HARVARD BIOSCIENCE INC
Form 10-Q
May 10, 2018

UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

WASHINGTON, DC 20549

FORM 10-Q

x **Quarterly report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934**

For the quarterly period ended March 31, 2018

¨ **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 001-33957

HARVARD BIOSCIENCE, INC.

(Exact Name of Registrant as Specified in Its Charter)

Delaware	**04-3306140**
(State or Other Jurisdiction of Incorporation or Organization)	**(IRS Employer Identification No.)**

84 October Hill Road, Holliston, MA	**01746**
(Address of Principal Executive Offices)	**(Zip Code)**

(508) 893-8999

(Registrant's telephone number, including area code)

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. x YES ¨ NO

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted 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 and post such files). x YES ¨ NO

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

Large accelerated filer	¨	Accelerated filer	x

Non-accelerated filer	¨ (Do not check if a smaller reporting company)	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 x NO

Indicate the number of shares outstanding of each of the issuer's classes of common stock, as of the latest practicable date.

As of May 3, 2018, there were 35,980,459 shares of common stock, par value $0.01 per share, outstanding.

HARVARD BIOSCIENCE, INC.

FORM 10-Q
For the Quarter Ended March 31, 2018

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PART I. FINANCIAL INFORMATION

Item 1. Financial Statements.

HARVARD BIOSCIENCE, INC.

CONSOLIDATED BALANCE SHEETS

(Unaudited, in thousands, except share and per share data)

	March 31, 2018	December 31, 2017
Assets		
Current assets:		
Cash and cash equivalents	$5,991	$5,192
Accounts receivable, net of allowance for doubtful accounts of $234 and $193, respectively	18,958	13,382
Inventories	27,902	16,848
Other receivables and other assets	2,959	3,709
Current assets held for sale	-	8,404
Total current assets	55,810	47,535
Property, plant and equipment, net	5,821	3,743
Deferred income tax assets	1,102	182
Amortizable intangible assets, net	49,370	10,030
Goodwill	56,239	36,336
Other indefinite lived intangible assets	1,253	1,244
Other assets	1,352	324
Long term assets held for sale	-	9,960
Total assets	$170,947	$109,354
Liabilities and Stockholders' Equity		
Current liabilities:		
Current portion, long-term debt	$1,413	$2,765
Accounts payable	7,359	4,410
Deferred revenue	3,853	505
Accrued income taxes	538	395
Accrued expenses	7,689	3,816
Other liabilities - current	1,432	293
Current liabilities held for sale	-	1,857
Total current liabilities	22,284	14,041

Long-term debt, less current installments	61,569	8,983
Deferred income tax liabilities	1,702	2,653
Other long term liabilities	6,098	1,466
Long term liabilities held for sale	-	1,311
Total liabilities	91,653	28,454
Commitments and contingencies		
Stockholders' equity:		
Preferred stock, par value $0.01 per share, 5,000,000 shares authorized	-	-
Common stock, par value $0.01 per share, 80,000,000 shares authorized; 43,409,357 and 42,763,985 shares issued and 35,663,850 and 35,018,478 shares outstanding, respectively	422	419
Additional paid-in-capital	220,020	218,792
Accumulated deficit	(121,031)	(116,967)
Accumulated other comprehensive loss	(9,449)	(10,676)
Treasury stock at cost, 7,745,507 common shares	(10,668)	(10,668)
Total stockholders' equity	79,294	80,900
Total liabilities and stockholders' equity	$170,947	$109,354

See accompanying notes to unaudited consolidated financial statements.

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HARVARD BIOSCIENCE, INC.

CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE LOSS

(Unaudited, in thousands, except per share data)

	Three Months Ended March 31,	
	2018	2017
Revenues	$26,759	$18,086
Cost of revenues	13,490	8,509
Gross profit	13,269	9,577
Sales and marketing expenses	5,646	3,478
General and administrative expenses	5,384	4,788
Research and development expenses	2,402	1,285
Amortization of intangible assets	1,103	376
Total operating expenses	14,535	9,927
Operating loss	(1,266)	(350)
Other expense:		
Foreign exchange	(347)	(143)
Interest expense, net	(894)	(163)
Other expense, net	(2,738)	(94)
Other expense, net	(3,979)	(400)
Loss from continuing operations before income taxes	(5,245)	(750)
Income tax expense (benefit)	605	(7)
Loss from continuing operations	(5,850)	(743)
Discontinued operations:		
Income (loss) from discontinued operations before income taxes	913	(293)
Income tax (benefit) expense	(873)	30
Income (loss) from discontinued operations	1,786	(323)
Net loss	$(4,064)	$(1,066)
Loss per share:		
Basic loss per common share from continuing operations	$(0.16)	$(0.02)
Basic earnings (loss) per common share from discontinued operations	0.05	(0.01)
Basic loss per common share	$(0.11)	$(0.03)
Diluted loss per common share from continuing operations	$(0.16)	$(0.02)
Diluted earnings (loss) per common share from discontinued operations	0.05	(0.01)

Diluted loss per common share	$(0.11)	$(0.03)
Weighted average common shares:		
Basic	35,463	34,579
Diluted	35,463	34,579
Comprehensive loss:		
Net loss	$(4,064)	$(1,066)
Foreign currency translation adjustments	1,506	942
Derivatives qualifying as hedges, net of tax:		
(Loss) gain on derivative instruments designated and qualifying as cash flow hedges	(254)	4
Amounts reclassified from accumulated other comprehensive loss to net loss	(25)	3
Total comprehensive loss	$(2,837)	$(117)

See accompanying notes to unaudited consolidated financial statements.

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HARVARD BIOSCIENCE, INC.

CONSOLIDATED STATEMENTS OF CASH FLOWS

(Unaudited, in thousands)

	Three Months Ended March 31,	
	2018	2017
Cash flows from operating activities:		
Net loss	$(4,064)	$(1,066)
Adjustments to reconcile net loss to net cash provided by (used in) operating activities:		
Stock compensation expense	1,012	863
Depreciation	495	306
Gain on sale of Denville	(1,227)	-
Amortization of catalog costs	6	9
Provision for (recovery of) allowance for doubtful accounts	5	(15)
Amortization of intangible assets	1,150	599
Amortization of deferred financing costs	276	19
Deferred income taxes	(1,354)	-
Changes in operating assets and liabilities:		
Decrease in accounts receivable	149	410
Decrease (increase) in inventories	799	(300)
Decrease (increase) in other receivables and other assets	650	(526)
Increase (decrease) in trade accounts payable	1,346	(320)
Increase (decrease) in accrued income taxes	173	(110)
Increase (decrease) in accrued expenses	850	(571)
Increase in deferred revenue	429	92
Decrease in other liabilities	(247)	-
Net cash provided by (used in) operating activities	448	(610)
Cash flows used in investing activities:		
Additions to property, plant and equipment	(493)	(198)
Additions to catalog costs	(13)	(30)
Acquisition, net of cash acquired	(67,413)	-
Disposition, net of cash sold	15,730	-
Net cash used in investing activities	(52,189)	(228)
Cash flows provided by (used in) financing activities:		
Proceeds from issuance of debt	67,000	1,000
Repayments of debt	(14,047)	(1,113)
Payments of debt issuance costs	(1,928)	-
Net proceeds from (net taxes paid for) issuance of common stock	219	(155)
Net cash provided by (used in) financing activities	51,244	(268)

Effect of exchange rate changes on cash	755	109
Increase (decrease) in cash and cash equivalents	258	(997)
Cash and cash equivalents at the beginning of period, including cash included in assets held for sale	5,733	5,596
Cash and cash equivalents at the end of period	$5,991	$4,599
Supplemental disclosures of cash flow information:		
Cash paid for interest	$944	$164
Cash (refunded) paid for income taxes	$(489)	$333

See accompanying notes to unaudited consolidated financial statements.

