULY EXECUTED. APPLICANT SHALL PAY OUR TRANSFER FEE OF 'A OF ¼ OF 1% OF THE TRANSFER AMOUNT (MINIMUM US$250.00) UNDER THIS LETTER OF CREDIT.

IF ANY INSTRUCTIONS ACCOMPANYING A DRAWING UNDER THIS LETTER OF CREDIT REQUEST THAT PAYMENT IS TO BE MADE BY TRANSFER TO YOUR ACCOUNT WITH ANOTHER BANK, WE WILL ONLY EFFECT SUCH PAYMENT BY FED WIRE TO A U.S. REGULATED BANK, AND WE AND/OR SUCH OTHER BANK MAY RELY ON AN ACCOUNT NUMBER SPECIFIED IN SUCH INSTRUCTIONS EVEN IF THE NUMBER IDENTIFIES A PERSON OR ENTITY DIFFERENT FROM THE INTENDED PAYEE.

THIS LETTER OF CREDIT IS SUBJECT TO THE INTERNATIONAL STANDBY PRACTICES (ISP98), INTERNATIONAL CHAMBER OF COMMERCE, PUBLICATION NO. 590.

AUTHORIZED SIGNATURE

AUTHORIZED SIGNATURE

ANNEX A

Form of
SIGHT DRAFT

DATE: _____ REF. NO.: _____

AT SIGHT

PAY TO THE ORDER
OF _____ US$ _____

"DRAWN UNDER _____, _____ IRREVOCABLE STANDBY LETTER OF CREDIT
NUMBER NO. _____ DATED _____,200 _____"

TO:

_____ _____
_____
_____ (INSERT NAME OF BENEFICIARY)
_____ _____
_____ _____
_____
AUTHORIZED SIGNATURE

ANNEX "B"
TRANSFER FORM

DATE: _____

TO: SILICON VALLEY BANK
3003 TASMAN DRIVE
SANTA CLARA, CA 95054
ATTN:INTERNATIONAL DIVISION.
STANDBY LETTERS OF CREDIT

RE: IRREVOCABLE STANDBY LETTER OF CREDIT
NO. _____ ISSUED BY
SILICON VALLEY BANK, SANTA CLARA
L/C AMOUNT:

GENTLEMEN:

FOR VALUE RECEIVED, THE UNDERSIGNED BENEFICIARY HEREBY IRREVOCABLY TRANSFERS TO:

_____
(NAME OF TRANSFEREE)

_____
(ADDRESS)

ALL RIGHTS OF THE UNDERSIGNED BENEFICIARY TO DRAW UNDER THE ABOVE LETTER OF CREDIT UP TO ITS AVAILABLE AMOUNT AS SHOWN ABOVE AS OF THE DATE OF THIS TRANSFER.

BY THIS TRANSFER, ALL RIGHTS OF THE UNDERSIGNED BENEFICIARY IN SUCH LETTER OF CREDIT ARE TRANSFERRED TO THE TRANSFEREE. TRANSFEREE SHALL HAVE THE SOLE RIGHTS AS BENEFICIARY THEREOF, INCLUDING SOLE RIGHTS RELATING TO ANY AMENDMENTS, WHETHER INCREASES OR EXTENSIONS OR OTHER AMENDMENTS, AND WHETHER NOW EXISTING OR HEREAFTER MADE. ALL AMENDMENTS ARE TO BE ADVISED DIRECTLY TO THE TRANSFEREE WITHOUT NECESSITY OF ANY CONSENT OF OR NOTICE TO THE UNDERSIGNED BENEFICIARY.

THE ORIGINAL OF SUCH LETTER OF CREDIT IS RETURNED HEREWITH, AND WE ASK YOU TO ENDORSE THE TRANSFER ON THE REVERSE THEREOF, AND FORWARD IT DIRECTLY TO THE TRANSFEREE WITH YOUR CUSTOMARY NOTICE OF TRANSFER.

SIGNATURE AUTHENTICATED

The names(s), title(s), and signature(s) conform to that/those on file with us for the company and the signature(s) is/are authorized to execute this instrument.

_____
(Name of Bank)

_____
(Address of Bank)

_____
(City, State, Zip Code)

_____
(Print Authorized Name and Title)

_____
(Authorized Signature)

_____
(Telephone Number)

_____
(BENEFICIARY'S NAME)

By: _____

Printed Name: _____

Title: _____

EXHIBIT B—SITE PLAN OF PROJECT

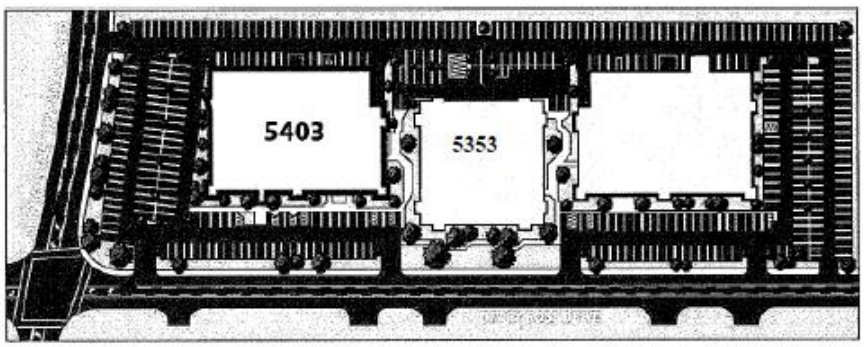

EXHIBIT C — LEGAL DESCRIPTION

Legal Description of Property

Real property in the City of Santa Clara, County of Santa Clara, State of California, described as follows:

PARCEL ONE:

ALL OF PARCEL 105 AS SHOWN UPON THAT CERTAIN MAP ENTITLED, “PARCEL MAP MARRIOTT BUSINESS PARK UNIT NO. 2 IMPROVEMENT PROJECT NO. 174 BEING PORTIONS OF THE -RANCHO PASTORIA DE LAS BORREGAS AND THE RANCHO ULISTAC AND IN SECTIONS 16, T6S. R1 W, M.D.M.”, WHICH MAP WAS I-11,ED FOR RECORD IN THE OFFICE OF THE RECORDER OF THE COUNTY OF SANTA CLARA, STATE OF CALIFORNIA ON FEBRUARY 17, 1978 IN BOOK 413

OF MAPS, AT PAGES 13, 14 AND 15.

PARCEL TWO:

ALL OF PARCEL 106 AS SHOWN UPON THAT CERTAIN MAP ENTITLED, “PARCEL MAP MARRIOTT BUSINESS PARK UNIT NO. 2 IMPROVEMENT PROJECT NO. 174 BEING PORTIONS OF THE RANCHO PASTORIA DE LAS BORREGAS AND THE RANCHO ULISTAC AND IN SECTIONS 16, T6S. R1W, ADM.”, WHICH MAP WAS FILED FOR RECORD IN THE OFFICE OF THE RECORDER OF TIM COUNTY OF SANTA CLARA, STATE OF CALIFORNIA ON FEBRUARY 17, 1978 IN BOOK 413 OF MAPS, AT PAGES 13, 14 AND 15.

APN: 104-49019

EXHIBIT D - TERM CERTIFICATION

The undersigned, as Tenant, under that certain lease dated [_____] (the "**Lease**"), with [_____], as Landlord, hereby certifies as follows:

1. That the undersigned has entered into occupancy of the Premises described in the Lease.

2. That the Lease is in full force and effect and has not been assigned, modified, supplemented or amended in any way, except as follows:_____.

3. That the Lease represents the entire agreement between the parties as to said leasing.

4. That the Commencement Date for Phase____of the Lease is:_____. The Lease expires on_____.

5. That, to Tenant's current actual knowledge, all improvements to have been constructed or completed by Landlord have been substantially completed in a satisfactory manner and all conditions of the Lease to be performed by Landlord and necessary to the enforceability of the Lease have been satisfied.

6. That, to Tenant's current actual knowledge, there are no defaults by either Tenant or Landlord under the Lease.

7. That no rents have been prepaid, other than as provided in the Lease.

8. That, to Tenant's current actual knowledge, on this date there are no existing defenses or offsets, which the undersigned has against the enforcement of the Lease by Landlord.

9. That the undersigned has received set(s) of keys to Phase_____on this date.

EXECUTED this_____day of_____ , 20___.

TENANT:

[_____]

a [_____]

By: _____

Printed Name: _____

Title: _____

EXHIBIT E — CONSTRUCTION

This Exhibit sets forth the terms and conditions relating to construction of the initial tenant improvements in each Construction Phase (as defined below). All references in this Exhibit to capitalized terms or "this Lease" shall mean the relevant portion of the lease to which this Exhibit is attached and of which this Exhibit forms a part.

1. Definitions.

a. "**Allowance**" shall mean each of the three (3) one-time tenant improvement allowances applicable to each Construction Phase in the amounts set forth on the Lease Summary, namely, the 5353 First Floor Allowance, 5353 Second Floor Allowance, and 5403 Allowance.

b. "**Approved Working Drawings**" shall have the meaning set forth in Exhibit E-1.

c. "**Construction Phase**" means the Tenant Improvements applicable to each of the 5353 Second Floor (the "**5353 2nd Floor Construction Phase**"), Phase 2 (the "**Phase 2 Construction Phase**"), and the 5353 First Floor (the "**5353 1st Floor Construction Phase**"; each of the 5353 2nd Floor Construction Phase, the Phase 2 Construction Phase Construction Phase and the 5353 1st Floor Construction Phase, a "**Construction Phase**").

d. "**Excess Costs**" shall mean with respect to each Construction Phase, the Total Construction Costs for such Construction Phase in excess of the applicable Allowance for such Construction Phase.

e. "**Tenant Improvements**" shall mean the improvements to each Construction Phase as approved by Landlord in accordance with Exhibit E-1.

f. "**Total Construction Costs**" shall mean with respect to each Construction Phase, the entire cost of constructing the Tenant Improvements for such Construction Phase, including space planning and preparation of the Approved Working Drawings, permit costs, labor and materials, electrical and other utility usage during construction, additional janitorial services, trash removal, general tenant signage, related taxes and insurance costs, the fees of any construction managers and the Landlord Supervision Fee set forth in the Lease Summary, as the same may increase as a result of any change orders. Tenant acknowledges and agrees that the costs to purchase and install any of Tenant's Property, including without limitation the portable clean rooms and machine shop, shall be not included in Total Construction Costs.

2. Allowances.

a. Tenant must request the applicable Allowance for each Construction Phase and satisfy all conditions set forth in Section 2(d) below for such Allowance before the date (i) that is thirty-six (36) months after the Phase 1 Commencement Date with respect to the 5353 First Floor Allowance and the 5353 Second Floor Allowance, and (ii) that is thirty-six (36) months after the Phase 2 Commencement Date with respect to the 5403 Allowance, or such Allowance shall be deemed forfeited with no further obligation by Landlord with respect thereto. All Tenant Improvements for which the Allowance has been made available shall be deemed Landlord's property. Tenant shall not be entitled to use any portion of the applicable Allowance for a Construction Phase for anything other than Total Construction Costs for such Construction Phase.

b. In no event shall Landlord be obligated to make disbursements with respect to the Tenant Improvements for a Construction Phase in an amount that exceeds the Allowance applicable to such Construction Phase, and in no event shall Tenant be entitled to any excess, credit, deduction or offset against Rent for any unused portion of the applicable Allowance. The Allowance shall not be disbursed to Tenant, but shall be applied by Landlord to the payment of the Total Construction Costs, if, as, and when the cost of the Tenant Improvements is actually incurred as set forth below.

c. Intentionally deleted.

d. Landlord shall disburse the applicable Allowance proceeds upon Tenant's written application in two installments for each Construction Phase, as follows: one-half (1/2) within thirty (30) days of written certification by Landlord's construction manager that the work for such Construction Phase is fifty percent (50%) complete, and the balance within thirty (30) days of receipt by Landlord of lien waivers and a final certificate of occupancy for the applicable portion of the Premises for such Construction Phase; provided, that Landlord shall not be required to disburse proceeds of the 5353 Allowances prior to the date that is twelve (12) months after the Phase 1 Commencement Date. It shall be a condition to the obligation of Landlord to make such disbursements that Tenant shall have provided Landlord with appropriate requests for payment, invoices, contractors' affidavits and sworn statements, contractors' and subcontractors' lien waivers, and other documents as may be reasonably required by Landlord to demonstrate the correctness of the amount requested by Tenant.

3. Amenity Space. Tenant may perform certain additions, alterations, or improvements ("**Amenity Space Improvements**") to certain portions of the Common Area directly between the Buildings as approved by Landlord ("**Amenity Space**"). Each of Landlord and Tenant shall contribute one-half (1/2) of the total cost of such Amenity Space Improvements ("**Amenity Space Cost**") up to the first Fifty Thousand Dollars ($50,000) of such costs; provided that in the event the Amenity Space Cost exceeds $50,000, Tenant shall pay the excess from the Allowance or Tenant's other funds. Such Amenity Space Improvements shall constitute Tenant Improvements for all purposes under this Lease, including Landlord's approval rights pursuant to this Exhibit and Tenant's surrender obligations, except that Landlord shall maintain such Amenity Space Improvements as portions of the Common Area and as otherwise provide in this Paragraph 3.

4. 5353 Building. As part of the Tenant Improvements for the 5353 Building, Tenant, at its cost and expense, shall have the right to (and shall be required to the extent required by applicable Law): (i) update or expand the existing restrooms in the 5353 Building to meet Tenant's intended occupancy of the Premises and to meet ADA handicapped accessibility, (ii) provide Title 24 upgrades as required by Law, (iii) provide a point-of-connection to the 5353 Building's life-safety system to have sufficient capacity for Tenant's life-safety devices installed in accordance with normal office occupancy requirements, and (iv) replace the HVAC system in the 5353 Building. The scope and cost of the work shall be subject to Landlord's approval under this Exhibit.

5. Miscellaneous.

a. Unless otherwise indicated, all references herein to a "number of days" shall mean and refer to calendar days. If any item requiring approval is timely disapproved by Landlord, the procedure for preparation of the document and approval thereof shall be repeated until Landlord approves the document.

