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Company Report

April 5, 2017

BioSig Technologies (BSGM - $1.49)

Healthcare / Biotechnology

Initiation of Coverage – PURE EP to fulfill an unmet need in a large and growing market

Ticker:	**BSGM**
Rating:	**Buy**
Price Target:	**$4.00**

We are initiating coverage of BioSig Technologies (BSGM) with a BUY rating and a $4 price target. BSGM is developing a complementary proprietary technology to minimize noise from cardiac recordings during electrophysiology (EP) studies and ablations. Their key product PURE EP could potentially help a large and growing market in clear need of improved technology. As ablations to treat Atrial Fibrillation (AF) and Ventricular Tachycardia (VT) become increasingly common, the unsatisfactory ~66% rate of success in the field could use some help. Additionally, we believe 2017 is off to a strong start (Mayo Clinic 10-year partnership announced on 3/17/17) and could be a critical year as BSGM expects to uplist to NASDAQ, publish in major journals, get 510(k) clearance from the FDA and finally launch PURE EP in 1Q18. While this catalyst-filled year could add value to shareholders on its own, we believe BSGM could represent an interesting acquisition target as M&A is common in the EP field. With multiple catalysts in 2017 targeting unmet medical needs, we believe BSGM is an exciting undiscovered opportunity. We are initiating coverage with a Buy rating, and a $4 price target.

- **PURE EP to fulfill an unmet medical need targeting a large market.** As ablations become first line therapy in certain arrhythmias, this >$3B and growing market is in need of improved EP recording devices, which currently yield a comparatively meager ~66% surgery success rate.
- **Off to a strong start, 2017 should be a defining year for BSGM.** With a 10-year partnership signed with the Mayo Clinic on 3/17/17, an uplisting to NASDAQ likely in the near term, multiple publications on deck, a 510(k) FDA clearance and a potential launch in 1Q18, 2017 should prove to be a transformative year for BSGM.
- **Hard to overstate the M&A appetite in the EP space.** As three companies (GE Healthcare, Abbott Laboratories, and Boston Scientific) share most of the EP recording market space, M&A in the field is common practice. We see 510(k) clearance in 2H17 as an important trigger for BSGM's potential acquisition.
- **Initiate with a Buy rating, $4 PT.** Our $4PT is based on a sum-of-the-parts analysis with $2.75/share for PURE EP in US, $0.75/share for PURE EP in EU and $0.50/share for cash and technology.

Trading Data:

Last Price (04/04/2017)	$1.49
52–Week High (04/29/2016)	$2.20
52–Week Low (08/02/2016)	$1.05
Market Cap. (MM)	$31.2
Shares Out. (MM)	20.95

Earnings Estimates: (per share)

(Dec)	1Q	2Q	3Q	4Q	FY	P/E
FY18E	(0.07)	(0.06)	(0.05)	(0.04)	(0.22)	NA
FY17E	(0.07)	(0.08)	(0.08)	(0.10)	(0.34)	NA
FY16	(0.15)	(0.32)	(0.07)	(0.06)	(0.59)	NA
FY15	(0.25)	(0.34)	0.01	(0.14)	(0.67)	NA

Source: Laidlaw & Company estimates

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5 Key Reasons to Own BioSig Technologies (BSGM)

1. **PURE EP to fulfill an unmet medical need targeting a huge market.** With ablations becoming increasingly common therapy for treating arrhythmias and only proven successful in ~66% of cases, there is a clear need for devices that could improve the current EP recording systems' accuracy by essentially differentiating true signal from noise. PURE-EP would be the first new device in EP recording in the last 20 years. With ~2,800 EP labs in U.S and ~1,200 labs ex-US, each with EP systems worth ~$250K and anywhere between ~2.7M to 6.1M Americans with AF, the market opportunity for PURE EP is impressive. Additionally, the EP global market is expected to grow from >$3B in 2014 to >$4.5B in 2019.

2. **Off to a strong start, 2017 should be a defining year for BSGM.** With an important strategic partnership signed with the Mayo Clinic on 3/17/17, and many important catalysts to come, 2017 should be a crucial year for BSGM. We anticipate an uplisting to NASDAQ, multiple publications in reputable Engineering and Cardiology Journals (1H17), a 510(k) submission (1H17) followed by clearance in 2H17 and launch in 1Q18.

3. **Hard to overstate the M&A appetite in the EP space.** With only 3 company (GE Healthcare, Abbott and Boston Scientific) sharing most of the electrophysiological recording market space, it isn't surprising that M&A activity is very common. Since 1998, acquisitions in the EP Sector have ranged from ~$90M to ~$25B anytime between prototype all the way through commercial stage companies. As stated previously, we believe 2017 should prove critical to BSGM and 510(k) clearance from the FDA should make it a highly coveted acquisition target.

4. **Collaborations with top medical centers, beneficial for visibility.** BSGM developed their concept with Texas Cardiac Arrhythmia and poc and prototype at UCLA in 2013/14. Since 2014, BSGM has been in collaborations with the Mayo Clinic for pre-clinical studies and advanced research programs. In July, 2016, BSGM initiated more pre-clinical work at Mount Sinai, Brigham and Women's and UH Case Medical Center in Cleveland. Finally on 3/17/17, BSGM announced a 10 year agreement with Mayo Clinic providing know-how, IP development and clinical resources for commercialization and technological development. This impressive list of collaborations should help BSGM's visibility and credibility in the medical community and eventually, in our view, as an acquisition target.

5. **A solid management team with a proven track record.** BSGM has a strong management team with an impressive wealth of knowledge and experience. CEO Greg Cash brings over 30 years of business experience included CEO positions and senior marketing roles at Medtronic. VP, Clinical Affairs Jay Millerhagen has over 25 years of experience in launching new medical technologies and has held important positions at St. Jude Medical and Boston Scientific. Executive chairman and director Ken Londoner brings a mix of leadership positions in cardiology and money management.

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Figure 1: Upcoming Potential Catalysts

Event	Timing
Uplist to NASDAQ	2017
Publications: Engineering Journal and Cardiology Journal	1H17
Submission FDA 510(k)	1H17
Clearance FDA 510(k)	2H17

Source: Company Reports; Laidlaw and Company estimates

Valuation

We value BSGM at $4 based primarily on our expectations for PURE EP in the US. We project a 2018 launch of PURE EP US with sales reaching $97M by year 6 of launch. We place a 3x multiple on PURE EP US 2023 sales and discount it back 6 years at 16% (510k clearance by 2H17). We project PURE EP to launch in EU in 2019 with sales reaching $48M by year 6 of launch. We anticipate BSGM will partner PURE EP EU launch, and we estimate a 10% royalty on top line sales to be paid to BSGM from the partner. Given that royalties drop straight to the bottom line as cash, we place an 10x multiple on our anticipated $4.8M in PURE EP EU royalties, discounted back 7 years at 7% (to account for the lower risk associated post PURE EP US launch). We value PURE EP US at $2.75/share, PURE EP EU at $0.75/share and cash (end'17) and technology value of $0.5/share for our $4 price target.