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HARVARD BIOSCIENCE, INC.

NOTES TO UNAUDITED CONSOLIDATED FINANCIAL STATEMENTS

1. Basis of Presentation and Summary of Significant Accounting Policies

Basis of Presentation

The unaudited consolidated financial statements of Harvard Bioscience, Inc. and its wholly-owned subsidiaries (collectively, Harvard Bioscience or the Company) as of March 31, 2018 and for the three months ended March 31, 2018 and 2017 have been prepared by the Company pursuant to the rules and regulations of the Securities and Exchange Commission (SEC). Certain information and footnote disclosures normally included in financial statements prepared in accordance with U.S. generally accepted accounting principles (U.S. GAAP) have been condensed or omitted pursuant to such rules and regulations. The December 31, 2017 consolidated balance sheet was derived from audited financial statements, but does not include all disclosures required by U.S. GAAP. However, the Company believes that the disclosures are adequate to make the information presented not misleading. These unaudited consolidated financial statements should be read in conjunction with the consolidated financial statements and the notes thereto included in the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2017, which was filed with the SEC on March 16, 2018.

In the opinion of management, all adjustments, which include normal recurring adjustments necessary to present a fair statement of financial position as of March 31, 2018, results of operations and comprehensive loss for the three months ended March 31, 2018 and 2017 and cash flows for the three months ended March 31, 2018 and 2017, as applicable, have been made. The results of operations for the three months ended March 31, 2018 are not necessarily indicative of the operating results for the full fiscal year or any future periods.

Reclassifications

As disclosed in the Note 5, on January 22, 2018, the Company sold substantially all the assets of its operating subsidiary, Denville Scientific, Inc. (Denville). The sale of Denville represented a strategic shift that has and will have a major effect on the Company's operations and financial results. As such and pursuant to Accounting Standards Codification (ASC) 205-20 – *Presentation of Financial Statements - Discontinued Operations,* the operating results of Denville for the three months ended March 31, 2018 and 2017 have been presented in discontinued operations in the consolidated statements of operations. Additionally, the assets and liabilities of Denville as of December 31, 2017 have been recast in the consolidated balance sheet and presented as held for sale. These reclassifications and

adjustments had no effect on total amounts within the consolidated balance sheet, consolidated statements of operations and comprehensive loss, consolidated statements of cash flows for any of the periods presented.

Summary of Significant Accounting Policies

The accounting policies underlying the accompanying unaudited consolidated financial statements are those set forth in Note 2 to the consolidated financial statements included in the Company's Annual Report on Form 10-K for the year ended December 31, 2017, which was filed with the SEC on March 16, 2018. Except for the accounting for revenue arising from contracts with customers as noted below there have been no material changes in the company's significant accounting policies during the three months ended March 31, 2018.

Revenue recognition

Nature of contracts and customers

The Company's contracts are primarily of short duration and are mostly based on the receipt and fulfilment of purchase orders. The purchase orders are binding and include pricing and all other relevant terms and conditions.

The Company's customers are primarily research scientists at universities, hospitals, government laboratories, including the United States National Institute of Health (NIH), contract research organizations, pharmaceutical and biotechnology companies. The Company also has global and regional distribution partners, and original equipment manufacturer (OEM) customers who incorporate its products into their products under their own brands.

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Performance obligations

The Company's performance obligations under its revenue contracts consist of its instruments, equipment, accessories, services, maintenance and extended warranties. Equipment also includes software that functions together with the tangible equipment to deliver its essential functionality. Contracts with customers may contain multiple promises such as delivery of hardware, software, professional services or post-contract support services. These promises are accounted for as separate performance obligations if they are distinct. For contracts with customers that contain multiple performance obligations, the transaction price is allocated to the separate performance obligations based on estimated relative standalone selling price, which does not materially differ from the stated price in the contract.