6. Compliance with Laws. Tenant shall construct the Tenant Improvements in compliance with all applicable Laws (including the ADA and Title 24), including (except as provided in Section 7 of Exhibit E-1) performing any alterations to other portions of any Building or Project necessitated by the Tenant Improvements, and all costs incurred for such compliance work shall be included in the Total Construction Costs

EXHIBIT E-1 — TENANT IMPROVEMENT WORK

1. Approval of Tenant Improvements; Preparation of Working Drawings.

a. Tenant shall retain an architect/space planner approved by Landlord ("**Architect**") to prepare the construction drawings for the Tenant Improvements for each Construction Phase. Tenant shall retain the engineering consultant approved by Landlord ("**Engineer**") to prepare all plans and engineering working drawings related to the structural, mechanical, electrical, plumbing, HVAC, life safety, and sprinkler work to the extent necessary for such Tenant Improvements. The plans and drawings to be prepared by Architect and the Engineer hereunder shall be known collectively as the "**Working Drawings**." All Working Drawings shall comply with the drawing format and specifications as determined by Landlord. It shall be the responsibility of Tenant and Architect to verify, in the field, the dimensions and conditions as shown on the relevant portions of the base Building plans. Notwithstanding the foregoing, Landlord hereby approves the following vendors, contractors and design professionals (including the Engineer and Architect) with respect the Tenant Improvements:

HVAC/Process Plumbing (also approved as an Engineer): Deharo Mechanical
280 Cochrane Cir, Morgan Hill, CA 95037

Electrical (also approved as an Engineer): Silver Creek Electric
280 Cochrane Cir B, Morgan Hill, CA 95037

Flooring:
East Bay Flooring
2215 National Ave, Hayward, CA 94545

Architect
Kobza2
2083 Old Middlefield Way Mountain View, CA 94043

b. Tenant, the Architect and the Engineers shall complete the architectural and engineering drawings for such Construction Phase, and the final architectural working drawings in a form that is sufficient to allow contractors to bid on the work and to obtain all applicable permits (collectively, "**Final Working Drawings**") and shall submit the same to Landlord for Landlord's approval. Landlord shall notify Tenant whether it approves or disapproves of the submitted Final Working Drawings within five (5) Business Days after Landlord's receipt thereof. If Landlord disapproves of such Final Working Drawings, then Landlord shall notify Tenant thereof specifying in reasonable detail the reasons for such disapproval and the changes required to obtain Landlord's approval. Tenant shall revise such Final Working Drawings to address Landlord's objections and submit the revised Final Working Drawings to Landlord for its review and approval. Landlord shall notify Tenant in writing whether it approves or disapproves of the revised Final Working Drawings within five (5) Business Days after its receipt thereof. If Landlord again disapproves of such Final Working Drawings, then Landlord shall notify Tenant thereof specifying in reasonable detail the reasons for such disapproval and the foregoing revision process shall be repeated until Landlord approves the revised Final Working Drawings. If Landlord fails to approve or disapprove of any Final Working Drawings within such five (5) Business Day period, Landlord shall be deemed to have approved such Final Working Drawings.

c. Landlord must have approved the Final Working Drawings ("**Approved Working Drawings**") for such Construction phase prior to the commencement of the construction of the Tenant Improvements for such Construction Phase. Tenant shall reimburse Landlord for its reasonable out-of-pocket cost and expense, if any, of third-party experts Landlord may require to review any and all the Working Drawings.

2. Permits. Upon receipt of Landlord's approval of the Approved Working Drawings for a Construction Phase, Tenant shall submit such Approved Working Drawings to the appropriate municipal authorities for all applicable building permits necessary for the Tenant Improvements in such Construction Phase ("**Permits**"). Neither Landlord nor Landlord's consultants shall be responsible for obtaining any building permit or certificate of occupancy for the Construction Phase or Building and the obtaining of the same shall be Tenant's responsibility; provided, however, that Landlord shall, in any event, cooperate with Tenant in executing permit applications and performing other ministerial acts reasonably necessary to enable Tenant to obtain any Permits.

3. Intentionally deleted.

4. Construction. Tenant shall retain contractors, on behalf of Tenant, to construct the Tenant Improvements in each Construction Phase in accordance with the Approved Working Drawings for such Construction Phase. Tenant shall notify Landlord upon completion of the Tenant Improvements, and shall, at its expense, obtain and deliver to Landlord a certificate of occupancy or other final governmental sign-off of the Tenant Improvements from the appropriate governmental authority for the Premises.

5. Time Deadlines. Tenant and Landlord shall meet upon reasonable request to discuss Tenant's progress in connection with the construction of the Tenant Improvements and Landlord's progress in connection with the Landlord's Work set forth in Section 7 below.

6. Landlord Delay. The term "**Landlord Delay**" shall mean (i) the failure of Landlord to provide any responses required of Landlord within the time periods set forth in this Exhibit E-1 or (ii) any actual delay in Tenant's ability to occupy the applicable portion of the Premises following completion of the applicable Construction Phase (including delays in the issuance of a certificate of occupancy or other governmental issued permit required for occupancy or completion of the applicable Construction Phase) caused by Landlord's failure to diligently perform the Landlord's Work set forth in Section 7 below (excluding delays caused by Force Majeure); provided, however, (1) a Landlord Delay shall not include any of the foregoing delays to the extent caused by the acts, omissions, or misconduct of Tenant or any Tenant Related Party, and (2) no Landlord Delay shall be deemed to have occurred unless Tenant has given Landlord written notice that an act or omission on the part of Landlord is about to occur or has occurred which will cause a delay in the completion of the Tenant Improvements and Landlord has failed to cure such delay within one (1) Business Day after Landlord's receipt of such notice, in which case the number of days of delay after such notice shall be a Landlord Delay. Tenant shall be entitled to one (1) day of Base Rent abatement applicable to the portion of the Premises that includes the affected Construction Phase, for each day of Landlord Delay.

7. Landlord's Work. Landlord shall construct promptly following the Phase 1 Commencement Date and no later than Tenant's completion of the Tenant Improvements, and, except as provided below to the contrary, pay for the entire cost of constructing the following work ("**Landlord's Work**"), at Landlord's sole cost and expense, to Landlord's Building standard condition, using Building standard procedures, methods, materials, colors and finishes: (i) with respect to the Project, (A) maintain and deliver the parking lots, exterior lighting, landscaping, wayfinding signage, irrigation, utilities, sidewalks, and driveways in good condition, and (B) complete, maintain and update the ADA path of travel from the parking lots to the Buildings as required by applicable Laws, (ii) with respect to the Buildings, maintain and deliver the roof, exterior walls, foundation and structure of the Buildings in good condition and leak-free, and (iii) with respect to the 5353 Building, deliver the Premises broom-clean and free of prior tenant's furniture, fixtures, equipment and possession, and provide telephone closets free of the prior tenant's cabling. In the event that any Pre-Existing Hazardous Materials (as defined in Section 7.1 of the Lease) (other than any asbestos-containing materials (**"ACMs"**)) are required to be remediated under Environmental Law in connection with or as a result of the performance of the Tenant Improvements, Landlord shall perform any such

remediation required by applicable Environmental Law at its sole cost and expense, and, any actual delay in the completion of the Tenant Improvements or Tenant's ability to legally occupy the Premises due to such remediation shall be deemed to be a Landlord Delay; provided that (i) if ACMs are likely to be disturbed in the course of the Tenant Improvements, Tenant shall encapsulate or remove the ACMs in accordance with an approved asbestos-removal plan and otherwise in accordance with all applicable Environmental Laws, including giving all notices required by California Health and Safety Code Sections 25915-25919.7 and (ii) if AMCs are likely to be disturbed in the course of Landlord's Work, Landlord shall encapsulate or remove such AMCs in accordance with all applicable Environmental Laws, including giving all notices required by California Health and Safety Code Sections 25915-25919.7.

8. Additional Provisions Regarding the Performance of the Tenant Improvements.

a. Concurrently with Tenant's submittal of the Working Drawings, Tenant shall submit (A) the names and addresses of Tenant's proposed contractors (and said contractors' subcontractors) and materialmen providing specialty materials to be engaged by Tenant for the Tenant Improvements (individually, a "Tenant Contractor," and collectively, "Tenant's Contractors"); and (B) certificates of insurance, evidencing the insurance required under this Exhibit E-1. Landlord's review and approval of any plans and specifications for the Tenant Improvements shall create no responsibility or liability on the part of Landlord for their completeness, design sufficiency, or compliance with all Laws.

b. All Tenant Improvements shall be (a) performed under a valid permit when required, a copy of which shall be furnished to Landlord before commencement of construction, (b) performed in a good and workmanlike manner using only new, first class materials and Tenant shall obtain standard contractors' warranties against defects in materials and workmanship; (c) performed in compliance with all applicable Laws, all applicable standards of the American Insurance Association (formerly, the National Board of Fire Underwriters), the National Electrical Code, manufacturer's specifications and Landlord's construction rules and regulations attached hereto as Exhibit E-2 (the "Construction Rules"); (d) performed in such manner as not to unreasonably obstruct access to the Project or the Common Areas or the conduct of business by Landlord or other tenants in the Project; (e) diligently prosecuted to completion; (f) performed in compliance with USGBC indoor air quality standards and waste management specifications, and (g) performed by Tenant's Contractors that are approved by Landlord.

Tenant agrees to (1) carry (or cause its general contractor to carry) Causes of Loss-Special Form Builder's Risk or Installation Floater insurance with a limit of not less than the total cost of the Tenant Improvements, in such form and including such terms, conditions and deductibles as are acceptable to Landlord in its sole but reasonable discretion, covering the construction of such Tenant Improvements, and (2) cause all of Tenant's Contractors to agree, in their construction contracts with Tenant, to meet all of the insurance requirements applicable to Tenant pursuant to Article 18 of the Lease (including providing the certificates of insurance required thereunder). Promptly after completion of the Tenant Improvements, Tenant shall deliver to Landlord "as-built" plans and specifications (including all working drawings) for the Tenant Improvements.

Landlord shall have the right to inspect the construction of the Tenant Improvements; however, Landlord's failure to inspect any portion of the Tenant Improvements shall in no event constitute a waiver of any of Landlord's rights under this Exhibit E-1, nor shall Landlord's inspection of any portion of the Tenant Improvements constitute Landlord's approval thereof. If, as a result of Landlord's inspection, Landlord determines any portion of the construction of the Tenant Improvements has been performed in violation of this Exhibit E-1, Landlord shall notify Tenant in writing of such disapproval and shall specify the items disapproved.

c. The Tenant Improvements shall be and remain a part of the Premises, shall be the property of Landlord, and shall not be removed by Tenant, unless: (i) such removal is necessary to ensure that the Premises and any Building comply with applicable code at the time of surrender, including but not limited to removal of wires located in risers and plenums without raceways or conduits; (ii) if Tenant, as part of its request for Landlord's approval of the Working Drawings or Final Working Drawings with respect to any Tenant Improvement ("**TI Approval Request**"); requested Landlord's determination as to whether Landlord will require Tenant to remove such Tenant Improvement upon the expiration or earlier termination of this Lease and, in response to such request, Landlord required removal of such Tenant Improvement at the time of Landlord's approval; or (iii) if Tenant does not request Landlord's designation as to whether Landlord will require Tenant to remove such Tenant Improvement

upon the expiration or earlier termination of this Lease as part of its TI Approval Request, and Landlord notified Tenant in writing that removal would be required at least ninety (90) days prior to the Expiration Date (however, if this Lease terminates prior to the Expiration Date, such ninety (90) day period shall not apply). In each of the foregoing circumstances, Tenant shall perform such removal and repair any damage caused thereby at Tenant's sole cost and expense prior to the expiration or earlier termination of this Lease.

d. Notwithstanding the foregoing, (1) Tenant shall have no obligation to remove any of the improvements existing in the Premises as of the date of this Lease, and (2) Landlord may only require Tenant to remove Tenant Improvements that are not customary general office improvements (which shall include, without limitation, private bathrooms and/or showers, fitness center, all equipment in any server room (including, without limitation, raised flooring, racking, wiring and cabling), fish tanks, supplemental HVAC units, vaults, internal stairwells, rolling file systems, space converted to lab space or other non-office uses, overhead roll-up doors and/or additional single or double-door exterior entrances (to the extent removal of an exterior door is required hereunder, Tenant shall restore the wall affected by such removal to the prior condition)). Except with respect to the restoration of any walls in connection with the removal of exterior doors, as indicated above, Tenant shall only be required to remove the improvements as requested by Landlord in accordance with this Section and repair damages caused by such removal. Both Landlord and Tenant acknowledge that all interior walls (including electrical, telephone cabling, and other lines therein, but excluding Telecom Wiring install by or on behalf of Tenant (which shall be removed as set forth in Article 24)), interior doors, wall and floor finishes and trim, and general duct-work (as opposed to duct-work related to Tenant's special systems) installed or modified by Tenant as depicted in the Approved Working Drawings constitute (without limitation) general office improvements.

e. Tenant shall cause each of Tenant's contractors to agree, in their construction contracts with Tenant, to satisfy and release (by bond or otherwise) any mechanic's or materialman's liens filed against the Project by any of the subcontractors engaged by such contractor within ten (10) days of such filing. Upon completion of the Tenant Improvements, Tenant shall furnish Landlord with full and final waivers of liens and contractors' affidavits and statements, in such form as may be required by Landlord, Landlord's title insurance company and any Mortgagee, from all parties performing labor or supplying materials or services in connection with the Tenant Improvements showing that all of said parties have been compensated in full. Before commencement of the Tenant Improvements, Tenant shall notify Landlord of the proposed date of commencement of the Tenant Improvements, and shall prepare and deliver to Landlord for Landlord's signature a notice of non-responsibility and allow Landlord no less than seven (7) days to record and post the same. Additionally, if Tenant fails to make any payment relating to the Tenant Improvements, Landlord, at its option, may complete the Tenant Improvements and/or make such payment and Tenant shall reimburse Landlord for all costs incurred therefor within five
(5) days of Landlord's demand.

f. Tenant agrees not to suffer or permit any lien of any mechanic or materialman to be placed or filed against the Premises, any Building or the Project due to work performed by or on behalf of Tenant. In case any such lien shall be filed, Tenant shall satisfy and release such lien of record within twenty (20) days (or such shorter period as may be required by any Mortgagee) after the earlier to occur of (a) receipt of notice thereof from Landlord; or (b) Tenant's actual knowledge or notice of such lien filing. If Tenant shall fail to have such lien satisfied and released of record as provided herein, Landlord may, on behalf of Tenant, without being responsible for making any investigation as to the validity of such lien and without limiting or affecting any other remedies Landlord may have, pay the same and Tenant shall reimburse Landlord on demand for such amount together with any other reasonable costs of Landlord, including, without limitation, reasonable attorneys' fees and/or Landlord shall have the right to deduct such costs from the Allowance. Notwithstanding the foregoing, Tenant shall have the right to contest any such lien claim diligently and in good faith, and during such contest shall not be obligated to pay such lien claim, provided that Tenant, at its sole cost and expense, bonds the lien, or transfers the lien from the Property to a bond, thereby freeing the Property from any claim of lien. Notwithstanding any such contest or title insurance, Tenant shall pay any such claim in full within five (5) days following the entry of an unstayed judgment or order of sale. All materialmen, contractors, artisans, mechanics, laborers and any other person now or thereafter furnishing any labor, services, materials, supplies or equipment to Tenant with respect to Premises or any portion thereof, are hereby charged with notice that they must look exclusively to Tenant to obtain payment for the same.