Figure 2: Sum-of-the-Parts Analysis

Sum-of-the-parts valuation		
Segment	Valuation (000's)	Per share value
PURE EP US	$122,478	$2.75
PURE EP ex-US	$31,858	$0.75
Cash (end of '17E)	$19,087	$0.50
	$173,423	**$4.00**
2017 fully diluted shares out (000)		44,548

Source: Company Reports; Laidlaw and Company estimates

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Company Description

BioSig Technologies (BSGM) is a development stage medical device company that is developing a proprietary technology platform designed to improve the rapidly growing $4B electrophysiology (EP) marketplace by minimizing noise and artifacts from cardiac recordings during EP studies and ablations. They are developing the PURE (Precise Uninterrupted Real-time evaluation of Electrograms) EP System, a surface electrocardiogram and intracardiac multichannel recording and analysis system that acquires, processes and displays electrocardiogram and electrograms required during electrophysiology studies and ablation procedures. These ablation procedures treat cardiac arrhythmias, which are broadly defined as a set of conditions in which the electrical activity of the heart is either irregular, faster or slower than normal. This type of heart disease afflicts ~14M Americans and two of the most prevalent and deadly types of arrhythmias consist of Atrial Fibrillation (AF) and Ventricular Tachycardia (VT).

BSGM will seek 510(k) clearance from the FDA, has achieved proof of concept through UCLA EP & Animal Labs and has performed preclinical studies at the Mayo Clinic in Minnesota. Collaborating with several of the nation's most prestigious cardiac arrhythmia centers such as Texas Cardiac Arrhythmia Institute, UCLA Cardiac Arrhythmia Center, U.H. Case Medical Center in Cleveland, William Beaumont Hospital in Michigan, Mount Sinai Medical Center in NY and Mayo Clinic in Minnesota; and led by a proven management team and a veteran, independent Board of Directors, Minneapolis-based BioSig is preparing to commercialize its PURE EP System.

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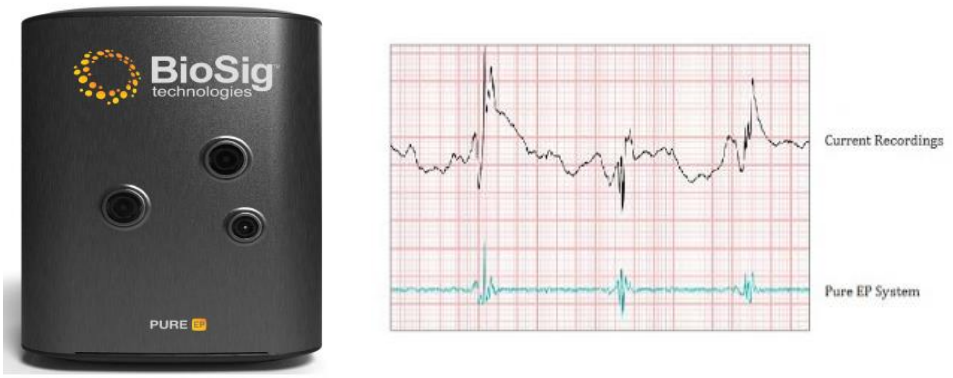
PURE EP System

The PURE EP System is designed to assist electrophysiologists in making clinical decisions in real-time by providing information that isn't always easily obtained, if at all, from any other equipment presently used in electrophysiology labs. The PURE EP Sytem's ability to acquire high fidelity cardiac signals could potentially increase these signals' diagnostic value, and therefore offer improved accuracy and efficiency of the EP studies and related procedures. BSGM is developing signal processing tools within the PURE EP System to assist electrophysiologists in further differentiating true signals from noise, and could provide guidance in identifying ablation targets.

Figure 3: BioSig's Pure EP System



Source: Company Presentation

BSGM is focused on improving the quality of cardiac recordings obtained during ablation of atrial fibrillation (AF), the most common cardiac arrhythmia commonly caused by poor blood flow, and ventricular tachycardia (VT), an arrthytmia evidenced by a fast heart rhythm originating from the lower chambers of the heart, which can be life-threatening.

Cardiac ablation is a procedure that corrects conduction of electrical impulses in the heart that cause arrhythmias. During this invasive procedure, a catheter is usually inserted using a venous access into a specific area of the heart. A special radiofrequency generator delivers energy through the catheter to small areas of the heart muscle that cause the abnormal heart rhythm. Ablation seems to be superior to pharmacological treatments and is becoming a first line of therapy for certain patients with arrhythmias (Circulation, 2009). Drug therapies are often ineffective and technology and procedures for ablation need improvement. In fact, ablation recurrence rates are >30% for paroxysmal AF and >45% for permanent AF (Journal of the American Heart Association, 2013). Although reports have indicated that the success rate of procedures is between 76% - 91%, research has shown that true success rate is more in the range of 66% (JACC, 2012). Research has also shown that one of the most technically difficult procedures in cardiac EP is commonly performed by doctors lacking the appropriate experience (JACC, 2012).

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BSGM wants to establish their proprietary technology as a new platform superior to the EP recording systems currently available in multiple ways. For instance, they anticipate higher quality cardiac signal acquisition for accurate and more efficient EP studies; precise, uninterrupted real time evaluations of electrocardiograms; reliable cardiac recordings to better determine precise ablation targets, strategy and end point of procedures and finally, a portable device that can be fully integrated into existing EP lab environments. This could lead to an increase in the number of procedures performed in each EP lab and possibly improved patient outcomes.

Brief Overview of BSGM History

In 2011, BSGM's initial concept validation was performed in collaboration with the Texas Cardiac Arrhythmia Institute, who provided recordings from EP systems and BSGM was able to import the data into the PURE EP System and reduce baseline wander, noise, and artifacts from the data. In 2013, the first proof-of-concept (poc) pre-clinical studies began. During the testing, they simultaneously recorded electrocardiogram and intracardiac signals on their poc unit and GE's CardioLab recording system (~50% of market share). An identical signal was applied to the input of both systems and the monitor of their poc unit was positioned next to the monitor of GE's CardioLab recording system. The electrocardiogram and intracardiac signals displayed on their poc unit showed a reduction in baseline wander, noise and artifacts. In 2015, three pre-clinical studies were performed at the Mayo Clinic in Rochester, MN. The goal of these pre-clinical studies is to show the clinical potential of the PURE EP System and its advantages over EP recorders currently used.