Instruments, equipment and accessories consist of a range of products that are used in life sciences research. Revenues from the sales of these items are recognized when transfer of control of these products to the customer occurs. Transfer of control occurs when the Company has a right to payment, and the customer has legal title to the asset and the customer or their selected carrier has possession, which is typically upon shipment. Sales on these items are therefore generally recognized at a point in time.

The Company's equipment revenue also includes the sale of wireless implantable monitors that are used for life science research purposes. The Company sells these wireless implantable monitors to pharmaceutical companies, contract research organizations and academic laboratories. In addition to sales generated from new and existing customers, these implantable devices are also sold under a program called the "exchange program". Under this program, customers may return an implantable monitor to the Company after use, and if the returned monitor can be reprocessed and resold, they may, in exchange, purchase a replacement implantable monitor of the same model at a lower price than a new monitor. The implantable monitors that are returned by customers are reprocessed and made available for future sale. The initial sale of implantable monitors and subsequent sale of replacement implantable monitors are independent transactions. The Company has no obligation in connection with the initial sale to sell replacement implantable monitors at any future date under any fixed terms and may refuse returned implantable monitors that cannot be recovered or are obsolete. The Company has made a judgment and concluded that the offer to its customers that they may purchase a discounted product in the future is not a material right based on the applicable guidance within ASC 606.

Service revenues consist of installation, training, data analysis, and surgeries performed on research animals. Maintenance revenue consists of post-contract support provided in relation to software that is embedded within the equipment that is sold to the customer. The Company provides standard warranties that promise the customer that the product will work as promised. These standard warranties are not a separate performance obligation. Extended warranties relate to warranties that are separately priced, and purchased in addition to a standard warranty, and are therefore a separate performance obligation. The Company has made the judgment that the customer benefits as the Company performs over the period of the contract, and therefore revenues from service, maintenance and warranty contracts are recognized over time. The Company uses the input method to recognize revenue over time, based on time elapsed, which is generally on a straight-line basis over the service period. The period over which maintenance

and warranty contracts is recognized is typically one year. The period over which service revenues is generally less than one month.

For sales for which transfer of control occurs upon shipment, the Company accounts for shipping and handling costs as fulfilment costs. As such, the Company records the amounts billed to the customer for shipping costs as revenue and the costs within cost of sales upon shipment. For sales, for which control transfers to customers after shipment, the Company has elected to account for shipping and handling as activities to fulfill the promise to transfer the goods to the customer. The Company therefore accrues for the costs of shipping undelivered items in the period of shipment.

Revenues expected to be recognized related to any and all remaining performance obligations are generally expected to be recognized in one year or less, as the majority of the Company's contracts have a term of less than one year.

Variable Consideration

The nature of the Company's contracts gives rise to certain types of variable consideration, including in limited cases volume and payment discounts. The Company analyzes sales that could include variable consideration, and estimates the expected or most likely amount of revenue after returns, trade-ins, discounts, rebates, credits, and incentives. Product returns are estimated and accrued for, based on historical information. In making these estimates, the Company considers whether the amount of variable consideration is constrained and is included in revenue only to the extent that it is probable that a significant reversal of the revenue recognized will not occur when the uncertainty associated with the variable consideration is subsequently resolved. Variable consideration, and its impact on the Company’s revenue recognition, was not material in any of the periods presented.

The Company’s payment terms are generally from zero to sixty days from the time of invoicing, which generally occurs at the time of shipment or prior to services being performed. Payment terms vary by the type of its customers and the products or services offered.

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Sales taxes, value added taxes, and certain excise taxes collected from customers and remitted to governmental authorities are accounted for on a net basis, and are therefore excluded from revenues.