Notice is hereby given that Landlord shall not be liable for any labor, services, materials, supplies, skill, machinery, fixtures or equipment furnished to or to be furnished to Tenant upon credit and that no mechanic's lien or any other lien for any such labor, services, materials, supplies, machinery, fixtures or equipment shall attach to or affect the estate or interest of Landlord in and to the Premises or the Project, or any portion thereof. Before the actual commencement of any work for which a claim or lien may be filed, Tenant shall give Landlord notice of the intended commencement date a sufficient time before that date to enable Landlord to post notices of nonresponsibility or any other notices that Landlord deems necessary for the protection of Landlord's interest in the Premises, any Building or the Project, and Landlord shall have the right to enter the Premises and post such notices at any reasonable time.

EXHIBIT E-2 CONSTRUCTION RULES AND REGULATIONS

1. All contractors, subcontractors, and materialmen ("**Contractor Parties**") will check in and out with Project management.

2. All Contractor Parties will be appropriately dressed to work in an office environment: shirts with sleeves (T-shirts with company name are acceptable), pants (no shorts), work shoes with socks, and whatever other clothing as may be appropriate. No torn or worn-out clothing is permitted. Contractor Parties will display a courteous demeanor towards tenants, customers, visitors and general public. No Contractor Parties shall remain in the Project after work hours.

3. All Contractor Parties shall clean the job site after meals are eaten. Alcoholic beverages and drugs are not to be brought into, or consumed in the Project. Personnel appearing to be under the influence of either alcoholic beverages or drugs will not be allowed into the Project.

4. Parking for all personnel must be arranged prior to commencement of work, and will be provided in designated areas only. Vehicles in unapproved areas will be subject to citation and towing without notice. Any parking charges are the sole responsibility of the Contractor Parties.

5. Intentionally Omitted.

6. Intentionally Omitted.

7. All Contractor Parties shall maintain the condition of docks, elevators and corridors used.

8. All materials are to be stored at the job site or in designated storage areas. No materials are to be stored in corridors or in public areas. Landlord may provide minimum secured storage for materials with prior arrangement.

9. Contractor Parties must arrange access to areas other than job site at least 24 hours in advance.

10. All work areas are to be visually and materially protected from the tenants and general public. If required by Landlord, the job site shall be sealed off from the balance of the adjoining space so as to minimize the disbursement of dirt, debris and noise.

11. Radios or other excessive noise are not permitted.

12. The use of toxic materials or odor-causing liquids must be scheduled with Landlord in advance and prior notice must be given to the tenants adjacent to the job site.

13. All non-job site areas are to be kept clean and dust free. No material residue shall be tracked through corridors or public areas.

Contractor Parties shall ensure the job site is left clean and secure at the completion of each work day. Trash and excess materials shall (a) not remain on, in, or at the job site; (b) be disposed of in bins or by truck promptly; (c) not be staged in storage at the job site in any public or adjacent areas; and (d) shall not be disposed of in the Project's trash receptacles.

EXHIBIT F - BUILDING SERVICES

Subject to all Laws applicable thereto and the Rules and Regulations, Landlord agrees to furnish the following services in a manner that such services are customarily furnished to comparable projects in the area:

1. Electrical power for the Permitted Use, as determined by Landlord.

2. City water from the regular Building outlets for drinking, lavatory and toilet purposes and the Permitted Use.

3. Maintenance of the Common Areas.

4. Landlord may, from time to time, provide such on-premises courtesy personnel (who will not necessarily have any responsibilities for any security), the cost of which shall be an Operating Cost hereunder; but Landlord makes no representation or warranty, written or oral, express or implied, that any security will be provided to the Project, or if provided, what the level of that security may be. Landlord does not guarantee any level of security and is released from any responsibility for any Claims based upon assertions that Landlord failed to provide adequate security to the Project, the Premises, or otherwise.

5. Trash pick-up and sewer services.

Tenant shall have access to the Premises twenty-four (24) hours per day, seven (7) days per week, subject to Landlord’s reasonable security requirements, Force Majeure, repairs and other de-minimus interruptions.

EXHIBIT G - RULES AND REGULATIONS

1. The Common Areas shall not be obstructed by any of the tenants or used by them for any purpose other than for ingress to and egress from their respective premises. The Common Areas are not for the general public, and Landlord shall in all cases retain the right to control and prevent access thereto of all persons whose presence in the judgment of Landlord would be prejudicial to the safety, character, reputation, and interest of the Project and its tenants; provided that nothing herein contained shall be construed to prevent such access to persons with whom any tenant normally deals in the ordinary course of its business, unless such persons are engaged in illegal activities.

2. The Premises shall not be used for the storage of merchandise held for sale to the general public or for lodging. No cooking shall be done or permitted on the Premises except that private use by Tenant of approved microwave ovens, equipment for brewing coffee, tea, hot chocolate, and similar beverages shall be permitted, provided that such use is in accordance with all Laws.

3. Intentionally Omitted.

4. Landlord will furnish each tenant free of charge with two (2) keys to each door provided in the premises by Landlord. Landlord may make a reasonable charge for additional keys. No tenant shall have any such keys copied. No tenant shall alter any lock or install a new or additional lock or any bolt on any door of its premises, subject to the below requirements. Each tenant upon the termination of its lease shall deliver to Landlord all keys to doors in the Buildings. Tenant may install a security system in the lobby of each Building that may be unlocked using a magnetic keycard, provided that Tenant shall provide Landlord with a magnetic keycard that provides access to such Building. Should Tenant install a locking system that requires a code, such code shall be provided to Landlord in writing, and all subsequent changes to the code will be provided in writing twenty-four (24) hours prior to such change taking place.

5. Landlord shall designate appropriate entrances for deliveries or other movement to or from the premises of equipment, materials, supplies, furniture, or other property, and Tenant shall not use any other entrances for such purposes. Landlord must have approved all means or methods used to move equipment, materials, supplies, furniture, or other property in or out of any Building prior to any such movement. Landlord will not be responsible for loss of or damage to any such property from any cause, and all damage done to any Building by moving or maintaining such property shall be repaired at the expense of Tenant. Tenant shall move all freight, supplies, furniture, fixtures, and other personal property only at such times as Landlord may designate. Unattended vehicles will be towed at the vehicle owner’s expense.

6. Intentionally Omitted.

7. No animals (except for service animals) shall be brought or kept in the Premises or any Building.

8. Landlord shall in no case be liable for damages for any error with regard to the admission to or exclusion from the Project of any person in the case of invasion, mob, riot, public excitement, or other circumstances rendering such action advisable in Landlord’s opinion. Landlord reserves the right to prevent access to the Project during the continuance of the same by such action as Landlord may deem appropriate, including closing doors.

9. Except in any clean room, surgical room or prototype area, as designated by Tenant from time to time, no curtains, draperies, blinds, shutters, shades, screens, or other coverings, hangings, or decorations shall be attached to, hung, or placed in, or used in connection with, any window of any Building. Such items shall be installed on the office side of Landlord’s standard window covering and shall in no way be visible from the exterior of any Building. Tenant shall keep window coverings closed when the effect of sunlight (or the lack thereof) would impose unnecessary loads on any Building’s heating or air condition systems.

10. Tenant shall ensure that the doors of the Premises are closed and locked and that all water faucets, water apparatus, and utilities are shut off before Tenant or Tenant's employees leave the Premises so as to prevent waste or damage, and for any default or carelessness in this regard, Tenant shall make good all injuries sustained by other tenants or occupants of the Project or Landlord.

11. The toilet rooms, toilets, urinals, wash bowls, and other apparatus shall not be used for any purpose other than that for which they are constructed, no foreign substance of any kind whatsoever shall be thrown therein, and the expense of any breakage, stoppage, or damage resulting from the violation of this rule shall be borne by the tenants who, or whose employees or invitee, shall have caused it.

12. No tenant shall sell at retail newspapers, magazines, periodicals, theater or travel tickets, or any other goods or merchandise to the general public in or on the Premises, nor shall any tenant carry on or permit any employee or other person to carry on the business of stenography, typewriting, printing, or photocopying or any similar business in or from the Premises for the service or accommodation of occupants of any other portion of the Project; nor shall the premises of any tenant be used for manufacturing of any kind, or any business or activity other than that specifically provided for in such tenant's lease.

13. No tenant shall install any radio or television antenna, loudspeaker, or other device on the roof or exterior walls of any Building, except as approved in connection with Tenant's construction of the Tenant Improvements or modifications or changes thereto. No TV or radio or recorder shall be played in such a manner as to cause a nuisance to any other tenant.

14. Intentionally Omitted.

15. Each tenant shall store all its trash and garbage within its premises or in exterior trash enclosures provided by a trash disposal company. Each tenant shall comply with any and all Laws regarding recycling.

16. Canvassing, soliciting, distribution of handbills, or any other written material and peddling in the Project are prohibited, and each tenant shall cooperate to prevent the same.

17. Except in a case of emergency, the requirements of tenants will be attended to only upon application in writing at the office of the Project or by facsimile transmitted to the office of the Project manager. Employees of Landlord shall not perform any work or do anything outside of their regular duties unless under special instructions from Landlord.

18. Tenant shall not occupy any Building or permit any portion of any Building to be occupied for the manufacture, distribution, or direct sale of liquor, narcotics, or tobacco in any form, or as a medical office, barber shop, manicure shop, music or dance studio, or employment agency. Tenant shall not conduct in or about any Building any auction, public or private, without the prior written approval of Landlord, which consent may be withheld in Landlord's sole discretion.

19. Intentionally Omitted.

20. Intentionally. Omitted.

21. Intentionally Omitted.

22. Intentionally Omitted.

23. Tenant will keep all doors opening to the exterior of each Building, all fire doors, and all smoke doors closed at all times.

24. Intentionally Omitted.

25. If Tenant uses the Premises after regular business hours or on non-business days Tenant shall lock any entrance doors to each Building or to the Premises used by Tenant immediately after using such doors.

26. Tenant shall not use any portion of the Premises for lodging.

27. Landlord reserves the right to exclude or expel from the Project any person who, in the judgment of Landlord is intoxicated or under the influence of liquor or drugs, or who shall in any manner do any act in violation of any of these Rules and Regulations.

28. Tenant shall not park or attach any bicycle or motor driven cycle on or to any part of the Premises or any Building, provided that Tenant may bring non-motorized bicycles into each Building.

29. Tenant shall not install any artwork that could give an artist or any other party a right under applicable Law to prevent removal of the same.

30. This is a non-smoking facility. Smoking is prohibited within the confines of each Building in all public areas, which includes interior common area hallways and restrooms.

31. Provided Landlord acts in good faith pursuant to sound operating procedures, Landlord may waive any one or more of these Rules and Regulations for the benefit of any particular tenant or tenants, but no such waiver by Landlord shall be construed as a waiver of such Rules and Regulations in favor of any other tenant or tenants, nor prevent Landlord from thereafter enforcing any such Rules and Regulations against any or all of the tenants of the Project.

32. These Rules and Regulations are in addition to, and shall not be construed to in any way modify or amend, in whole or in part, the agreements, covenants, conditions, and provisions of any lease of premises in the Project.

33. Landlord reserves the right to modify the foregoing and promulgate such other rules and regulations as Landlord may from time to time decide are needed for the safety, care, or cleanliness of the Project, for the preservation of good order therein, or as changed conditions or particular circumstances may require.

EXHIBIT H - PARKING AGREEMENT

Tenant shall be provided, at no additional cost, the number of non-reserved parking spaces as set forth on the Lease Summary, in such areas or spaces as Landlord shall determine from time to time (the "**Non-exclusive Parking**"). The Non-exclusive Parking shall be available for use by Tenant on a "non-reserved" and "space available" basis; however, Landlord shall not allow parking in the Project in a manner that would result in overparking on a regular basis.

During the Term, the monthly rate per vehicle for any parking spaces granted Tenant shall be the then prevailing rate generally charged for such parking, which shall be free of charge during the initial Term. The parking rates charged by Landlord for Tenant's parking passes shall be exclusive of any parking tax or other charges imposed by governmental authorities in connection with the use of such parking, which taxes and/or charges shall be paid directly by Tenant or the parking users, or, if directly imposed against Landlord, Tenant shall reimburse Landlord for all such taxes and/or charges concurrent with its payment of the parking rates described herein.

Tenant's use of the parking areas serving the Project shall be subject to the following:

1. Parking shall not be permitted for Tenant or its employees in the Project over and above the number of spaces designated on the Lease Summary and any parking by Tenant or its employees in excess of such number of spaces shall be a Default under this Lease.

2. All parking areas shall be under the control of Landlord, and Tenant agrees that all Tenant Related Parties shall conform to such reasonable written parking regulations, conditions and provisions as may from time to time be prescribed by Landlord, provided the same do not increase Tenant's obligations or decrease Tenant's rights.

3. If Tenant is not permitted to utilize any parking space in the parking areas at any time through no direct intentional act of Landlord, then so long as Tenant is not able to utilize any such parking space (for reasons other than as a result of the negligence of any Tenant Related Party) and Landlord does not provide reasonable alternate parking, Tenant's obligation to pay rental for any such parking space that is not provided shall be abated for so long as Tenant does not have the use of such parking space. Such abatement shall constitute full settlement of all Claims that Tenant might otherwise have against Landlord by reason of such failure or inability to provide Tenant with such parking space. Landlord agrees to use reasonable efforts to provide alternate parking for use by Tenant in reasonable proximity to the Project. Landlord shall not be responsible for enforcing Tenant's parking rights against any third parties.

4. Restricted and unrestricted parking areas shall include only those areas designated by Landlord as such.

5. Landlord will be entitled to utilize whatever access device Landlord deems necessary (including but not limited to the issuance of parking stickers or access cards) to assure that only those persons contracting for the use of spaces in the parking areas are using the parking spaces therein. In the event any Tenant Related Parties wrongfully park in any parking spaces, Landlord will be entitled and is hereby authorized to impose upon Tenant a charge of $25.00 for each such occurrence. Tenant hereby agrees to pay all amounts becoming due hereunder as Additional Rent upon demand therefor, and the failure to pay any such amount will additionally be deemed a Default.

6. All vehicles are to be currently licensed, in good operating condition, parked for business purposes having to do with Tenant's business operated in the Premises, parked within designated parking spaces, one (1) vehicle to each space. No vehicle shall be parked as a "billboard" vehicle in the parking lot.

Any vehicle parked improperly may be towed away. Any Tenant Related Parties who do not operate or park their vehicles as required shall subject the vehicle to being towed at the expense of the owner or driver. Landlord may place a "boot" on the vehicle to immobilize it and may levy a charge of $50.00 to remove the "boot." Tenant shall indemnify, hold and save harmless Landlord of any Claims arising from the towing or booting of any unauthorized vehicles.

7. Tenant acknowledges and agrees that, so long as the same does not materially interfere with Tenant's use of the Premises or parking areas, Landlord may, without incurring any liability to Tenant and without any abatement of Rent under this Lease, from time to time, close-off or restrict access to the parking area, or relocate Tenant's parking spaces to other parking areas within a reasonable distance of the Premises, for purposes of permitting or facilitating any such construction, alteration or improvements with respect to the parking area or to accommodate or facilitate renovation, alteration, construction or other modification of other improvements or structures located on the Property.