Dr. Samuel Asirvatham, a professor of medicine in the division of Cardiovascular Diseases and director of strategic collaboration for the Center of Innovation at the Mayo Clinic in Rochester, weighed in on the two animal studies comparing PURE EP to standard recording systems in terms of sensing of electrograms, effective pacing and ablation, and the potential for discemment between the individual components of complex signals. Here are some of the advantages he noted:

> *The improved resolution may translate to better ability to pick up specific signals and relate them to specific structure and substrate.*
>
> *The dynamic range of the system is larger – likely will translate into better ability to see both large and small (frequency and amplitude) signals with similar resolution. This is a major problem with present systems, where in order to see smaller signals, we have to amplify the signals, and in doing so we lose the ability to see larger signals without saturating these signals.*
>
> *The display options also more intuitive and flexible. For example, different filtering can be applied to the same signal and displayed as separate, simultaneous signals. Presently this is not possible with the existing systems to my knowledge.*

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This past year proved to show significant progress on the pre-clinical front for BSGM. In March 2016, a team from the Mayo Clinic presented "Enhanced Electrophysiology Recording Improves Signal Acquisition and Differentiation" at the 13th Annual International Dead Sea Symposium (IDSS) in Tel-Aviv. In this study, the aim was to test PURE-EP against traditional recording system. Before diving into the results, here's a chart comparing both systems in the study.

Figure 4: System A vs PURE-EP

	System A	PURE-EP
Bandwith	0.05-500Hz	0.05-1,000Hz
Sampling rate	977 Samples/sec	2,000 Samples/sec
Dynamic range	N/A	105dB
A/D converter	12-bit	24-bit
Minimum CMRR @ 60 Hz	100dB	110dB
Input impedance	$>10^9\Omega$	>500MΩ
Noise		1μV RMS
Gain	Programmable (From 50-10,000 in 8 steps)	10

Source: Mayo Clinic, 2016

These were extensive mappings of 3 acute canine studies of PURE-EP vs traditional system. Although further work is needed, these studies showed improved cardiac signal recording in terms of signal to noise ratio and visualization of juxtaposed signals, which are benefits that could likely add value in EP procedures.

Another important milestone for BSGM was the acceptance for publication in JACC Clinical Electrophysiology of their manuscript entitled "Novel electrophysiology signal recording system enables specific visualization of the Purkinje network and other high frequency signals". This manuscript demonstrates the superior acquisition of Purkinje potentials through improved high-frequency signal visualization in all sites of the cardiac conduction system. The article also displays the same electrogram signal with different processing options to highlight specific features while still displaying original electrogram signal. Finally the paper concludes that this could possibly improve mapping and ablation outcomes in arrhythmias dependent on Purkinje network. The following figure depicts intracardiac electrograms from CardioLab and PURE-EP signal recording systems.

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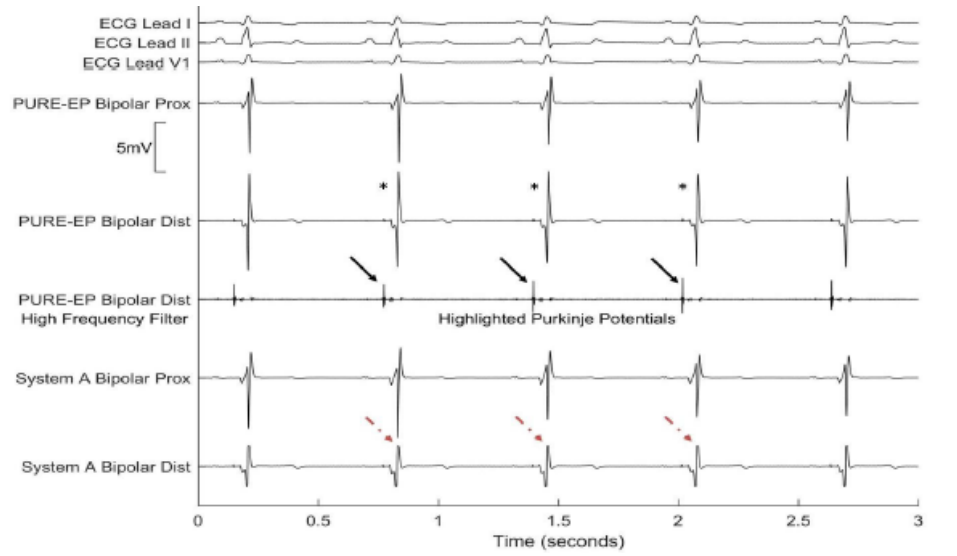
Figure 5: Intracardiac Electrograms of CardioLab vs PURE-EP



Source: JACC, 2016

In the previous figure, PURE EP was able to demonstrate high-frequency signals without artifact and clipping, which is emphasized by the *. Also, the PURE-EP automated filtering algorithm shows high-frequency signals that correlated with Purkinje potentials (black arrow). While CardioLab was also able to show the Purkinje signals, they had to increase gain to visualize it, which led to saturation and clipping of the ventricular electrogram (red arrow). On 2/21/17, it was announced that this manuscript published in the JACC: Clinical Electrophysiology was in the top 5 most read, discussed and shared articles in 2016, which we view as a real positive.

BSGM's latest important presentation came in August 2016, as BSGM presented a poster at the EMBC entitled "Enhanced Electrophysiology Recording System". The poster showed more high frequency information on PURE-EP system (PDist) vs GE's CardioLab (GDist). They observed a noisier baseline on GE's CardioLab Unipolar (GUni), which could obscure fractionated potentials. There was higher sampling rates in the PURE-EP, which once again enabled simultaneous viewing and recording of high/low amplitude and frequency signals without clipping. Finally, there was less high frequency information on GDist vs PDist.

On 3/17/17, BSGM announced a ten-year strategic partnership with Mayo Clinic and Mayo Clinic Ventures providing know-how, intellectual property, development and clinical resources to commercialize the PURE EP System and develop future technologies. BSGM will be working closely with two leading electrophysiologists, Drs. Samuel Asirvatham and K.L. Venkatachalam and expects joint patent filings from the relationship. We see this as a real positive for BSGM making it an even more attractive acquisition target, in our view.

As mentioned previously, BSGM intends to uplist to NASDAQ in 2017. In the 1H17, they are expecting publications in both engineering and cardiology journals as they also have on-going clinical trials at Mayo (Advanced Research Initiative), Mount Sinai (VT Scar Model) and UCLA (Advanced VT Mapping). There are important industry symposia still to come in 2017 such as Heart

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Rhythm Society (5/10-13), and Cardiostim (6/18-21). They believe that by 2H17, they should have obtained 510(k) marketing clearance from the FDA and will be able to commence marketing and commercialization of the PURE EP System in the US as a class II device in 1Q18. BSGM expects to add on applications the following year (Version 2.0). They also intend to launch in Europe, which we expect to start 1Q19. Extensive clinical work isn't required. They believe their initial customers will consist of hospitals and other health care facilities that operate EP labs. BSGM will be targeting the innovators and early adopters (~25% of EP physicians) in the first 2 years of launch before they expect the followers to come on board. The latter might require human data, which we expect should be available in 2018. We also expect the life cycle of the machines to be 3-5 years.