Deferred revenue

The Company records deferred revenue when cash is collected from customers prior to satisfaction of the Company's performance obligation to the customer. Deferred revenue consists of amounts deferred related to service contracts and revenue deferred as a result of payments received in advance from customers. Deferred revenue is generally expected to be recognized within one year.

The amounts included in deferred revenue from advanced payments relate to amounts that are prepaid for wireless implantable monitors under the exchange program. The Company has made the judgment that these payments do not represent a significant financing component as the customer can exercise their discretion as to when they can obtain the products that they have made a prepayment for.

Advanced payments received from customers are recorded as a liability, and revenue is recognized when the Company's performance obligations are completed. Performance obligations are completed when the product is shipped or delivered to the customer, or at the end of the exchange program if goods are not acquired prior to the termination of the contract period.

Allowance for doubtful accounts

The allowance for doubtful accounts reflects the Company's best estimate of probable losses inherent in the accounts receivable balance. The Company determines the allowance based on known troubled accounts, historical experience, and other currently available evidence.

Disaggregation of revenue

Refer to Note 17 for revenue disaggregated by type and by geographic region as well as further information about the allowance for doubtful accounts and deferred revenue balances.

2. Recently Issued Accounting Pronouncements

In February 2016, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2016-02, *Leases*, which is intended to improve financial reporting about leasing transactions. The update requires a lessee to record on the balance sheet the assets and liabilities for the rights and obligations created by lease terms of more than 12 months. The update is effective for fiscal years beginning after December 15, 2018. The Company has commenced the process of evaluating the requirements of the standard as well as collecting information on all its leases. The Company has not yet concluded on the impact of the adoption on its consolidated financial position, results of operations and cash flows, however, assets and liabilities will increase upon adoption for right-of-use assets and lease liabilities. The Company's future commitments under lease obligations are summarized in Note 12.

In August 2017, the FASB issued ASU 2017-12, *Derivatives and Hedging (Topic 815)* which amends the hedge accounting recognition and presentation requirements in ASC 815. The Board's objectives in issuing the ASU are to (1) improve the transparency and understandability of information conveyed to financial statement users about an entity's risk management activities by better aligning the entity's financial reporting for hedging relationships with those risk management activities and (2) reduce the complexity of and simplify the application of hedge accounting by preparers. The ASU is effective for annual reporting periods, including interim periods within those annual reporting periods, beginning after December 15, 2018. Early adoption is permitted, including adoption in any interim period. The Company is evaluating the requirements of this guidance and has not yet determined the impact of the adoption on its consolidated financial position, results of operations and cash flows.

Recently Adopted Accounting Pronouncements

In May 2014, the FASB issued ASU 2014-09, *Revenue from Contracts with Customers,* a new accounting standard that provides for a comprehensive model to use in the accounting for revenue arising from contracts with customers that will replace most existing revenue recognition guidance within generally accepted accounting principles in the United States. Under this standard, revenue will be recognized to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the Company expects to be entitled in exchange for those goods or services.

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The Company adopted this standard as of January 1, 2018 using the modified retrospective approach, and applied the guidance to contracts that were not completed at the date of adoption. The Company's significant revenue streams currently consist primarily of product revenue transactions, service, maintenance and extended warranty transactions on certain product sales. The timing of recognizing revenues for these revenue streams did not materially change. Additionally, the adoption of ASU 2014-09 did not have a material impact on the Company's financial position, results of operations, equity or cash flows as of the adoption date or for the three months ended March 31, 2018. The Company's updated revenue recognition policy is described in Note 1 and disaggregated revenue disclosures required under ASC 2014-09 are presented in Note 17.

In May 2017, the FASB issued ASU 2017-09, Stock compensation (Topic 718): Scope of modification accounting which amends the scope of modification accounting for share-based payment arrangements. The ASU provides guidance on the types of changes to the terms or conditions of share-based payment awards to which an entity would be required to apply modification accounting under ASC 718. Specifically, an entity would not apply modification accounting if the fair value, vesting conditions, and classification of the awards are the same immediately before and after the modification. The ASU is effective for annual reporting periods, including interim periods within those annual reporting periods, beginning after December 15, 2017. The Company adopted this guidance on January 1, 2018, and the new standard did not have a material impact on its consolidated financial position, results of operations and cash flows.