8. Landlord may delegate its responsibilities hereunder or lease the parking facilities to a parking operator in which case such parking operator shall have all the rights of control attributed hereby to Landlord but Landlord shall not be responsible or liable for the acts or omissions of such parking operator.

EXHIBIT I - ENVIRONMENTAL DISCLOSURES

Landlord hereby discloses to Tenant that chemicals listed under the California Safe Drinking Water and Toxic Enforcement Act (Proposition 65), are used in building materials, and in products used to maintain the Property, and are emitted as a result of the activities of tenants and guests. In addition, other listed chemicals are present in some of the building materials, in products used to maintain the Property, and are emitted as a result of the activities of tenants and guests. In accordance with Proposition 65, the following warning is provided:

WARNING

THIS BUILDING CONTAINS CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, AND BIRTH DEFECTS AND OTHER REPRODUCTIVE HARM. THESE CHEMICALS ARE CONTAINED IN SOME BUILDING MATERIALS, IN SOME OF THE PRODUCTS AND MATERIALS USED TO MAINTAIN THE PROPERTY, AND IN EMISSIONS, FUMES, AND SMOKE FROM TENANT AND GUEST ACTIVITIES. DISTURBANCE OF OR DAMAGE TO INTERIOR SURFACES OF THE BUILDING MAY INCREASE THE POTENTIAL FOR EXPOSURE TO THESE SUBSTANCES.

(CALIFORNIA HEALTH AND SAFETY CODE §25249.5 ET SEQ.)

Tenant acknowledges that Landlord has advised Tenant that each Building contains or, because of its age, is likely to contain ACMs. If ACMs are likely to be disturbed in the course of any Alterations including Tenant Improvements, as permitted by Article 11 of the Lease, Tenant shall, in addition to complying with the requirements of Article 11, encapsulate or remove the ACMs in accordance with an approved asbestos-removal plan and otherwise in accordance with all applicable Environmental Laws, including giving all notices required by California Health and Safety Code Sections 25915-25919.7.

EXHIBIT J – EXAMPLE PERMITTED MATERIALS INDEX

Chemical Inventory Shockwave Medical Inc.

Product/Chemical Name (as on container)	Solid, Liquid, or Gas	Typical Qty,	Typical Container Size	Container Type	Reference
Lead Solder	Solid	26	100g	Plastic Spool	MSDS Binder - Onsite
Ethanol	Liquid	4	1 Gallon	Glass Bottle	MSDS Binder - Onsite
Loctite AA3526	Liquid	10	2 Gram	Tube	MSDS Binder - Onsite
Loctite AA3922	Liquid	10	2 Gram	Tube	MSDS Binder - Onsite
Loctite AA3972	Liquid	10	2 Gram	Tube	MSDS Binder - Onsite
Loctite AA3936	Liquid	10	2 Gram	Tube	MSDS Binder - Onsite
Loctite 4011	Liquid	10	2 Gram	Tube	MSDS Binder - Onsite
Loctite 3979	Liquid	10	2 Gram	Tube	MSDS Binder - Onsite
Loctite 4310	Liquid	10	2 Gram	Tube	MSDS Binder - Onsite
Loctite 3311	Liquid	10	2 Gram	Tube	MSDS Binder - Onsite

SHOCKWAVE MEDICAL	**No.**: SOP/WI 101	**Rev.**01
	Title: Injury Illness Prevention Plan	
	Class: Standard Operating Procedure, Work Instruction	Page 1 OF 16

1. Purpose

In order to maintain a safe and healthy work environment, Shockwave Medical Inc, has developed this Injury and Illness Prevention Program (IIPP) for all employees.

Background

Awareness and use of safety measures is known to reduce accidents. Shockwave is committed to providing a safe and healthy workplace for all employees. Communication and employee participation are vital to this effort.

Shockwave has prepared this **Injury and Illness Prevention Plan** (IIPP) describing measures for protecting employees from occupational risks of injury or illness.

This program meets requirements of the California Code of Regulations (CCR), Title 8, §3203 of the General Industry Safety Orders (GISO).

All Shockwave employees are urged to actively participate in this program.

Note: Talk to your supervisor about activities or situations you think may be unsafe. If everyone participates, we can avoid work-place_injury and illness.

2. Scope

Shockwave is committed to providing a safe and healthy environment for all employees. Employee safety is extremely important. To support this commitment, Shockwave has developed this IIPP.

This program complies with Senate Bill 198, as codified in the California Code of Regulations, Title 8, and Section 3203 of the General Industry Safety Orders. Included is identification and evaluation of hazards, injury and illness investigation, correction of unsafe and unhealthy work conditions and practices, training, responsibility, communication and record keeping.

3. References

XXXXXXXX	Accident Incident Report
XXXXXXXX	Report Hazardous or Unsafe Conditions
XXXXXXXX	Hazard Correction Report

4. Responsibilities

4.1 Shockwave will assume responsibility for the operation of an effective Injury and Illness Prevention Program. The Safety Officer is approved by the CEO of Company. The Safety Officer will be responsible for implementing the program and initiating appropriate remedial action when necessary to correct safety hazards. Shockwave may elect to delegate authority of certain elements of this program to managers or supervisors, but may not delegate the responsibility for the plan's implementation.

4.2 Managers/supervisors are responsible for developing the proper attitudes toward safety and health for all employees. They have primary responsibility for actually establishing and maintaining programs to ensure compliance with the Injury and Illness Prevention Program, especially as it relates directly to the workplace. They are responsible for being familiar with safety and health hazards to which employees are exposed, how to recognize them, the potential effects of these hazards and rules and procedures for maintaining a safe workplace.

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4.3 It is Shockwave employees' responsibilities to comply with the following:

4.3.1. Read the OSHA/Cal OSHA poster at your job-site.

4.3.2. Comply with any applicable OSHA/Cal OSHA Standards.

4.3.3. Follow all your employer's safety and health standards and rules.

4.3.4. Wear or use personal protective equipment (PPE) as required.

4.3.5. Report any hazardous or unsafe conditions to your supervisor and/or the Safety Officer.

4.3.6. Report any job-related injuries or illnesses to your employer and seek treatment promptly.

4.3.7. Cooperate with the OSHA/Cal OSHA compliance officer conducting an inspection if he enquires about conditions at your job-site.

5. Definitions

Term	Definition
Physical Hazard	Includes heavy lifting, falls, punctures, cuts, noise, electrical and thermal injuries
Ergonomic Hazard	Includes posture and repetitive motion injuries
Chemical or Biological Hazard	Includes using reagents, solvents, corrosives, and contact with Human tissue or blood. The main portals of entry into the human body are; inhalation, ingestion, injection, skin or mucous membrane contact and skin permeation

6. General Policy

6.1 **Shockwave Employees have the following rights:**

6.1.1. You may obtain a copy of the OSHA/Cal OSHA Standards and other rules, regulations and requirements.

6.1.2. Request information from your employer on safety and health hazards in your work area, precautions you need to take and what you must do if involved in an accident or exposed to toxic substances.

6.1.3. Have your name withheld from your employer, upon request to OSHA/Cal OSHA, if you file a complaint.

6.1.4. Be advised of OSHA/Cal OSHA actions regarding your complaint, and have an informal review, if you request it, of any decision, not to inspect.

6.1.5. File a complaint to OSHA/Cal OSHA within 30 days if you believe you have been discriminated against because you asserted a right under the California Occupational Safety and Health Act and be notified by OSHA/Cal OSHA of its decision within 90 days of your filing.

6.1.6. Be notified by your employer if he applies for variance (waiver) from any OSHA/Cal OSHA standard, testify at a variance hearing and appeal the final decision.

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7. Compliance

7.1 All Shockwave personnel have the responsibility for complying with company and Cal OSHA safe and healthy work practices, including applicable regulations, company policy, code of safe practices and departmental safety procedures.

7.2 Overall performance and maintenance of a safe and healthy work environment should be recognized by the department manager and noted in performance evaluations.

Employees will not be discriminated against for work-related injuries, and injuries will not be included in performance evaluations, unless the injuries were a result of an unsafe act or failure, on the part of the employee, to comply with safe and healthy work practices.

7.3 Progressive measures in accordance with the following "Disciplinary Procedures" will result when employees fail to comply with applicable regulations, company policy, programs or safety procedures. Persons not employed by Shockwave will be disciplined for unsafe practices in accordance with the policy of their agency or may be released from performing services at Shockwave. All personnel will be given instruction and an opportunity to correct unsafe behavior. Repeated failure to comply or willful and intentional non-compliance may result in disciplinary measures up to and including termination.

7.4 Disciplinary measures are required by Cal OSHA. Any employee found to be in willful violation of safety policy will be subject to disciplinary action.

7.5 General guidelines for administration of disciplinary actions are as follows:

7.5.1 First Violation -verbal warning.

7.5.2. Second Violation – written reprimand recorded in personnel file and considered in appraisals.

7.5.3. Third Violation – strong written reprimand, recorded in personnel file, and is accountable for job evaluation.

7.5.4. Fourth Violation – dismissal.

7.6 These are only guidelines, as some infractions may be severe enough to justify termination with a single occurrence.

8. COMMUNICATION

8.1 Company shall communicate with employees in a form readily understandable by all affected employees on matters related to occupational safety and health, including provisions designed to encourage employees to inform the employer of hazards at the worksite without fear of reprisal.

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8.2 Company uses various communication systems to relay information to all employees on matters relating to occupational safety and health, which include:

8.2.1. A labor/management Health and Safety Committee, which will meet at least monthly. The Health and Safety committee prepares written records of the meetings, reviews results of the periodic safety inspections, reviews investigations of accidents or exposures (except for confidential medical information) and makes suggestions to management for the prevention of future incidents, reviews alleged hazardous conditions and submits recommendations to assist in the evaluation of employee safety suggestions.

8.2.2. Safety Presentations – Films, slides or videos on safety topics may be presented periodically.

8.2.3. Safety Postings – These are placed in the lunchroom, labs, and other common areas.

8.2.4. Anonymous and confidential hazard reporting

8.2.4.1. Employees are encouraged to communicate safety concerns to their Manager/Supervisor or the safety officer without fear of reprisal.

8.2.4.2. Report of hazardous or unsafe conditions form is available for confidential hazard reporting. It is located on the server. Any employee may use this form anonymously, or confidentially, to report a hazard or share a health and safety concern.

8.2.4.3. If a hazard is identified, the appropriate resources will be taken to correct the problem. If the problem cannot be corrected, then employees will be instructed to vacate the area until the hazard can be corrected.

8.2.5. Safety Suggestion Box – The Suggestion Box is in the lunchroom.

The Suggestion Box, located near Safety Bulletin Board, may encourage employees to make suggestions anonymously (if desired) ***without fear of reprisal.***

If anonymity is not an issue, emails regarding safety may be sent to the plan navigator/Human Resources.

The Safety Officer and managers review all suggestions and recognize good ideas that can be put into action, with credit and rewards to the creator. **Identification and Evaluation of Workplace Hazards**

8.2.6. A Safety Bulletin Board – Located in the lunchroom. The Safety Bulletin board will contain:

8.2.6.1. Cal/OSHA prescribed materials such as Employee Rights under OSHA/Cal OSHA.

8.2.6.2. Safety Committee meeting minutes, safety posters, and actions on safety suggestions.

8.2.6.3. Other safety related items (i.e., safety forms, safety tips, etc.)

9. THE HEALTH AND SAFETY COMMITTEE

9. 1 The function of the Health and Safety Committee is to promote communication and to establish employee interest in workplace safety and health. The Committee's membership includes representatives from both management and non-management positions. The Health and Safety Committee shall:

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9.1.1. Meet at least monthly.

9.1.2. Document meeting activities using the safety meeting minutes and make this information available to employees by posting the minutes. These records will be maintained by the safety officer for at least three years.

9.1.3. Review investigation reports of occupational injuries, occupational illnesses, and exposure to hazardous substances. Where appropriate, the committee will submit recommendations to management regarding prevention of future incidents.

9.1.4. Review employee safety suggestions discuss employee experiences in work areas and investigate reports of unsafe work practices and hazardous conditions.

9.1.5. Review results of safety inspections to ensure that identified hazards have been corrected. The committee also has the authority to conduct its own inspection and investigation, when necessary.

9.1.6. Verify abatement action taken by Company if the California Division of Safety and Health issues a citation and Cal/ OSHA makes such a request.

10. SAFETY MEETINGS

10.1 Safety meetings provide an opportunity to increase safety awareness, provide training and address pertinent safety issues. Employees will be encouraged to participate and voice their safety concerns during safety meetings.

10.2 Safety Meeting minutes will be used to document safety meetings. Records will be maintained by the Safety Officer or designee.

11. HAZARD IDENTIFICATION AND ASSESSMENT

Company works to recognize all potential and actual hazards through periodic inspections and to evaluate these through appropriate materials and activities studies.

11.1 **Scheduled Safety Inspections**

11.1.1. At a minimum, annual inspections of all office areas will be conducted to detect and eliminate any hazardous conditions that may exist.

11.1.2. At a minimum, monthly inspections of all potentially hazardous areas (warehouse, docks, etc.) will be conducted to detect and eliminate any hazardous conditions that may exist.

11.1.3. Laboratories will be inspected at least monthly or at the Laboratory Director's discretion.

11.1.4. Eyewash stations are checked weekly and safety showers are checked monthly for applicable expiration dates and to ensure proper function.

11.1.5. Fire extinguishers are checked monthly and serviced annually.

11.1.6. Weekly inspection of hazardous waste storage areas to ensure integrity of storage vessels.

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11.2 **Hazard Evaluation**

11.2.1. Company conducts inspections to identify hazards at a point where they can be easily eliminated and before they result in injury. Hazard evaluations report the status of periodic safety inspections and any unusual hazards that are discovered. The Safety Committee may request more frequent inspections in areas that are found to be more hazardous or where problematic trends have been identified. To evaluate hazards:

11.2.1.1. Determine materials handled and obtain their SDS and toxicity information.

11.2. l.2. Determine the frequency of use and personnel involved.

11.2.l.3. Determine the conditions of the area.

11.2.1.4. Determine personnel exposure through visual observations and environmental monitoring, if required.

11.2.1.5. Evaluate required control devices and any potential improvements.

11.2.l.6. Document all above findings, recommendations and actions.

12. HAZARDS

12.1 The best control is avoiding exposure through engineering devices that minimize the release of contaminants to the work environment or through filters or barriers such as respirators, gloves, safety glasses and lab coats, which prevent chemical contact.

12.2 Follow recommendations on the manufacturers Safety Data Sheet (SDS). MSDS are located on the shared drive and with the Safety Officer.

12.3 Employees should adhere to the following:

12.3.1. Review the SDS for health risks and safe handling of the chemical substance.

12.3.2. Do not work alone with toxic substances.

12.3.3. Confine all work with toxic chemicals to suitable laboratory/controlled areas (equipped with fume hoods if necessary). Adjust the sash to the level indicated on the hood for optimal face velocity.