Figure 6: PURE EP System Prototype

Source: Company reports

The Field of Electrophysiology

EP is the study of the propagation of electrical impulses throughout the heart. EP studies are focused on the diagnosis and treatment of arrhythmias. The invasive cardiac EP study for the evaluation of cardiac conduction disorders has evolved rapidly from a research tool to an established clinical treatment and enables detailed analyses of the mechanism underlying cardiac arrhythmias and determines precise locations of the sites of origin of these arrhythmias, thereby, aiding in treatment strategies.

While medicine-based therapies have historically been used as first-line of therapy, their efficacy and safety is lackluster. Catheter ablation is thus now recommended for treating arrhythmia. As mentioned previously, catheter ablation involves advancing several flexible catheters into the patient's blood vessels, usually either in the femoral vein, internal jugular vein or subclavian vein. The catheters are then advanced towards the heart. Electrical impulses are then used to induce the arrhythmia and local heating or freezing is used to ablate the abnormal tissue that is causing it (Figure 7).

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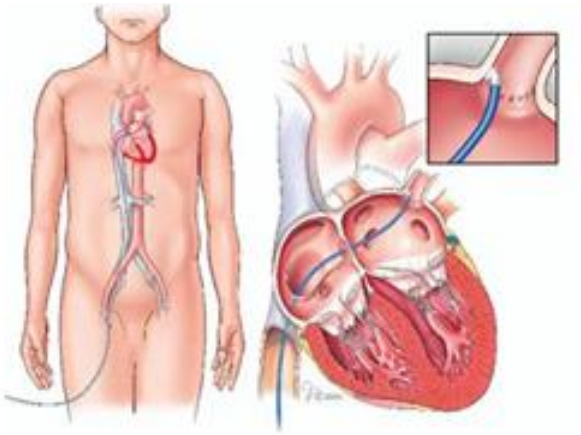
Figure 7: Catheter Ablation in Atrial Fibrillation



Source: Stopafib.org, 2011

Catheter ablation therapy of AF seems effective in ~80% of patients after an average of 1.3 procedures per patient, with ~70% of patients not needing antiarrhythmic drugs during intermediate follow-up (Arrhythmia and Electrophysiology, 2010).

Catheter ablation is usually performed by an electrophysiologist in a catheterization lab or a specialized electrophysiology lab (~2,800 in US and ~1,200 ex-US). Each of these is equipped with an electrophysiology recording system costing ~$250,000 leading to ~$500M market in the U.S. Between 2.7M and 6.1M Americans have AF. As is the case for many heart related illnesses, AF is more common amongst the older population. In fact, ~2% of people <65 years old and ~9% of people ≥ 65 years old have AF. As women tend to live longer than man, AF is more common in women. More than 750,000 hospitalizations happen each year due to AF and the condition contributes to ~130,000 deaths each year (CDC, 2015). In 2014, there were >260,000 total catheter ablations in the US and >600,000 WW each costing ~$15,000. Rapid growth is predicted in the U.S. market for EP mapping and ablation devices from 2012 to 2016, due to the medical community's growing focus on treating AF (Millennium Research Group, 2012). The global EP market (>$3B) over 2014 to 2019 is expected to grow at CAGR of 10.3% potentially reaching $4.73B by 2019. The main factors fueling this impressive growth are development of technologically advanced EP devices, rapid growth in aging population with high risk of target diseases, increasing incidence of arrhythmia cases and growing focus of key market players to expand their geographic presence (Marketsandmarkets, 2015).

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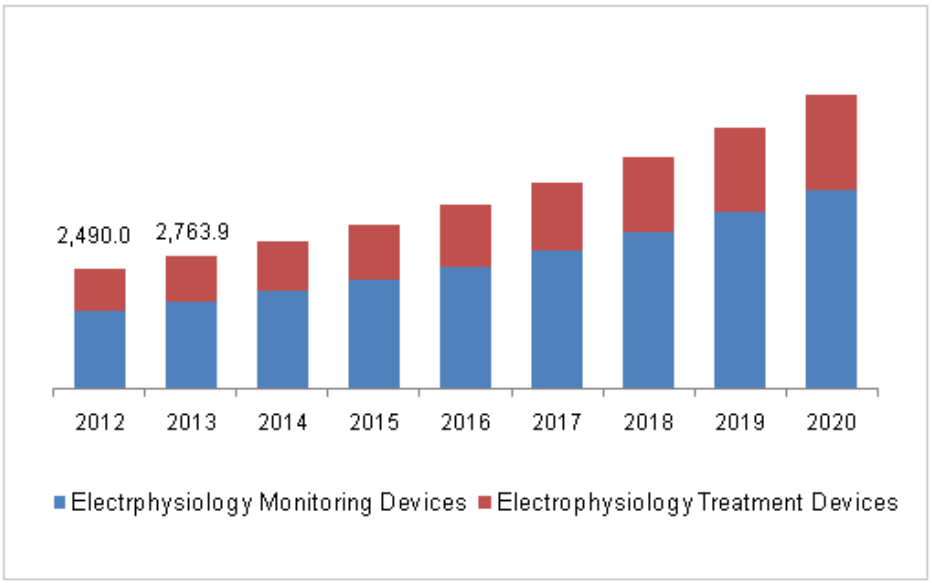
Figure 8: Global EP Devices Growth from 2012-2020 ($M)



Source: Grand View Research, 2014

Target Populations – Atrial Fibrillation and Ventricular Tachycardia

For patients who are candidates for ablation, an EP study is necessary to define the targeted sites for the ablation procedure. Ablation is mostly performed in AF and VT, which are both complex arrhythmias as their origins and mechanisms of action are misunderstood.

AF ablation is becoming the fastest growing procedure type in this market, increasing at an average annual rate of 16% from 2012 to 2016. Catheter-directed ablation of AF has been reported to represent a substantial achievement that promises better therapy for a large number of patients presently resistant to pharmacological or electrical conversion to sinus rhythm (ACCF/AHA/HRS, 2011). The first line of therapy for first stages of AF is Pulmonary Vein Isolation (PVI) during which areas around the Pulmonary Veins are ablated (blocked from firing inappropriate impulses). Unfortunately, PV tends to reconnect and there's an inability to detect gaps in ablation lines. Late stage AF also needs more than PVI.

Catheter ablation of VT in nonischemic heart diseases can be challenging, and outcomes across different diseases are incompletely defined (Arrhythmia and Electrophysiology, 2012). Not only are these procedures manually difficult, their length (3-6 hours) exposes the physicians to extensive radiation, requiring them to wear heavy lead vests.