3. Accumulated Other Comprehensive Loss

Changes in each component of accumulated other comprehensive loss, net of tax are as follows:

(in thousands)	Foreign currency translation adjustments	Derivatives qualifying as hedges	Defined benefit pension plans	Total
Balance at December 31, 2017	$ (9,755)	$ 37	$ (958)	$ (10,676)
Other comprehensive income before reclassifications	1,506	(254)	-	1,252
Amounts reclassified from AOCI	-	(25)	-	(25)
Other comprehensive income	1,506	(279)	-	1,227
Balance at March 31, 2018	$ (8,249)	$ (242)	$ (958)	$ (9,449)

4. Acquisition

On January 31, 2018, the Company acquired all of the issued and outstanding shares of Data Sciences International, Inc. (DSI), a Delaware corporation, for approximately $70.0 million. The Company funded the acquisition from its existing cash balances, excess proceeds from the Denville Transaction discussed in Note 5, and proceeds from the Financing Agreement discussed in Note 14.

DSI, a St. Paul, Minnesota-based life science research company, is a recognized leader in physiologic monitoring focused on delivering preclinical products, systems, services and solutions to its customers. Its customers include pharmaceutical and biotechnology companies, as well as contract research organizations, academic labs and government researchers. This acquisition diversifies the Company’s customer base into the biopharmaceutical and contract research organization markets.

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The aggregate purchase price for this acquisition was preliminarily allocated to tangible and intangible net assets acquired as follows:

	(in thousands)
Tangible assets	$ 32,562
Liabilities assumed	(12,994)
Net assets	19,568
Goodwill and intangible assets:	
Goodwill	18,731
Amortizable intangible assets:	
Trade name	3,524
Developed technology	25,570
Customer relationships	9,837
In-process research and development	1,387
Total amortizable intangible assets	40,318
Deferred tax, net	(8,617)
Total goodwill and intangible assets, net of tax	50,432
Acquisition purchase price	$ 70,000

Tangible assets and liabilities assumed, as referenced above, preliminarily consist of the following:

Cash acquired	$ 2,576
Accounts receivable, net	5,069
Inventories	11,512
Other current assets	846
Property, plant and equipment, net	2,090
Deferred income tax assets, net	10,469
Tangible assets	$ 32,562
Accounts payable and accrued liabilities	$ 5,438
Deferred revenue including customer advances	2,976
Other long term liabilities	4,580
Liabilities assumed	$ 12,994

The preliminary allocation of the purchase price for DSI was based on estimates of the fair value of the net assets acquired and is subject to adjustment upon finalization of the valuation of the acquired intangible assets and the related deferred taxes. Measurements of these items inherently require significant estimates and assumptions.

The weighted-average amortization periods for definite-lived intangible assets acquired are 9.4 years for tradenames, 8.2 years for developed technology, 12.4 years for customer relationships and 7.4 years for in-process research and

development assets. The weighted average amortization period for all definite-lived intangible assets acquired is 9.3 years.

Goodwill recorded as a result of the acquisition of DSI is not deductible for tax purposes.

The results of operations for DSI have been included in the Company's consolidated financial statements from the date of acquisition. The revenues of DSI included in the Company's consolidated statement of operations from the date of acquisition were approximately $7.6 million for the period ended March 31, 2018. Net loss of DSI included in the Company's consolidated statement of operations for the same period was $0.4 million. Included in the net loss was a $1.5 million charge recognized in cost of revenues related to purchase accounting inventory fair value step up amortization. The total inventory fair value step up was preliminarily valued at $3.8 million and will be recognized into cost of revenues over one inventory turn, or approximately five months. Also included in the net loss of DSI is $0.7 million of intangible asset amortization expense.