12.3.4. Wear personal protective equipment, including eye protection, to avoid harmful exposure to the material. Be sure to remove protective equipment ***before*** leaving the laboratory area.

12.3.5. Wash hands ***immediately*** after working with chemicals or biological material.

12.3.6. Smoking, eating and drinking or storing foods and beverages are never permitted in the labs or in areas where chemicals and biological materials are used or stored.

12.3.7. Know where the spill kits and fire extinguishers are located.

12.3.8. Chemical/Biological (hazardous) waste must be disposed of properly.

Dumping it down the drain or evaporating it in the fume hood is not acceptable.

12.3.9. Before work begins, employees must inspect the work area for any dangerous conditions. Inform a supervisor of anything significant. Merely identifying the problem is not sufficient. A Report of Hazard or Unsafe Condition form must be completed.

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12.3.10. Latex products are not used in this laboratory and if a worker is diagnosed with an exposure allergy the laboratory will take the necessary steps as practical to the work environment to provide alternative products or re-assign the employee to a different but equivalent work responsibility.

13. INCIDENT AND ACCIDENT INVESTIGATION

13.1 Management is responsible for investigating and documenting all accidents, incidents and near misses, even those that do not result in injury or significant damage to equipment or property. The early identification and correction of problems leading to minor incidents may prevent future injuries and property damage. Appropriate repairs and/or procedural changes will be implemented promptly to mitigate the hazards implicated in these events.

13.2 When an accident occurs, the Manager/Supervisor must assist the injured employee in completing an Accident Incident Report form or company designated insurance form within 24 hours (injury permitting or as soon as possible afterwards).

13.3 Serious accidents will also be investigated by the safety officer, appropriate management, and/or the Health and Safety Committee.

14. HAZARD CORRECTION

14.1 It is the intent of Company to correct any unsafe or unhealthful condition as soon as it is observed or discovered. The immediate corrective action may be an expedient temporary measure, until a permanent corrective measure can be implemented.

15. TRAINING

15.1 Safety training and information is provided to all employees under the Company IIPP.

15.2 Company will provide safety training:

15.2. 1. When the IIPP is first established and when significant changes occur.

15.2.2. To all new employees at commencement of work assignments.

15.2.3. To all employees given new assignments for which training has not been previously received.

15.2.4. Whenever substances, processes or equipment represent a new hazard.

15.2.5. When the Company becomes aware of a new or previously unrecognized hazard.

15.3 General safety to all new employees includes:

15.3.1. Injury & Illness Prevention Program

15.3.2. Emergency Evacuation & Fire Prevention Program, and Earthquake Emergency Procedure.

15.3.3. Information on Company’s health and safety policies and practices

15.3.4. Employee health and safety rights and responsibilities

15.3.5. Provisions for medical and first aid

15.3.6. Emergency procedures

15.3.7. General electrical safety

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15.4 Additional health & safety training, based on job function, includes (but not limited to):

15.4.l. Hazard Communications

15.4.2. Hazardous Waste Management

15.4.3. Chemical Hygiene Plan and Personal Protective Equipment

15.4.4. Blood-borne Pathogens and Exposure Control

15.5 Many Cal/OSHA, EPA, and DOT regulations require safety training of employees if they perform certain functions, or work in certain environments. It is the responsibility of managers to identify the types of job specific safety training required for each of their employees and to see that this training is provided.

16. RETRAINING AND RE-CERTIFICATION

16.1 Regulations and policy may require periodic retraining and re-certification. Examples are blood-borne pathogens, emergency procedures and hazardous waste management.

16.2 Company can teach safety, but only employees can practice safety. Safety education requires employee participation and compliance. Remember, the following general rules apply in all situations:

16.2.1. No employee should undertake a job that appears to be unsafe.

16.2.2. No employee is expected to undertake a job until he/she has received adequate safety instructions.

16.2.3. No employee should use chemicals without fully understanding their hazards and properties.

16.2.4. Mechanical safeguards must be kept in place.

16.2.5. Employees must report any unsafe conditions as specified in this program.

16.2.6. Any work-related injury or illness must be reported to Human Resources, the Safety Officer or the Manager/Supervisor.

16.2.7. Personal protective equipment must be used when and where required. All such equipment must be properly maintained.

17. DOCUMENTATION

17.1 Many standards and regulations of Cal/OSHA contain requirements for the maintenance and retention of records for occupational injuries and illnesses, medical surveillance, exposure monitoring, inspections, and other activities relevant to occupational health and safety. The following records will be kept on file for at least the length of time indicated below:

17.1.l. Copies of all Safety Inspection Forms. Retain 3 years.

17.1.2. Copies of all Hazard Identification Forms. Retain 3 years.

17.1.3. Copies of all Accident Investigation Forms. Retain 5 years.

17.1.4. Copies of all Safety Postings and Safety Meeting Agendas. Retain 3 years.

18. RECORD RETENTION

18.1 Copies of training documents are retained for 3 years.

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18.2 Copies of employee exposure records, or other required employee medical records are retained for 50 years after employee leaves the company. Access to employee medical records will be limited, in accordance with Cal/OSHA, HIPAA, regulations and Shockwave policies.

18.3 Human Resources or designee will ensure that these records are kept and present them to Cal/OSHA or other regulatory agency representatives if requested. Review of these records may be necessary during routine inspections to measure compliance with the Program.

19. Physical Hazards

19.1 ***Traumatic Hazards*** involve activities that could result in an immediate injury such as punctures, scrapes, cuts, falls, being hit by, or against, objects, caught in-between objects, and other such occurrences.

19.2 Safety engineers suggest the following precautions:

19.2.1. **Falls**

19.2.1.1. ***Fall account for more than 30% of all injuries***

19.2.1.2. Most often caused by losing balance, tripping or slipping, falls can result in scrapes, bruises, cuts, strains, sprains, dislocations, even fractures or fatalities.

19.2.l.3. Falls can occur on the same level or from a higher level to a lower one; obviously, height intensifies the severity of injury. *To minimize injury:*

Walking surfaces: must be firm, free from obstructions, holes, debris, tripping hazards (pipes, wires, ropes, cables) and spills. If the surface is a steep ramp or incline, safety/nonslip soled shoes should be worn to prevent slipping. Hand/support rails should be installed where possible.

Footwear: sturdy, comfortable shoes that fully hug the foot, with slip- resistant soles and heels that will not become lodged in floor crevices. Steel-toed shoes must be worn where falling objects could crush or penetrate the foot. Appropriate foot protection is required in areas with electrical hazards or abnormal wetness

Ladders: must conform to Cal OSHA specifications; must be inspected before each use for sturdiness and be in working order. All ladders must be ***nonconductive.***

19.2.2. Bruises, cuts etc.

19.2.2.1. Can occur through contact of fast moving objects or mechanical parts with the human body. These are either "hitting by" or "hitting against", based on whether the impact is caused by an exterior agent (flying objects, piece of equipment) or by the person (putting a hand in the wrong place, running into something).

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19.2.2.2. Depending on the force of contact, resulting injuries could be bruises, cuts, punctures, or scrapes.

19.2.2.3. Very strong impacts may develop into stunning (and sometimes deadly) concussion, bruises, bone fractures, amputations, dismemberments, extensive internal injuries, life-threatening bleeding, etc.

19.2.2.4. To minimize hazards:

- **Be aware of moving objects or parts in the work area.** Unless working on them with proper lock– out/tag-out procedures in place, do not get to close to moving parts. Guards, bollards, signs, etc., are in place to regulate contact.
- **Prevent rushing motions** that could force any part of the body into contact with fast moving hard, sharp objects.
- **Cover your body and skin** if there is a possibility of being hit by flying fragments or rough surfaces. Safety glasses with solid side shields, gloves, steel – toed shoes or other equipment may be required for protection.
- **Eyes must always be protected** from flying particles, filings, dusts, grit or grindings, by safety glasses with solid side shields, goggles and/or a face shield.
- **When using band tools, avoid pointing the tool toward any part of the body.** Sharp points or edges should be held *away* from the body. Tool extensions, tongs, etc., may be used to keep body surfaces away from hazard zones.

19.2.3. Caught-by Hazards

19.2.3.1. These include not only a hand being caught in a gear or pinch point, but also extends to inextricable (difficult to get out of) situations, confined spaces, limited footing, infirm flooring, etc.

19.2.3.2. To minimize injury:

- **Be aware of conditions** in your work area; avoid infirm footing and unusually narrow passages or access points. If necessary, have someone stand by to facilitate•escape.
- **Make sure moving machinery with "pinch points" is guarded and/or shielded to prevent unsafe access.** Machine controls must be equipped with switches or brakes to stop them before hazardous pinching can occur. Operators of machinery should *always* know where the **Emergency Stop** is located
- **Avoid loose and hanging garments, hairstyles, jewelry or swinging apparel** that could get caught and drag the operator into a pinch point.

19.2.4. Non-ionizing Radiation Hazards

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19.2.4.1. These include X-Rays, magnetic fields, ultraviolet light, noise and vibrations, radio frequency, or microwave energies. A sign or notice at or near the hazard, as to the type and amount of energy released must identify these hazards. Filters, controlled areas, shields or barriers must be provided to prevent over exposures to personnel.

19.2.4.2. ***To minimize over-exposure:***

- All non-ionizing **radiation sources must be labeled**, shielded and their output monitored periodically.
- **Monitoring** is conducted in areas likely to receive non-ionizing radiation.
- **Estimates of personnel exposure** are made frequently to confirm effectiveness of controls.

19.2.5. **Electrical Hazards**

19.2.5.1. These arise when electrical energy over 15 volts is used.

19.2.5.2. As voltage increases, the penetrating power of electric fields and currents into the human body increases. When the current is strong enough to move through body tissues, it can cause shocks and electrical burns. If the flow crosses the heart muscle, arrhythmia and cardiac fibrillation may lead to death.

19.2.5.3. To prevent injury:

- **Never touch live wires.** Check with appropriate personnel ***before*** using any electrical device. Report ***any electrical shock*** immediately.
- **Do not attempt repairs or adjustments on live circuits.** Qualified service personnel must un-plug, turn off or lockout the switch before any work is done. Electrical work in progress **must** be roped off and posted appropriately.

- **Electrical equipment must be internally grounded** (and labeled) or have a grounding wire in the system.
  - o Use three-hole receptacles
  - o Don't force plugs
  - o ***Never*** cut off the grounding prongs in power cables.
- **All electrical cables and cords must be whole, and free from cracks, frays or bare scuffs.** A licensed electrician must do any splicing.
- **Avoid overloading circuits,** moist or wet cables, tight metal clasping or mishandling electrical equipment.
- **In case of electrical shock or electrocution, follow these procedures:**
- **1. If possible, and if it is safe to do so turn off electrical supply *immediately.* Get assistance to contact closest First Aid Responder.**

2. Call 911 immediately

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3. Never touch a person who has been in contact with electrical current until current is shut off at plug, circuit breaker or fuse box.

4. Use a dry nonconductive stick (wood/plastic) to move wires or downed power lines away from victim.

5. Do not approach if ground is wet.

6. Check breathing. If trained, administer CPR AED Treatment if necessary.

7. Keep the victim warm and lying down.

8. Give victim nothing by mouth.

19.2.6. **Thermal Hazards**

19.2.6.1. These result from exposures to extreme heat that could cause heat cramps, heat exhaustion or heat stroke, or from contact with very hot (or very cold) surfaces, fluids, gases or actual flames that destroy surface tissues of skin.

19.2.6.2. ***To prevent injury:***

19.2.6.2.1. Working in a hot environment (indoor or outdoor) raises the pulse rate. If you become aware of any significant increase in your pulse rate, stop work and move to a cooler area.

19.2.6.2.2. Continuous work in a hot environment requires periodic (every half hour) cooling/rest periods. Increased air movement and increased fluid intake help to prevent heat illness.

19.2.6.2.3. Very hot (or very cold) surfaces must be shielded and labeled to help prevent accidental contact.

19.2.6.2.4. Burns can be avoided by not touching hot/cold surfaces. Protective gloves should be used wherever hot/cold surfaces must be handled.

19.2.6.2.5. Extension tools/tongs also help.

19.2.6.2.6. Upon getting a burn (hot or cold), seek ***immediate*** first aid treatment. Do not wait. Infection and/or additional inflammation could occur and increase the extent of the injury.

20. Chemical-Hazards

20. l These result from contact between chemical substances and the body.

20.2 All types of matter may react with body systems.

20.2.1. ***Matter:***

- Solids
- liquids
- gases,
- either naturally occurring or man-made

20.2.2. ***Body systems:***

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- Skin • mucous membranes
- Respiratory tract • digestive system
- eyes • circulatory • nervous •immune, etc.

20.2.3. To cause immediate or delayed injury or disease.

20.2.4. The main routes of entry into the human body are:

20.2.4.1. ***Inhalation*** (of dusts, fumes, mists, vapors, gases) into the respiratory system with potential for transfer into the circulatory system.

20.2.4.2. ***Ingestion*** (of contaminated food, drink or saliva) into the digestive system and potential damage to the liver and/or kidneys.

20.2.4.3. ***Absorption*** through skin and potential transfer to underlying tissues or blood vessels.

20.2.4.4. ***Injection*** into the body via needle or sticks or skin puncture with a contaminated sharp.

20.2.5. The best control is avoidance; using devices to minimize the release of contaminants, or using filters or barriers (gloves, safety glasses) and appropriate techniques to prevent inhalation, ingestion, absorption or injection.

20.3 **Monitoring and Surveillance**

20.3.1. At Shockwave, there are only a few substances that may require occasional monitoring or surveillance.

20.3.2. The *Safety Officer* reviews all SDS for chemicals with published:

- ***Permissible Exposure Limits*** (PELs)
- ***Time Weighted Averages*** (TWAs- concentrations that **must not** be exceeded during any 8-hour work shift)
- ***Short Term Exposure Limits*** (STELs
  - concentration of a substance
- measured over a 15 minute period that **must not** be exceeded
- ***These exposure limits may not be exceeded.***

20.3.3. The ***Safety Officer*** provides a list of substances with exposure limits to management who will determine if air monitoring is necessary to assure employees are not being over exposed.

20.3.4. Employees must observe these **general rules when working with hazardous materials:**

20.3.4. 1. **Review SDS** to become familiar with the nature, health risks and safe handling of any toxic substances you work with, or near.

20.3.4.2. **Never work alone when using toxic materials.** Make sure someone is nearby or checks on you regularly.

20.3.4.3. **Confine all work with toxic chemicals.** If working with a chemical with exposure limits, make sure this work is done inside a hood that is functioning and at required performance.

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20.3.4.4. **Wear protective eyewear and gloves (PPE)** to avoid harmful exposure to toxic materials. Be sure to remove PPE ***before*** leaving lab area.

20.3.4.5. **Wash hands immediately** after working with toxic materials.

20.3.4.6. **No smoking, eating, drinking, applying cosmetics or lip balm** and storing foods or beverages in areas where toxic materials are used or stored.

20.3.4.7. **Know where spill kits and fire extinguishers are located,** how to use them and how to summon help.