VT is considered to be the most dangerous arrhythmias since it may result in ventricular fibrillation (VF), which restricts contracting and pumping of the blood to the brain and vital organs. In fact, VF is the number one cause of

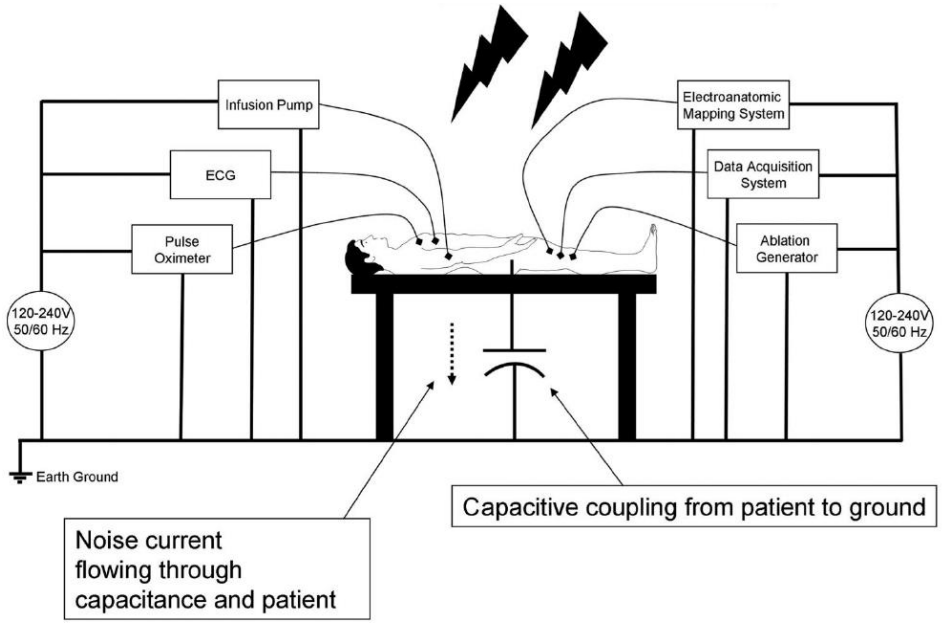
sudden cardiac death accounting for ~300,000 deaths in the U.S. each year. VT is typically treated with implantable cardioverter defibrillators (ICD), or a combination of ablation and ICD. After ICD, many patients continue to have symptoms and these shocks are physically and emotionally painful and lead to poor quality of life and adverse psychological outcomes in patients and their families.

The success of VT ablation varies, depending on the patient's specific heart condition. The procedure is most effective in patients with otherwise normal hearts, in whom the success rate is > 90%. In patients with structural heart disease resulting from scar or cardiomyopathy, success rates range between 50% and 75% at 6 to 12 months. In cases in which a patient experiences a recurrence, two of three patients will still have less ventricular tachycardia than before the initial ablation (Circulation, 2010). Scars are the main ablation targets since viable myocardium within scar is responsible for arrhythmia. The issue however is that identification of ablation targets within the scar is difficult because of low signal levels and presence of noise.

Eletrophysiology Lab Environment and Electrophysiology Recording Systems

The EP lab environment and recording systems create significant amounts of noise and artifacts during EP procedures. Current surface and intracardiac recording systems typically consist of large workstations interconnected by a complex set of cables that contribute to significant amounts of noise during signal acquisition. To remove noise and artifacts, recorders that are currently on the market offer a family of low pass, high pass and notch filters, but these filters alter signal information context.

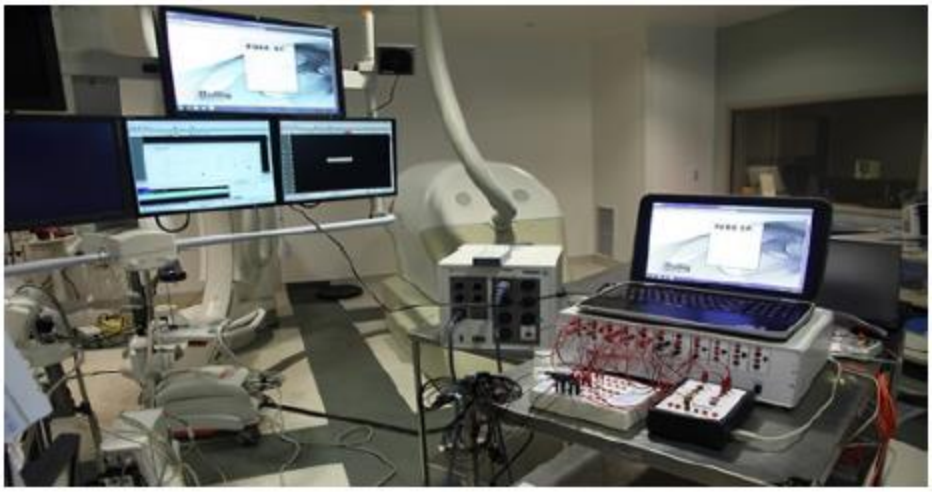
Figure 9: Radiofrequency Inteference



Source: Circ Arrhythm Electrophysiol, 2011

An electrophysiologist needs to evaluate the acquired cardiac signals and the patient's responses to any induced arrhythmias during the procedure. However, it is difficult for an electrophysiologist to synthesize the disparate information of all the monitors in the lab and calculate the real-time, 3-D orientation of the anatomy and the location of the recording and ablation catheters. There are also remote robotic and magnetic navigation systems that are being developed to address limitations of dexterity in controlling the catheter tip, especially during complex arrhythmia ablation procedures. BSGM believes that the PURE EP System will be able to deliver superior quality of recordings that will allow it to successfully integrate with the other advanced equipment found in the electrophysiology lab.

Figure 10: POC at UCLA's EP Lab



Source: Company Reports

The requirement for optimal signal integrity is further amplified during ablation treatments. Presently, one of the main objectives of the AF ablation procedure is to precisely identify, ablate and eliminate pulmonary vein potentials and one of the main objectives of the VT procedure is to map the arrhythmia substrate and precisely identify, ablate and eliminate small abnormal potentials. The information provided by recorders is essential for an electrophysiologist to determine ablation strategy during termination of both pulmonary vein potentials and VT. Therefore, it is important that the recording system's noise removal technique does not alter appearance and fidelity of these potentials. As a result, it is necessary that any new signal processing preserves signal fidelity as much as possible during EP recordings.

Competition

There are currently three large companies that share the majority of the electrophysiological recording market share. The following figure depicts the EP recording system they produce with a unit price of ~$250,000.