20.3.4.8. **Chemical wastes, including debris like gloves, wipes and bench protectors must be disposed of properly.** Putting contaminated materials in the regular trash, liquids down the drains or air evaporation of liquid residues is not permitted.

21. Biohazards

21.I Certain viruses and micro-organisms used in research programs are classified as biohazards or infectious agents. The U.S. Public Health Service classifies biohazards into five classes in its publication ***Classification of Etiologic Agents on the Basis of Hazard.*** Biosafety relies on a set of standard safety practices and special procedures, equipment and laboratory installations that provide physical barriers according to the estimated risk involved in handling biohazards.

21.2 The primary hazards to personnel working with infectious agents include: accidental self-inoculation, ingestion, and skin or mucous membrane exposure to infectious materials. Shockwave has policies and procedures for controlling biohazards; this IIPP does not cover these issues. Affected personnel should consult the Biosafety Officer and Shockwave's ***Exposure Control Plan.***

22. Ergonomics Program

22.1 Ergonomic hazards refer to existing workplace conditions that create a risk of injury to the musculoskeletal system.

22.2 **Examples of musculoskeletal injuries include:**

- Tennis elbow (an inflammation of a tendon in the elbow)
- Carpal tunnel syndrome (a condition affecting the hand and wrist).

22.3 Ergonomic hazards include:

- Repetitive and forceful movements
- Vibration
- Temperature extremes
- Awkward postures arising from improper work methods
- Improperly designed workstations, tools, and equipment.

22.4 Imbalances can be caused by:

- Sudden exertions

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- Strenuous action
- Torsions
- Awkward positions
- Strenuous and/or repetitive visual adjustments

22.5 For ergonomic related issues, please notify HR to schedule an ergonomics assessment. Ergonomic-related issues will be addressed on a case-by-case basis.

22.6 How to lift:

22.6.1. **Plan ahead before lifting.** Clear a path, and if lifting something with another person, make sure both agree on the plan.

22.6.2. **Lift close to your body.** Be sure to have a firm grip on the object you are lifting, and keep it balanced close to your body.

22.6.3. **Feet shoulder width apart.** Keep the feet about shoulder width apart and take short steps.

22.6.4. **Bend knees and keep back straight.** Focus on keeping the spine straight--raise and lower by bending your knees.

22.6.5. **Tighten your stomach muscles:** Tightening your abdominal muscles will hold your back in a good lifting position and will help prevent excessive force on- the spine.

22.6.6. **Lift with your legs.** Your legs are stronger than your back muscles--let strength work in your favor. Lower to the ground by bending your knees, not your back. Keeping your eyes focused upwards helps to keep your back straight.

22.6.7. **If you're straining, get help.** If an object is too heavy, or awkward in shape, have someone help you.

22.7 **Working posture must be relaxed, not forced.** When sitting, neither slump nor stretch. Seats with lumbar support, at a comfortable distance from the work are recommended.

22.8 Have adequate lighting for the job. Avoid strong lights shining in your visual field or undue reflections from surrounding area. If necessary, wear protective glasses or shields.

22.9 **Perform required job evaluations.** This involves formal examination of the range of motion, determining potential ergonomic impact; and redesigning the task if repetitive motions are required.

22.10 **Provide suitable aids** (e.g., seats, supports, rest breaks, etc.). These must be provided, and are designed to minimize ergonomic hazards.

23. TUBERCULOSIS (TB) EXPOSURE

23.1 **Shockwave Medical, Inc. is not a health care facility and employees have no patient contact; as such employees are considered to have no risk for TB exposure.**

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24. HISTORY BLOCK

Rev	Release Date	DCO#	Reason for Revision	Doc Owner
	X/XX/XXX X	XXXX X	Initial release.	

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EXHIBIT K

FORM OF SUBORDINATION, NON-DISTURBANCE AND ATTORNMENT AGREEMENT

(See attached.)

RECORDING REQUESTED BY AND WHEN RECORDED RETURN TO:

PREFERRED BANK
600 California Street, Suite 550
San Francisco, California 94108
Attention: Alice Huang

5353, 5403 Betsy Ross Drive, Santa Clara, CA
APN # 104-49-019

SUBORDINATION, NON-DISTURBANCE AND ATTORNMENT AGREEMENT

THIS SUBORDINATION,NON-DISTURBANCEANDATTORNMENT AGREEMENT (this "Agreement") is entered into by and among SHOCKWAVE MEDICAL, INC., a Delaware corporation ("Tenant"), BETSY ROSS PROPERTY, LLC, a Delaware limited liability company ("Borrower"), and PREFERRED BANK ("Lender").

RECITALS:

A. Borrower is the owner in fee simple of the real property described in Exhibit "A" attached hereto, together with the improvements thereon (the "Property").

B. Borrower and Tenant are parties to that certain Office Lease (Net), dated December__, 2019 (as the same may have been or may hereafter be amended, modified, renewed, extended or replaced, the "Lease") leasing to Tenant a portion of the Property (the "Premises"), as more particularly defined in the Lease.

C. Lender made a loan to Borrower (the "Loan"), which is evidenced by a Promissory Note (the "Note") and secured by, among other things, a Deed of Trust, Assignment of Rents and Leases, Security Agreement and Fixture Filing (the "Deed of Trust") and certain Assignments of Lessor's Interest in Rents and Leases (the "Assignment of Rents") encumbering the Property;

D. Lender, Borrower and Tenant desire to confirm their understanding with respect to the Lease and the Loan and the rights of Tenant and Lender thereunder.

AGREEMENT

NOW, THEREFORE, in consideration of the mutual covenants and agreements contained herein and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto agree as follows:

1. Subordination. The Lease and the leasehold estate created thereof, are hereby subordinated and subject to the Deed of Trust and the liens thereof and all advances and rights of Lender thereunder and to any and all renewals, modifications, consolidations and extensions thereof, as fully and as if the Deed of Trust and all of its renewals, modifications, consolidations and extensions had been executed, delivered and recorded prior to execution of the Lease. Without affecting the foregoing subordination, Lender may, from time to time: (a) extend, in whole or in part, by renewal or otherwise, the terms of payment or performance of any obligation secured by the Deed of Trust; (b) release, surrender, exchange or modify any obligation secured by the Deed of Trust, or any security for such obligation; or (c) settle or compromise any claim with respect to any obligation secured by the Deed of Trust or against any person who has given security for any such obligation. Notwithstanding the foregoing subordination, the provisions of the Lease concerning alterations and assignment and subletting shall prevail over any contrary or inconsistent provisions contained in the Deed of

Trust. In the event the consent of Lender is required before Tenant may take an action that it is otherwise permitted to take under the Lease, such consent of Lender shall not be unreasonably withheld or delayed.

2. Non-Disturbance. So long as the Lease is in effect and Tenant is not in default beyond applicable notice and cure periods under the Lease, Lender agrees for itself and its successors in interest and for any purchaser of the Property upon a foreclosure of the Deed of Trust or the sale of the Property, the Lease shall not be terminated and Tenant shall not be named as a party therein unless such joinder shall be required by law, provided, however, such joinder shall not result in the termination of the Lease or disturb the Tenant's possession, quiet enjoyment or use of the premises demised thereunder, and the sale of the Property in any such action or proceeding and the exercise by Lender of any of its other rights under the Deed of Trust shall be made subject to all rights of Tenant under the Lease. For purposes of this Agreement, a "foreclosure" shall include (but not be limited to) a sale under the power of sale contained in the Deed of Trust.

3. Attornment. After its receipt of notice from Lender or any person or entity which acquires the Property through a foreclosure (an "Acquiring Party") of the completion of a foreclosure under the Deed of Trust or that Lender or Acquiring Party has received a conveyance of the Property in lieu of foreclosure or otherwise obtained the right to possession of the Property, Tenant will be considered to have attorned to and recognized Lender or Acquiring Party as its substitute landlord under the Lease, and Tenant's possession, quiet enjoyment and use of the Property will not be disturbed. The foregoing provision will be self-operative, and will not require the execution of any further instrument or agreement by Tenant to effectuate the attornment and recognition. The attornment and recognition of a substitute landlord will be upon all of the terms set forth in the Lease. Notwithstanding anything to the contrary herein, if Lender or any Acquiring Party shall fail to obtain possession of the Letter of Credit (as such term is defined in the Lease) provided by Tenant to Landlord under the Lease (or any proceeds thereof), Tenant shall not be required to provide Lender or any Acquiring Party with a new or replacement Letter of Credit under the Lease unless and until any existing Letter of Credit provided by Tenant under the Lease is returned to Tenant and extinguished.

4. No Liability. Lender and Tenant agree that if Lender or any Acquiring Party shall become the owner of the Property by reason of the foreclosure of the Deed of Trust or the acceptance of a deed or assignment in lieu of foreclosure or otherwise, the Lease shall not be terminated or affected thereby but shall continue in full force and effect as a direct lease between Lender or any Acquiring Party and Tenant upon all of the terms, covenants and conditions set forth in the Lease, provided, however, that Lender or Acquiring Party shall not be:

(a) liable for the acts or omissions of a prior landlord (including Borrower), except for defaults of a continuing nature (such as ongoing maintenance and repair obligations). Tenant shall have no right to assert the same or claim for any damages arising therefrom as an offset defense or deficiency against Lender, Acquiring Party or their successors or assigns provided that Tenant shall not be deemed to waive any claim on account of any continuing violation of the Lease occurring after such date; or

(b) bound by any rent or additional rent which is payable on a monthly basis and which Tenant might have paid for more than one (1) month in advance to any prior landlord (including Borrower), unless such prepayment is required under the Lease; or

(c) bound by any amendment or modification of the Lease which would change the term of the Lease or the fixed rent specified therein made without Lender's prior written consent, excluding any termination of the Lease due to casualty, condemnation, Landlord default or Landlord insolvency or bankruptcy; or

(d) subject to any offsets or defenses that Tenant might have against any prior landlord (including Borrower); or

(e) bound to any representation or warranty relating to the tenant improvements or any construction or delays in construction of the tenant improvements.

Notwithstanding the foregoing, if Lender or any Acquiring Party shall become the owner of the Property by reason of the foreclosure of the Deed of Trust or the acceptance of a deed or assignment in lieu of foreclosure or otherwise, Lender or such Acquiring Party shall be bound by the terms of the Lease relating to (i) funding of the Allowance, (ii) payment of Landlord's share of the Amenity Space Cost, (iii) payment and performance of Landlord's Work, (iv) Landlord Delay and (v) Tenant's offset rights as set forth in Section 19.2 of the Lease.

5. Borrower's Default. Tenant shall provide Lender with copies of all written notices of any default by Borrower sent to Borrower pursuant to the Lease simultaneously with the transmission of such notices to the Borrower. Lender shall have the right but not the obligation to remedy any Borrower default under the Lease, or to cause any default of Borrower under the Lease to be remedied for the greater of (i) the same time period a Borrower as set forth in the Lease, or (ii) 15 days after Lender's receipt of written notice of default. Tenant shall accept performance by Lender of any term, covenant, condition or agreement to be performed by Borrower under the Lease with the same force and effect as though performed by Borrower.

6. Rent. Tenant hereby agrees to and with Lender that upon receipt from Lender of a demand by Lender under the Assignment of Rents, Tenant will pay to Lender directly all rents, additional rents, and other sums due under the Lease. In the event of the foregoing, Borrower hereby authorizes Tenant to pay to Lender directly all rents, additional rents, and other sums due under the Lease and Borrower hereby agrees that any such rents paid to Lender shall be deemed to be payment made to Borrower in satisfaction of Tenant's obligations under the Lease.. In addition, Borrower hereby indemnifies and holds Tenant harmless from and against any and all claims, causes of actions, demands, liabilities and losses of any kind or nature, including but not limited to attorney's fees and expenses, sustained by Tenant as a result of its payment of the Rent, additional rents, and other sums due under the Lease directly to Lender in accordance with the terms and conditions hereof.

7. Limitation of Liability. Lender shall not, solely by virtue of the Deed of Trust, the Assignment of Rents or this Agreement, be or become a mortgagee-in-possession. Lender shall not be subject to any liability or obligation under the Lease until Lender shall have acquired the interest of Borrower in the Premises or the Property, by foreclosure or otherwise. In addition, upon such acquisition, Lender shall have no obligation, nor incur any liability, beyond Lender's then equity interest, if any, in the Property (including any rent, income, condemnation and sales proceeds), and Tenant shall look solely to such interest of Acquiring Party or Lender in the Property and not to any other assets of Acquiring Party or Lender.

8. Notice. All notices or other written communications hereunder shall be deemed to have been properly given if given in accordance with the provisions of the Lease and addressed as follows:

If to Borrower:	BETSY ROSS PROPERTY, LLC c/o 230 California Avenue, Ste. 212 Palo Alto, California 94306 Attention: Property Manager
If to Tenant:	SHOCKWAVE MEDICAL, INC. 5403 Betsy Ross Drive Santa Clara, CA 95054 Attention: General Counsel
If to Lender:	PREFERRED BANK 600 California Street, Suite 550 San Francisco, California 94108 Attention: Ms. Alice Huang Facsimile: (415) 230-3280

or to such other address in the United States as such party from may from time to time designate by written notice to the other parties.

9. Insurance and Condemnation Proceeds. Notwithstanding anything to the contrary in the Dede of Trust, Lender shall make all insurance proceeds and condemnation awards received by it available for repair and restoration of the Premises to the extent necessary for Landlord and Tenant to fulfill their repair and restoration obligations under the Lease.

10. Miscellaneous.

(a) In the event of any conflict or inconsistency between the provisions of this Agreement and the Lease, the provisions of this Agreement shall govern.

(b) This Agreement shall inure to the benefit of the parties hereto and their respective successors and assigns.

(c) The captions appearing under the paragraph number designations of this Agreement are for convenience only and are not a part of this Agreement and do not in any way limit or amplify the terms and provisions of this Agreement.

(d) If any portion or portions of this Agreement shall be held invalid or inoperative, then all of the remaining portions shall remain in full force and effect and, so far as is reasonable and possible, effect shall be given to the intent manifested by the portion or portions held to be invalid or inoperative.

(e) This Agreement shall be governed by and construed in accordance with the laws of the State of California.

(f) This Agreement may be executed in any number of separate counterparts, each of which shall be deemed an original, but all of which, collectively and separately, shall constitute one and the same agreement.

(g) This Agreement may not be modified in any manner or terminated except by an instrument in writing executed by all the parties hereto, or if the Note is paid in full, this Agreement shall automatically terminate.

(h) This Agreement cannot be altered, modified, amended, waived, extended, changed, discharged or terminated orally or by any act on the part of Tenant, Borrower or Lender, but only by an agreement in writing signed by the party against whom enforcement of any alteration, modification, amendment, waiver, extension, change, discharge or termination is sought.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the dates set forth adjacent to their signatures below to be effective as of the date of the Deed of Trust.

"TENANT":
SHOCKWAVE MEDICAL, INC.,
a Delaware corporation

By _____

Its _____

"BORROWER":
BETSY ROSS PROPERTY, LLC,
a Delaware limited liability company

By TG USA Development Corp.
its Member

By _____

Its _____

"LENDER":
PREFERRED BANK

By _____

Its _____

ACKNOWLEDGEMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)
) ss.
County of _____)

On _____, 20__, before me, _____ , a Notary Public, personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

[Affix seal here]

_____
Signature of Notary Public

ACKNOWLEDGEMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)
) ss.
County of _____)

On _____, 20__, before me,_____ , a Notary Public, personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

[Affix seal here]

_____
Signature of Notary Public

ACKNOWLEDGEMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)
) ss.
County of _____)

On ____, 20____, before me, _____, a Notary Public, personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

[Affix seal here]

_____
Signature of Notary Public

EXHIBIT A

Description of Property

For APN/Parcel ID(s): 104-49-019

THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE CITY OF SANTA CLARA, COUNTY OF SANTA CLARA, STATE OF CALIFORNIA AND IS DESCRIBED AS FOLLOWS:

PARCEL ONE:

ALL OF PARCEL 105 AS SHOWN UPON THAT CERTAIN MAP ENTITLED, "PARCEL MAP MARRIOTT BUSINESS PARK UNIT NO. 2 IMPROVEMENT PROJECT NO. 174 BEING PORTIONS OF THE RANCHO PASTORIA DE LAS BORREGAS AND THE RANCHO ULISTAC AND IN SECTIONS 16, T6S. R1W, M.D.M.'', WHICH MAP WAS FILED FOR RECORD IN THE OFFICE OF THE RECORDER OF THE COUNTY OF SANTA CLARA, STATE OF CALIFORNIA ON FEBRUARY 17, 1978 IN BOOK 413 OF MAPS, AT PAGES 13, 14 AND 15.

PARCEL TWO:

ALL OF PARCEL 106 AS SHOWN UPON THAT CERTAIN MAP ENTITLED, "PARCEL MAP MARRIOTT BUSINESS PARK UNIT NO. 2 IMPROVEMENT PROJECT NO. 174 BEING PORTIONS OF THE RANCHO PASTORIA DE LAS BORREGAS AND THE RANCHO ULISTAC AND IN SECTIONS 16, T6S. R1W, M.D.M.", WHICH MAP WAS FILED FOR RECORD IN THE OFFICE OF THE RECORDER OF THE COUNTY OF SANTA CLARA, STATE OF CALIFORNIA ON FEBRUARY 17, 1978 IN BOOK 413 OF MAPS, AT PAGES 13, 14 AND 15.

Exhibit 10.15

FIRST AMENDMENT
TO
LOAN AND SECURITY AGREEMENT

THIS FIRST AMENDMENT TO LOAN AND SECURITY AGREEMENT (this "**Amendment**") is entered into this 11th day of February, 2020, by and between SILICON VALLEY BANK, a California corporation ("**Bank**"), and SHOCKWAVE MEDICAL, INC., a Delaware corporation ("**Borrower**").

RECITALS

A. Bank and Borrower have entered into that certain Loan and Security Agreement dated as of February 26, 2018 (the "**Existing Loan Agreement**"; the Existing Loan Agreement, as amended by this Amendment, and (as the same may from time to time be further amended, modified, supplemented or restated on or after the date hereof, the "**Loan Agreement**").

B. Bank has extended credit to Borrower for the purposes permitted in the Loan Agreement.

C. Borrower desires (i) for Bank to make a supplemental term loan to Borrower to refinance the Term Loan Advances, and (ii) to make certain other revisions to the Existing Loan Agreement as more fully set forth herein.

D. Bank and Borrower have agreed to so amend certain provisions of the Existing Loan Agreement, but only to the extent, in accordance with the terms, and in reliance upon the representations and warranties set forth below.

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing recitals and other good and valuable consideration, the receipt and adequacy of which is hereby acknowledged, and intending to be legally bound, the parties hereto agree as follows:

1. Definitions. Capitalized terms used but not defined in this Amendment shall have the meanings given to them in the Loan Agreement.

2. Amendments to Loan Agreement.

2.1 Section 2.2 (Revolving Line). Bank and Borrower hereby agree that (a) the Revolving Line is terminated, (b) Bank shall have no further obligation to make Advances thereunder, (c) Borrower shall have no further Obligations to Bank thereunder; provided, however, any Warrant and those obligations, liabilities, covenants, and terms that are expressly specified in any Loan Document as surviving that respective agreement's termination, including without limitation, Borrower's indemnity obligations set forth in the Loan Agreement, shall continue to survive notwithstanding the foregoing, and (d) Bank hereby waives the Termination Fee.

2.2 Section 2.3 (Term Loan). Section 2.3 of the Existing Loan Agreement is amended by adding the following after Section 2.3 as Section 2.3.1:

2.3.1 Supplemental Term Loan

(a) Availability. Subject to the terms and conditions of this Agreement, upon Borrower's request, Bank shall make a supplemental term loan to Borrower on or about the First Amendment Closing Date in the original principal amount of Sixteen Million Five Hundred Thousand Dollars ($16,500,000) (the "**Supplemental Term Loan Advance**"). After repayment, the Supplemental Term Loan Advance (or any portion thereof) may not be reborrowed. Borrower shall use a portion of the Supplemental Term Loan Advance to repay in full in cash all of the Term Loan Advances in accordance with Section 2.3(d) (it being understood, however, that (x) Bank is waiving, and Borrower shall not be required to pay, the Prepayment Fee in connection with such prepayment but (y) Borrower shall be required to pay the Final Payment due in connection therewith). Upon such prepayment, all of the Obligations owing to Bank under the Term Loan Advances shall be deemed to be satisfied and discharged in full.

(b) Interest Payments. With respect to the Supplemental Term Loan Advance, commencing on the first Payment Date following the Funding Date of the Supplemental Term Loan Advance and continuing on the Payment Date of each month thereafter, Borrower shall make monthly payments of interest, in arrears, on the principal amount of the Supplemental Term Loan Advance at the rate set forth in Section 2.5(a)(iii).

(c) Repayment. Commencing on the Supplemental Term Loan Amortization Date and continuing on each Payment Date thereafter, Borrower shall repay the Supplemental Term Loan Advance in (i) the Supplemental Applicable Number of equal monthly installments of principal, which interest shall be calculated at the rate set forth in Section 2.5(a)(iii), plus (ii) monthly payments of accrued interest at the rate set forth in Section 2.5(a)(iii). All outstanding principal and accrued and unpaid interest under the Supplemental Term Loan Advance, and all other outstanding Obligations with respect to the Supplemental Term Loan Advance, are due and payable in full on the Supplemental Term Loan Maturity Date.

(d) Permitted Prepayment. Borrower shall have the option to prepay all, but not less than all, of the Supplemental Term Loan Advance, provided Borrower (i) delivers written notice to Bank of its election to prepay the Supplemental Term Loan Advance at least ten (10) days prior to such prepayment, and (ii) pays, on the date of such prepayment (1) the outstanding principal plus accrued and unpaid interest with respect to the Supplemental Term Loan Advance, (2) the Supplemental Prepayment Fee, (3) the Supplemental Final Payment, and (4) all other sums, if any, that shall have become due and payable with respect to the Supplemental Term Loan Advance, including interest at the Default Rate with respect to any past due amounts.

(e) Mandatory Prepayment Upon an Acceleration. If the Supplemental Term Loan Advance is accelerated by Bank following the occurrence and during the continuance of an Event of Default, Borrower shall immediately pay to Bank an amount equal to the sum of (i) all outstanding principal plus accrued and unpaid interest with respect to the Supplemental Term Loan Advance, (ii) the Supplemental Prepayment Fee, (iii) the Supplemental Final Payment, and (iv) all other sums, if any, that shall have become due and payable with respect to the Supplemental Term Loan Advance, including interest at the Default Rate with respect to any past due amounts.

2.3 Section 2.5 (Payment of Interest on the Credit Extensions). Section 2.5(a) of the Existing Loan Agreement is amended by adding the following after subclause (ii) as subclause (iii):

(iii) Supplemental Term Loan Advance. Subject to Section 2.5(b), the principal amount outstanding under the Supplemental Term Loan Advance shall accrue interest at a floating per annum rate equal to the greater of (A) the Prime Rate minus one and one quarter of one percent (1.25%) and (B) three and one half of one percent (3.50%), which interest shall be payable monthly in accordance with Section 2.5(d) below.

2.4 Section 2.6 (Fees). Section 2.6 of the Existing Loan Agreement is hereby amended by adding the following immediately after clause (h) as clauses (i) and (j):

(i) Supplemental Prepayment Fee. The Supplemental Prepayment Fee, when due hereunder; and

(j) Supplemental Final Payment. The Supplemental Final Payment, when due hereunder.

2.5 Section 3.2 (Conditions Precedent to all Credit Extensions). Section 3.2 of the Existing Loan Agreement is hereby amended by deleting clause (a)(ii) thereof and replacing it with the following:

(ii) with respect to the request for the Supplemental Term Loan Advance, an executed Payment/Advance Form and any materials and documents required by Section 3.4;

2.6 Section 3.4 (Procedures for Borrowing). Section 3.4 of the Existing Loan Agreement is hereby amended by deleting clause (b) thereof and replacing it with the following:

(b) Supplemental Term Loan Advance. Subject to the prior satisfaction of all other applicable conditions to the making of the Supplemental Term Loan Advance set forth in this Agreement, to obtain the Supplemental Term Loan Advance, Borrower (via an individual duly authorized by an Administrator) shall notify Bank (which notice shall be irrevocable) by electronic mail by 12:00 noon Pacific time on the Funding Date of the Supplemental Term Loan Advance. Such

notice shall be made by Borrower through Bank's online banking program, provided, however, if Borrower is not utilizing Bank's online banking program, then such notice shall be in a written format acceptable to Bank that is executed by an Authorized Signer. Bank shall have received satisfactory evidence that the Board has approved that such Authorized Signer may provide such notices and request the Supplemental Term Loan Advance. In connection with such notification, Borrower must promptly deliver to Bank by electronic mail or through Bank's online banking program a completed Payment/Advance Form executed by an Authorized Signer together with such other reports and information, as Bank may request in its sole discretion. Bank shall credit proceeds of the Supplemental Term Loan Advance to the Designated Deposit Account. Bank may make the Supplemental Term Loan Advance under this Agreement based on instructions from an Authorized Signer or without instructions if the Supplemental Term Loan Advance is necessary to meet Obligations which have become due**.**

2.7 Section 5.1 (Due Organization, Authorization; Power and Authority). Section 5.1 of the Existing Loan Agreement is hereby amended by deleting the parenthetical at the end thereof and replacing it with the following:

(it being understood and agreed that Borrower (i) has delivered an updated Perfection Certificate in connection with the Supplemental Term Loan Advance and (ii) may otherwise from time to time update certain information in the Perfection Certificate after the Effective Date to the extent permitted by one or more specific provisions in this Agreement);

2.8 Section 5.3 (Accounts Receivable). Section 5.3 of the Existing Loan Agreement is hereby amended by deleting it in its entirety and replacing it with the following:

5.3 [Reserved].

2.9 Section 6.2 (Financial Statements, Reports).

(a) Section 6.2 of the Existing Loan Agreement is amended by deleting clauses (a) through (f) thereof in their entirety and replacing them with the following:

(a) [Reserved];

(b) [Reserved];

(c) as soon as available, but no later than forty-five (45) days after the final day of the first three fiscal quarters of each fiscal year, a company prepared consolidated balance sheet and income statement covering Borrower's consolidated operations for such fiscal quarter in a form acceptable to Bank (the "**Quarterly Financial Statements**"); provided that the timely filing of a 10-Q with the SEC by such date will be deemed to satisfy the requirement to provide the Quarterly Financial Statements;

(d) together with the Quarterly Financial Statements, a duly completed Compliance Statement, substantially in the form of Exhibit B;

(e) contemporaneously with any updates or amendments thereto, within thirty (30) days after the end of each fiscal year of Borrower, (1) annual operating budgets (including income statements, balance sheets and cash flow statements, by month) for the upcoming fiscal year of Borrower, and (2) annual financial projections for the following fiscal year (on a quarterly basis), in each case as approved by the Board, together with any related business forecasts used in the preparation of such annual financial projections;

(f) as soon as available and in any event within one hundred eighty (180) days following the end of Borrower's fiscal year, audited consolidated financial statements prepared under GAAP, consistently applied, together with an unqualified opinion (provided that such opinion may contain a going concern qualification typical for venture backed companies similar to Borrower) on the financial statements from an independent certified public accounting firm; provided that the timely filing of a 10-K with the SEC by such date will be deemed to satisfy the requirement to provide the annual financial statements;

(b) Section 6.2 of the Existing Loan Agreement is further amended by adding the following after clause (j) as clause (k):

(k) prompt written notice of any changes to the beneficial ownership information set out in items 2(d) through (g) of the Perfection Certificate. Borrower understands and acknowledges that Bank relies on such true, accurate and up-to-date beneficial ownership information to meet Bank's regulatory obligations to obtain, verify and record information about the beneficial owners of its legal entity customers.

2.10 Section 6.3 (Accounts Receivable). Section 6.3 of the Existing Loan Agreement is amended by deleting it in its entirety and replacing it with the following:

6.3 [Reserved].

2.11 Section 6.8 (Accounts). Subsection (a) of Section 6.8 of the Existing Loan Agreement is hereby deleted in its entirety and replaced with the following:

(a) Borrower shall, and shall cause any Subsidiary of Borrower and any Guarantor to maintain an aggregate account balance in accounts at or through Bank equal to at least fifty percent (50%) of all deposit account balances (excluding, for the avoidance of doubt, any investment, securities or commodities account balances) of Borrower, such Subsidiary and such Guarantor at any financial institution in the United States. Borrower, or any Subsidiary of Borrower or any Guarantor, shall maintain at least one business credit card with Bank.

2.12 Section 6.12 (Online Banking**)**. Section 6.12 of the Existing Loan Agreement is hereby amended by deleting clause (b) thereof in its entirety and replacing it with the following:

(b) Comply with the terms of Bank's Online Banking Agreement as in effect from time to time and ensure that all persons utilizing Bank's online banking platform are duly authorized to do so by an Administrator. Bank shall be entitled to assume the authenticity, accuracy and completeness on any information, instruction or request for a Credit Extension submitted via Bank's online banking platform and to further assume that any submissions or requests made via Bank's online banking platform have been duly authorized by an Administrator.