Figure 11: Competition

Company (system)	Market share (%)
GE Healthcare (CardioLab Recording System)	50%
Abbott (EP-WorkMate Rescording System)	35%
Boston Scientific (LabSystem PRO EP Recording System)	15%

Source: Company reports and Laidlaw estimates

BSGM believes that the old recording systems are built on relatively dated technologies and all use the same approach in applying digital filters to remove noise and artifacts. BSGM believes that such an approach loses cardiac signal fidelity and, in the case of ablation, the filters have a direct impact on the ablation strategy. With only a few companies with most of the market share of the industry, it isn't surprising that mergers and acquisitions are very common. The following figure depicts examples of companies that have been acquired by competitors.

Figure 12: Mergers and Acquisitions in the Space

Company	Acquirer	Valuation
St Jude Medical	Abbott	$25B
Kalila Medical	Abbott	Undisclosed
nContact	Atricure	$149M
CardioInsight	Medtronic	$272M
Topera Medical	Abbott	$350M
Bard EP	Boston Scientific	$275M
Rhythmia Medical	Boston Scientific	$410M
Ablation Frontiers	Medtronic	$465M
EP Medsystems	St. Jude	$92.1M
Cryopath	Medtronic	$380M
Endocardial Solutions	St. Jude	$272M
Prucka Engineering	GE	Undisclosed

Source: Company Reports and Laidlaw estimates

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Major Risks

Exogenous events could impact our outlook. We believe pharmaceutical companies have the least control over competitive, political, and regulatory risks. Although we have incorporated competitive assumptions into our forecasts, there may be other risks beyond the scope of our analysis. Changes in the drug reimbursement system, as well as any political or regulatory amendments, may significantly influence the earnings power of these companies.

Actual clinical results and the FDA's conclusions may deviate from expectations. Many of our assumptions are based on a review of incomplete clinical trial data available in the public domain. Often, our conclusions are drawn from early stage data, which may not be reflected by pivotal studies. Furthermore, the FDA's conclusions may not coincide with our own, materially changing our revenue and earnings assumptions.

Compliance issues, product recalls, and other mandates by regulatory authorities could materially change our expectations. Regulatory compliance issues, ranging from accounting irregularities to defective manufacturing practices, could materially change our assumptions and earnings outlook. Unanticipated product recalls and labeling changes could also have adverse consequences on our earnings assumptions.

Legal risks could lead to additional liabilities and revenue loss. In addition to the expenses incurred by patent challenges, product liability and other legal suits could occur and lead to additional liabilities and revenue loss, which could substantially change our financial assumptions.

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Management

Gregory D. Cash, President CEO, and Director. Greg Cash is an experienced executive and a seasoned industry veteran. He has over 30 years of business experience and has been CEO of several companies, both public and privately held, as well as run global business units of larger companies. Previous positions include CEO of NeuroTherm, HeartSine Technologies and Vasomedical. He began his career at Medtronic, where he served 14 years in increasingly senior sales and marketing positions.

Steve Chaussy, CFO. Mr. Chaussy has served as CFO on a part time basis since May 2011. Prior to 2001, Mr. Chaussy served as CFO for a large private distribution and wholesaling company, where he gained international experience. Mr. Chaussy is a graduate of Virginia Polytechnic Institute and State University and is a licensed certified public accountant in Virginia, California and Florida.

Asher Holzer, Ph.D., CSO. Dr. Holzer was appointed CSO of BioSig following years of service as a member of BioSig's Board of Directors. Dr. Holzer had served as a director of InspireMD, until 2013 an Israeli-based developer of a new stent platform, and served as that company's president from March 2011 until June 2012 and chairman from March 2011 until November 2011. In addition, Dr. Holzer co-founded InspireMD Ltd., the predecessor and later wholly-owned subsidiary of InspireMD, Inc., and served as its president and chairman of the board from April 2007 until June 2012. Dr. Holzer earned his Ph.D. in Applied Physics from the Hebrew University. Dr. Holzer is also an inventor and holder of numerous patents.

Jay Millerhagen, VP, Clinical Affairs. Mr. Millerhagen has over 25 years of experience developing, evaluating and launching new medical technologies and therapies. Most recently, Mr. Millerhagen served as VP, Clinical Affairs and Market Development for RESPICARDIA. Prior to joining RESPICARDIA, Mr. Millerhagen served in positions of increasing responsibility at St. Jude Medical. From 2011 to 2012, as VP, Clinical Affairs, he led a team of 20 in-house clinical personnel and a team of 22 field clinical engineers to execute a series of clinical studies targeted at addressing cardiac arrhythmias. His team was the first to design, submit and secure approval of an IDE from the FDA for a novel open irrigated ablation catheter based indication for AF. From 1989 to 2007, Mr. Millerhagen held senior positions at Boston Scientific. During his tenure at Boston Scientific he directed numerous areas of cardiovascular health. Mr. Millerhagen received his MBA from the University of St. Thomas, earned an MS in Exercise Physiology from St. Cloud State University. He has been member of the Heart Rhythm Society (NASPE), the Heart Failure Society of America, and the American College of S ports Medicine.

Kenneth Londoner, Executive Chairman and Director. Mr. Londoner has served as director since February 2009 and as executive chairman since November 2013. Mr. Londoner founded BioSig Technologies in 2009. Mr. Londoner is the Managing Partner of Endicott Management Partners. From 2007 to 2009, Mr. Londoner was the executive VP of NewCardio. Mr. Londoner also served as a Director and the architect for the turnaround at Alliqua BioMedical (ALQA) from 2012 to 2014. Mr. Londoner was the founder and managing partner of Red Coat Capital Management. Mr. Londoner graduated from Lafayette College in 1989 with a degree in economics and finance and received his MBA from NYU's Stern School of Business in 1994.