2.13 Section 6.13 (Formation **or Acquisition of Subsidiaries)**. Section 6.13 of the Existing Loan Agreement is hereby amended by deleting the first sentence leading up to (a) clause therein of such Section, and replacing it with the following:

"Notwithstanding and without limiting the negative covenants contained in Sections 7.3 and 7.7 hereof, promptly following the date that Borrower forms any direct or indirect Subsidiary or acquires any direct or indirect Subsidiary after the Effective Date (including, without limitation, pursuant to a Division), if Bank requests in its sole discretion, Borrower shall"

2.14 Section 7.1 (Dispositions). Section 7.1 of the Existing Loan Agreement is hereby amended by deleting the first sentence leading up to clause (a) therein of such Section, and replacing it with the following:

"Convey, sell, lease, transfer, assign, or otherwise dispose of (including, without limitation, pursuant to a Division) (collectively, "**Transfer**"), or permit any of its Subsidiaries to Transfer, all or any part of its business or property, except for Transfers"

2.15 Section 7.3 (Mergers or Acquisitions). Section 7.3 of the Existing Loan Agreement is hereby amended by deleting the first sentence of such Section and replacing it with the following:

"Merge or consolidate, or permit any of its Subsidiaries to merge or consolidate, with any other Person, or acquire, or permit any of its Subsidiaries to acquire, all or substantially all of the capital stock or property of another Person (including, without limitation, by the formation of any Subsidiary or pursuant to a Division)."

2.16 Section 8.1 (Payment Default). Section 8.1 of the Existing Loan Agreement is hereby amended by deleting clause (b) thereof and replacing it with the following:

(b) pay any other Obligations within three (3) Business Days after such Obligations are due and payable (which three (3) Business Day cure period shall not apply to payments due on the Revolving Line Maturity Date, the Term Loan Maturity Date or the Supplemental Term Loan Maturity Date).

2.17 Section 8.3 (Investor Abandonment). Section 8.3 of the Existing Loan Agreement is hereby amended by **deleting** it in its entirety and replacing it with the following:

8.3 Material Adverse Change. A Material Adverse Change occurs;

2.18 Section 12.1 (Termination Prior to Maturity Date; Survival). Section 12.1 of the Existing Loan Agreement is hereby amended by adding the following after the reference to "Term Loan Maturity Date":

"and the Supplemental Term Loan Maturity Date"

2.19 Section 13 (Definitions).

(a) The following terms and their respective definitions set forth in Section 13.1 of the Existing Loan Agreement are amended in their entirety and replaced with the following:

"**Administrator**" is an individual that is named:

(a) as an "Administrator" in the "SVB Online Services" form completed by Borrower with the authority to determine who will be authorized to use SVB Online Services (as defined in Bank's Online Banking Agreement as in effect from time to time) on behalf of Borrower; and

(b) as an Authorized Signer of Borrower in an approval by the Board. "**Credit Extension**" is any Advance, any Overadvance, Term Loan Advance, Supplemental Term Loan Advance or any other extension of credit by Bank for Borrower's benefit.

"**Obligations**" are Borrower's obligations to pay when due any debts, principal, interest, fees, Bank Expenses, the Termination Fee, the Prepayment Fee, the Anniversary Fees, the Final Payment, the Supplemental Prepayment Fee, the Supplemental Final Payment and other amounts Borrower owes Bank now or later, whether under this Agreement, the other Loan Documents (other than the Warrant), or otherwise, including, without limitation, all obligations relating to Bank Services and interest accruing after Insolvency Proceedings begin and debts, liabilities, or obligations of Borrower assigned to Bank, and to perform Borrower's duties under the Loan Documents (other than the Warrant or any other warrant to purchase issued to Bank by Borrower).

"**Payment Date**" is (a) with respect to Term Loan Advances and the Supplemental Term Loan Advance, the first (1st) calendar day of each month and (b) with respect to Advances, the last calendar day of each month.

"**Perfection Certificate**" is defined in Section 5.1 and includes any updated Perfection Certificate (or updates to the Perfection Certificate) contemplated or permitted hereby.

"Revolving Line" is an aggregate principal amount equal to Zero Dollars ($0).

b) The following defined terms are hereby deleted from Section 13.1 of the Existing Loan Agreement in their entirety: "**Investor Support**" and "**Monthly Financial Statements**".

(c) The following terms and their respective definitions are hereby added in alphabetical order to Section 13.1 of the Existing Loan Agreement as follows:

"**Division**" means, in reference to any Person which is an entity, the division of such Person into two (2) or more separate Persons, with the dividing Person either continuing or terminating its existence as part of such division, including, without limitation, as **contemplated** under Section 18-217 of the Delaware Limited Liability Company Act for limited liability companies formed under Delaware law, or any analogous action taken pursuant to any other applicable law with respect to any corporation, limited liability company, partnership or other entity.

"**First Amendment Closing Date**" is February 11, 2020.

"**Performance Milestone One**" means Bank's receipt of evidence reasonably satisfactory to Bank, on or before June 30, 2021, that Borrower's trailing twelve (12) month revenue for the trailing twelve (12) month period ending on June 30, 2021, is at least seventy-five percent (75%) of the revenue projected for such period in Borrower's financial projections approved by the Board; provided such projections must demonstrate year over year growth.

"**Performance Milestone Two**" means Bank's receipt of evidence reasonably satisfactory to Bank, on or before December 31, 2021, that (i) Borrower has received Premarket Approval from the United States Food and Drug Administration of Borrower's C2 Catheter and (ii) Borrower's trailing twelve (12) month revenue for the trailing twelve (12) month period ending on December 31, 2021, is at least seventy-five percent (75%) of the revenue projected for such period in Borrower's financial projections approved by the Board; provided such projections must demonstrate year over year growth.

"**Quarterly Financial Statements**" is defined in Section 6.2(c). "**Supplemental Applicable Number**" means (a) thirty (30) if the Supplemental Interest-Only Period ends on June 30, 2021, (b) twenty-four (24) if the Supplemental Interest-Only Period ends on December 31, 2021, and (c) eighteen (18) if the Supplemental Interest-Only Period ends on June 30, 2022.

"**Supplemental Final Payment**" is a payment (in addition to and not a substitution for the regular monthly payments of principal plus accrued interest) due on the earliest to occur of (a) the Supplemental Term Loan Maturity Date, or (b) the acceleration of the Supplemental Term Loan Advance, or (c) the prepayment of the Supplemental Term Loan Advance in full pursuant to Section 2.3.1(d) or 2.3.1(e), equal to One Million Five Hundred Sixty-Seven Thousand Five Hundred Dollars ($1,567,500).

"**Supplemental Interest-Only Period**" means, for the Supplemental Term Loan Advance, the period beginning on the Funding Date of the Supplemental Term Loan Advance and ending on (i) June 30, 2021 if Borrower does not achieve Performance Milestone One, (ii) December 31, 2021 if Borrower achieves Performance Milestone One but not Performance Milestone Two, and (iii) June 30, 2022 if Borrower achieves both Performance Milestone One and Performance Milestone Two.

"**Supplemental Prepayment Fee**" shall be an additional fee, payable to Bank, with respect to the Supplemental Term Loan Advance, in an amount equal to(a) three percent (3%) of the outstanding principal balance of the Supplemental Term Loan Advance if the prepayment is made before the date that is twelve (12) months after the First Amendment Closing Date, (b) two percent (2%) of the outstanding principal balance of the Supplemental Term Loan Advance if the prepayment is made on or after the date that is twelve (12) months after the First Amendment Closing Date but before the date that is twenty four (24) months after the First Amendment Closing Date, (c) one percent (1%) of the outstanding principal balance of the Supplemental Term Loan Advance if the prepayment is made on or after the date that is twenty four (24) months after the First Amendment Closing Date but before the date that is thirty six (36) months after the First Amendment Closing Date and (d) zero percent (0%) of the outstanding principal balance of the Supplemental Term Loan Advance if the prepayment is made on or after the date that is thirty six (36) months after the First Amendment Closing Date.

"**Supplemental Term Loan Advance**" is defined in Section 2.3.1 of this Agreement.

"**Supplemental Term Loan Amortization Date**" is, for the Supplemental Term Loan Advance, the first (1st) calendar day of the first (1st) month following the end of the Supplemental Interest-Only Period.

"**Supplemental Term Loan Maturity Date**" is, for the Supplemental Term Loan Advance, December 1, 2023.

2.20 Exhibit B (Compliance Statement). The Compliance Statement attached to the Existing Loan Agreement as Exhibit B is replaced in its entirety with the Compliance Statement attached hereto as Exhibit B. From and after the date hereof, all references in the Loan Agreement to the Compliance Statement shall be deemed to refer to the Compliance Statement in the form attached hereto as Exhibit B.

3. Limitation of Amendments.

3.1 The amendments set forth in **Section** 2, above, are effective for the purposes set forth herein and shall be limited precisely as written and shall not be deemed to (a) be a consent to any amendment, waiver or modification of any other term or condition of any Loan Document, or (b) otherwise prejudice any right or remedy which Bank may now have or may have in the future under or in connection with any Loan Document.

3.2 This Amendment shall be construed in connection with and as part of the Loan Documents and all terms, conditions, representations, warranties, covenants and agreements set forth in the Loan Documents, except as herein amended, are hereby ratified and confirmed and shall remain in full force and effect.

4. Representations and Warranties. To induce Bank to enter into this Amendment, Borrower hereby represents and warrants to Bank as follows:

4.1 Immediately after giving effect to this Amendment (a) the representations and warranties contained in the Loan Documents are true, accurate and complete in all material respects as of the date hereof (except to the extent such representations and warranties relate to an earlier date, in which case they are true and correct as of such date), and (b) no Event of Default has occurred and is continuing;

4.2 Borrower has the power and authority to execute and deliver this Amendment and to perform its obligations under the Loan Agreement;

4.3 The organizational documents of Borrower delivered to Bank on or prior to the date hereof remain true, accurate and complete and have not been amended, supplemented or restated and are and continue to be in full force and effect;

4.4 The execution and delivery by Borrower of this Amendment and the performance by Borrower of its obligations under the Loan Agreement have been duly authorized;

4.5 The execution and delivery by Borrower of this Amendment and the performance by Borrower of its obligations under the Loan Agreement do not and will not contravene (a) any law or regulation binding on or affecting Borrower, (b) any material contractual restriction with a Person binding on Borrower, (c) any order, judgment or decree of any court or other governmental or public body or authority, or subdivision thereof, binding on Borrower, or (d) the organizational documents of Borrower;

4.6 The execution and delivery by Borrower of this Amendment and the performance by Borrower of its obligations under the Loan Agreement, as amended by this Amendment, do not require any order, consent, approval, license, authorization or validation of, or filing, recording or registration with, or exemption by any governmental or public body or authority, or subdivision thereof, binding on Borrower, except as already has been obtained or made; and

4.7 This Amendment has been duly executed and delivered by Borrower and is the binding obligation of Borrower, enforceable against Borrower in accordance with its terms, except as such enforceability may be limited by bankruptcy, insolvency, reorganization, liquidation, moratorium or other similar laws of general application and equitable principles relating to or affecting creditors' rights.

5. Integration. This Amendment and the Loan Documents represent the entire agreement about this subject matter and supersede prior negotiations or agreements. All prior agreements, understandings, representations, warranties, and negotiations between the parties about the subject matter of this Amendment and the Loan Documents merge into this Amendment and the Loan Documents.

6. Counterparts. This Amendment may be executed in any number of counterparts and all of such counterparts taken together shall be deemed to constitute one and the same instrument.

7. Effectiveness. This Amendment shall be deemed effective upon (a) the due execution and delivery to Bank of this Amendment by each party hereto, and (b) Borrower's payment of Bank's legal fees and expenses in connection with the negotiation and preparation of this Amendment.

[Signature page follows.]

IN WITNESS WHEREOF, the parties hereto have caused this Amendment to be duly executed and delivered as of the date first written above.

BANK		**BORROWER**	
Silicon Valley Bank		Shockwave Medical, Inc.	
By:	**/s/** Robert Mingrone	By:	/s/ Dan Puckett
Name:	Robert Mingrone	Name:	Dan Puckett
Title:	Director	Title:	CFO

EXHIBIT B

COMPLIANCE STATEMENT

TO: SILICON VALLEY BANK Date: _____
FROM: SHOCKWAVE MEDICAL, INC.

Under the terms and conditions of the Loan and Security Agreement between Borrower and Bank (the "**Agreement**"), Borrower is in complete compliance for the period ending ,with all required covenants except as noted below. Attached are the required documents evidencing such compliance, setting forth calculations prepared in accordance with GAAP consistently applied from one period to the next except (i) as explained in an accompanying letter or footnotes and (ii) with respect to unaudited financial statements, for the absence of footnotes and subject to year-end adjustments. Capitalized terms used but not otherwise defined herein shall have the meanings given them in the Agreement.

Please indicate compliance status by circling Yes/No under "Complies" column.

Reporting Covenants	**Required**	**Complies**
Quarterly financial statements with Compliance Statement	Quarterly within 45 days for 1st three fiscal quarters	Yes No
Annual audited financial statements (CPA Audited)	FYE within 180 days	Yes No
10-Q, 10-K and 8-K	Within 5 days after filing with SEC	Yes No
Annual financial projections	FYE within 30 days, and as amended/updated	Yes No

The following are the exceptions with respect to the statements above: (If no exceptions exist, state "No exceptions to note.")

Exhibit 21.1

SHOCKWAVE MEDICAL, INC.

The following is a list of subsidiaries of the Company as of December 31, 2019:

Name	Jurisdiction of Incorporation
Shockwave Medical GmbH	Germany

Exhibit 23.1

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the Registration Statement on Form S-8 (No. 333-230113) pertaining to the ShockWave Medical, Inc. 2019 Equity Incentive Plan, the ShockWave Medical, Inc. Employee Stock Purchase Plan, and the ShockWave Medical, Inc. 2009 Equity Incentive Plan, of our report dated March 12, 2020, with respect to the consolidated financial statements of ShockWave Medical, Inc. included in this Annual Report (Form 10-K) for the year ended December 31, 2019.

/s/ Ernst & Young LLP

San Jose, California

March 12, 2020

Exhibit 31.1

CERTIFICATION PURSUANT TO
RULES 13a-14(a) AND 15d-14(a) UNDER THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Douglas Godshall, certify that:

1. I have reviewed this Annual Report on Form 10-K of ShockWave Medical, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) *Reserved*;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 12, 2020

By: /s/ Douglas Godshall
Douglas Godshall
President and Chief Executive Officer

Exhibit 31.2

CERTIFICATION PURSUANT TO
RULES 13a-14(a) AND 15d-14(a) UNDER THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Dan Puckett, certify that:

1. I have reviewed this Annual Report on Form 10-K of ShockWave Medical, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) *Reserved*;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 12, 2020

By: /s/ Dan Puckett
Dan Puckett
Chief Financial Officer

Exhibit 32.1

CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report of ShockWave Medical, Inc. (the "Company") on Form 10-K for the period ending December 31, 2019 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that:

(1) The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and result of operations of the Company.

Date: March 12, 2020

By: /s/ Douglas Godshall
Douglas Godshall
President and Chief Executive Officer

Exhibit 32.2

CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report of ShockWave Medical, Inc. (the "Company") on Form 10-K for the period ending December 31, 2019 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that:

(1) The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and result of operations of the Company.

Date: March 12, 2020

By: /s/ Dan Puckett
Dan Puckett
Chief Financial Officer