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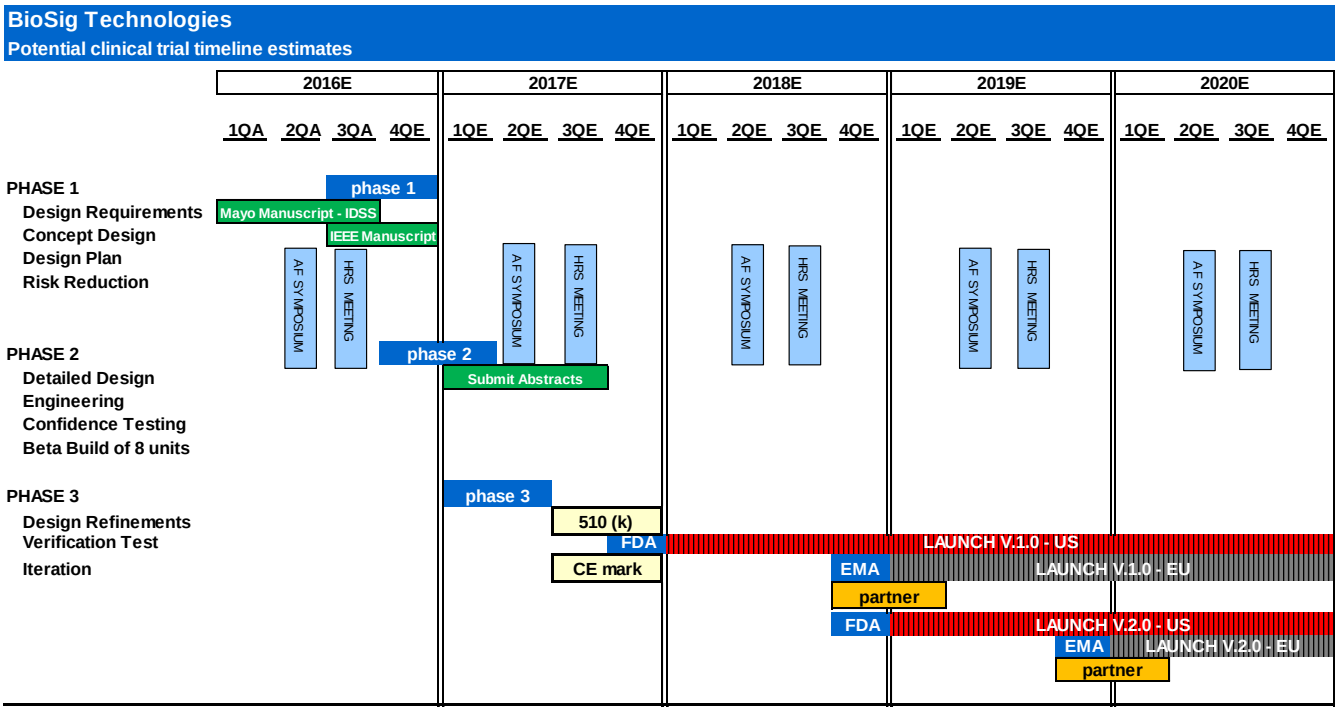
Figure 13: Potential Clinical Trial Timeline



Source: Company Reports; Laidlaw & Company estimates

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Figure 14: Quarterly Income Statement

BioSig Technologies
Quarterly income statement

($000's except per share)	2015A Year	2016A 1QA	2016A 2QA	2016A 3QA	2016A 4QA	2016A Year	2017E 1QE	2017E 2QE	2017E 3QE	2017E 4QE	2017E Year
Revenues											
PURE EP-US sales											
PURE EP EU royalties											
Total Revenues											
COGS											
Gross margin											
SG&A	10,795	1,939	4,381	992	1,188	8,499	1,250	1,500	1,750	2,500	7,000
R&D	1,239	372	1,153	561	569	2,655	525	550	575	600	2,250
Depreciation	10	3	2	3	3	10	3	3	3	3	12
Operating income/(loss)	**(12,044)**	**(2,314)**	**(5,536)**	**(1,555)**	**(1,759)**	**(11,164)**	**(1,778)**	**(2,053)**	**(2,328)**	**(3,103)**	**(9,262)**
Interest (exp) income	(1)		1			0					0
Gain (loss) on ch. In fair value	3,114	(268)	(556)	18	384	(423)	50	50	50	50	200
Other	(530)					0					0
Total other income (expense)	**2,583**	**(268)**	**(555)**	**18**	**384**	**(423)**	**50**	**50**	**50**	**50**	**200**
(Loss) income before income tax	**(9,461)**	**(2,583)**	**(6,091)**	**(1,537)**	**(1,376)**	**(11,587)**	**(1,728)**	**(2,003)**	**(2,278)**	**(3,053)**	**(9,062)**
Income Taxes (benefit)											
Net (loss) income	**(9,461)**	**(2,583)**	**(6,091)**	**(1,537)**	**(1,376)**	**(11,587)**	**(1,728)**	**(2,003)**	**(2,278)**	**(3,053)**	**(9,062)**
						0					
Pref. Stock dividend	(352)	(32)	(28)	(25)	(25)	(110)					
NI/(loss) as reported	**(9,813)**	**(2,615)**	**(6,120)**	**(1,562)**	**(1,400)**	**(11,697)**					
Adj-EPS ex-non-cash	**($0.67)**	**($0.15)**	**($0.32)**	**($0.07)**	**($0.06)**	**($0.59)**	**($0.07)**	**($0.08)**	**($0.08)**	**($0.10)**	**($0.34)**
EPS as reported	**($0.70)**	**($0.15)**	**($0.32)**	**($0.08)**	**($0.07)**	**($0.60)**					
Shares out (000)	14,103	17,074	18,876	20,581	21,432	19,491	23,432	25,432	28,289	30,539	26,923
Fully diluted shares (000)	29,943	33,007	36,198	37,731	43,374	37,577	40,932	42,932	46,039	48,289	44,548

Source: Company Reports; Laidlaw & Company estimates

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Figure 15: Annual Income Statement

BioSig Technologies
Annual income statement

($000's except per share)	2015A	2016A	2017E	2018E	2019E	2020E	2021E	Comments
Revenues								PURE EP US launch V.1.0 1Q18
PURE EP-US				$7,350	$24,528	$46,286	$51,339	PURE EP US launch V.2.0 1Q19
								PURE EP EU launch V.1.0 1Q19
PURE EP ex-US royalty					95	532	1,793	PURE EP EU launch V.2.0 1Q20
Total Revenues				**$7,350**	**$24,624**	**$46,818**	**$53,132**	royalties only for EU
COGS	0	0	0	2,573	8,585	16,431	18,482	
Gross margin	**0**	**0**	**0**	**4,778**	**16,039**	**30,386**	**34,650**	
SG&A	10,795	8,499	7,000	10,500	13,500	15,500	17,500	
R&D	1,239	2,655	2,250	2,650	3,050	3,450	3,850	
Operating income/(loss)	**(12,044)**	**(11,164)**	**(9,262)**	**(8,385)**	**(523)**	**11,350**	**13,288**	
Interest expense	(1)	0	0	0	0	0	0	
Conv note extinguish	3,114	(423)	200	300	300	400	400	
Other	(530)	0	0	0	0	0	0	
Total other loss	**2,583**	**(423)**	**200**	**300**	**300**	**400**	**400**	
Adj-Net income/(loss)	**(9,461)**	**(11,587)**	**(9,062)**	**(8,085)**	**(223)**	**11,750**	**13,688**	
Series A convert premium	(352)	(110)						
Other convert premium	0	0						
NI/(loss) as reported	**(9,813)**	**(11,697)**						
Adj-EPS ex-non-cash	**($0.67)**	**($0.59)**	**($0.34)**	**($0.22)**	**($0.00)**	**$0.15**	**$0.15**	
EPS as reported	**($0.70)**	**($0.60)**						
Shares out (000)	14,103	19,491	26,923	36,352	46,477	57,602	69,727	
Fully diluted shares (000)	29,943	37,577	44,548	54,227	64,602	75,977	88,414	
Cash balance	$953	$1,056	$9,087	$9,462	$18,449	$40,159	$64,557	

Source: Company Reports; Laidlaw & Company estimates

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Figure 16: Balance Sheet

BioSig Technologies
Balance sheet

($000's except per share)	2015A	1Q16A	2Q16A	3Q16A	2016A	2017E	2018E	2019E	2020E	2021E
Current Assets										
Cash and equivalent	$953	$138	$705	$150	$1,056	$9,087	$9,462	$18,449	$40,159	$64,557
Total Current Assets	**985**	**149**	**847**	**285**	**1,190**	**9,197**	**9,582**	**18,579**	**40,299**	**64,707**
Property and equip, net	18	16	19	23	24	22	24	26	28	30
Deposits	28	28	28	28	28	30	32	34	36	38
Deferred tax assets										
Total Assets	**1,031**	**192**	**893**	**335**	**1,242**	**9,219**	**9,606**	**18,605**	**40,327**	**64,737**
Current Liabilites										
Total Current Liabilites	**2,470**	**2,758**	**3,221**	**3,383**	**2,959**	**3,250**	**3,500**	**3,750**	**4,000**	**4,250**
Series C Pred. Stock	1,471	1,396	1,090	1,090	1,070	1,000	1,000	1,000	1,000	1,000
Total Liabilities	**3,941**	**4,154**	**4,311**	**4,473**	**4,029**	**4,250**	**4,500**	**4,750**	**5,000**	**5,250**
Shareholders' Equity										
Common stock	17	17	20	21	23	22	25	27	30	32
Additional paid in capital	29,314	30,845	37,479	38,295	41,019	57,838	66,057	75,027	84,746	95,216
Accumulated deficit	(32,242)	(34,825)	(40,917)	(42,454)	(43,829)	(52,891)	(60,976)	(61,199)	(49,449)	(35,761)
Total SE (deficit)	**(2,911)**	**(3,962)**	**(3,418)**	**(4,138)**	**(2,787)**	**4,969**	**5,106**	**13,855**	**35,327**	**59,487**
Total liabilities & SE	**1,031**	**192**	**893**	**335**	**1,242**	**9,219**	**9,606**	**18,605**	**40,327**	**64,737**

Source: Company Reports; Laidlaw & Company estimates

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Figure 17: Cash Flow Statement

BioSig Technologies
Statement of cash flows

($000's except per share)	2015A	1Q16A	2Q16A	3Q16A	2016A	2017E	2018E	2019E	2020E	2021E
Operating Cash Flow										
Net Income/Loss	(9,461)	(2,583)	(8,675)	(10,212)	(11,587)	(9,062)	(8,085)	(223)	11,750	13,688
Depreciation	10	3	5	8	10					
Amortization of debt	585		825			1,000	1,250	1,500	1,750	2,000
Change in derivative liabilities	(3,114)	268		807	423	750	1,000	1,250	1,500	1,750
Equity based compensation	7,968	1,119	5,142	5,453	6,000	5,750	6,000	6,250	6,500	6,750
Net Chg Assets and Liabs	(513)	25	(63)	100	47	208	225	225	225	225
Cash from operations	**(4,524)**	**(1,168)**	**(2,766)**	**(3,845)**	**(5,107)**	**(1,354)**	**391**	**9,002**	**21,725**	**24,413**
Investing Activities										
PP&E	(16)		(6)	(12)	(16)	(15)	(15)	(15)	(15)	(15)
Cash from investing	**(18)**	**0**	**(6)**	**(12)**	**(16)**	**(15)**	**(15)**	**(15)**	**(15)**	**(15)**
Financing Activities										
Proceeds from sale of common stock	4,760	352	2,524	3,054	5,226	9,400	0	0	0	0
Proceeds from sale of Series C pref. stock	450									
Proceeds from exercise of options	21									
Proceeds from exercise of warrants	25									
Cash from financing	**5,256**	**352**	**2,524**	**3,054**	**5,226**	**9,400**	**0**	**0**	**0**	**0**
Change in cash	**713**	**(816)**	**(248)**	**(803)**	**103**	**8,031**	**376**	**8,987**	**21,710**	**24,398**
Cash, start of period	240	953	953	953	953	1,056	9,087	9,462	18,449	40,159
Cash, end of period	**953**	**138**	**705**	**150**	**1,056**	**9,087**	**9,462**	**18,449**	**40,159**	**64,557**

Source: Company Reports; Laidlaw & Company estimates

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Additional information available upon request.

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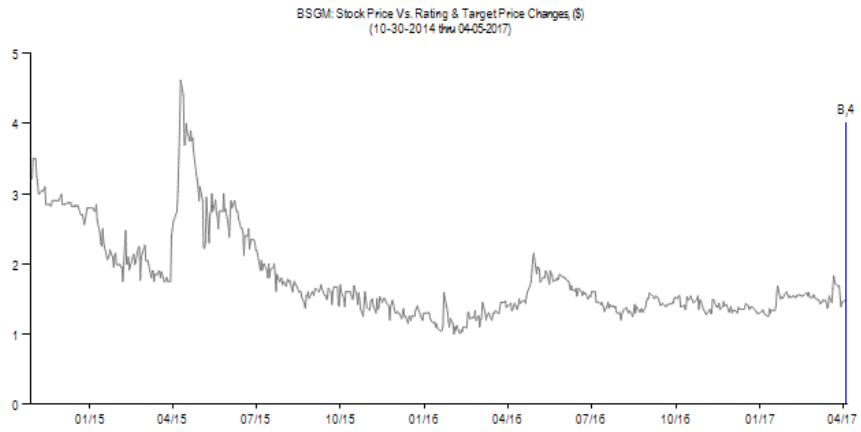
Rating and Price Target Change History



3 Year Rating Change History

Date	Rating	Closing Price ($)
04/05/2...	Buy (B)	1.49*

3 Year Price Change History

Date	Target Price ($)	Closing Price, ($)
04/05/2...	4.00	1.49*

** Previous Close4/4/2017*

Source: Laidlaw & Company **Created by: Blue-Compass.net**

Laidlaw & Company Rating System*		% of Companies Under Coverage With This Rating	% of Companies for which Laidlaw & Company has performed services for in the last 12 months	
			Investment Banking	Brokerage
Strong Buy (SB)	Expected to significantly outperform the sector over 12 months.	2.33%	2.33%	0.00%
Buy (B)	Expected to outperform the sector average over 12 months.	65.12%	30.23%	2.33%
Hold (H)	Expected returns to be in line with the sector average over 12 months.	2.33%	0.00%	0.00%
Sell (S)	Returns expected to significantly underperform the sector average over 12 months.	4.65%	0.00%	0.00%

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Abbot Laboratories (ABT – Not Rated)
Boston Scientific (BSX – Not Rated)

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