The following consolidated pro forma information is based on the assumption that the acquisition of DSI occurred on January 1, 2017. Accordingly, the historical results have been adjusted to reflect amortization expense, interest expense and other purchase accounting adjustments that would have been recognized on such a pro forma basis. The pro forma information is presented for comparative purposes only and is not necessarily indicative of the financial position or results of operations which would have been reported had the Company completed the acquisition during these periods or which might be reported in the future.

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	Three Months Ended March 31,	
	2018	2017
	(in thousands)	
Pro Forma		
Revenues	$30,071	$29,191
Loss from continuing operations	(2,168)	(3,672)

Direct acquisition costs recorded in other expense, net in the Company's consolidated statements of operations were $2.6 million and $0 for the three months ended March 31, 2018 and 2017, respectively.

5. Discontinued Operations

On January 22, 2018, the Company sold substantially all the assets of its wholly owned subsidiary, Denville, for approximately $20.0 million, which includes a $3.0 million earn-out provision (the Denville Transaction). Upon the closing of the transaction, the Company received $15.7 million. The $3.0 million earn-out provision represents consideration that is contingent on Denville achieving certain performance metrics over a period of two years.

The following table is a reconciliation of the carrying amounts of major assets and liabilities of Denville classified as held for sale in the Company's consolidated balance sheet as of December 31, 2017.

	December 31, 2017 (in thousands)
Carrying amounts of major classes of assets	
Cash	$ 541
Accounts receivable, net	2,854
Inventories	4,505
Other receivables and other assets	504
Current assets held for sale	8,404
Property, plant and equipment	397
Amortizable intangible assets	5,930
Allocation of goodwill	3,633
Long term assets held for sale	9,960
Total assets of the disposal group classified as held for sale in the consolidated balance sheet	$ 18,364

Carrying amounts of major classes of liabilities	
Accounts payable and accrued expenses	$ 1,736
Other current liabilities	121
Current liabilities held for sale	1,857
Deferred income tax liabilities	1,311
Long term liabilities held for sale	1,311
Total liabilities of the disposal group classified as held for sale in the consolidated balance sheet	$ 3,168

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The following table is a reconciliation of the major line items of income (loss) from discontinued operations presented within the Company's consolidated statements of operations for the three months ended March 31, 2018 and 2017.

	Three Months Ended	
	March 31, 2018	March 31, 2017
	(in thousands)	
Revenues	$893	6,070
Cost of revenues	(534)	(4,147)
Operating and other expenses	(673)	(2,216)
Gain on disposal of discontinued operations	1,227	-
Income (loss) from discontinued operations before income taxes	$913	(293)
Income tax (benefit) expense	(873)	30
Income (loss) from discontinued operations	1,786	(323)

Total operating and investing cash flows for Denville were immaterial for both the periods presented in the Company's consolidated statements of cash flows for the three months ended March 31, 2018 and 2017.

6. Goodwill and Other Intangible Assets

Intangible assets consist of the following:

	March 31, 2018 (in thousands)		December 31, 2017		Weighted Average Life	(a)
Amortizable intangible assets:	Gross	Accumulated Amortization	Gross	Accumulated Amortization		
Existing technology	$42,088	$ (14,146)	$16,173	$ (13,179)	8.1	Years
Trade names	7,996	(2,427)	4,443	(2,280)	8.4	Years
Distribution agreements/customer relationships	23,138	(8,707)	13,197	(8,373)	11.3	Years
In-process research and development	1,387	-	-	-	7.4	Years
Patents	232	(191)	223	(174)	0.9	Years
Total amortizable intangible assets	74,841	$ (25,471)	34,036	$ (24,006)		
Indefinite-lived intangible assets:						
Goodwill	56,239		36,336			

Other indefinite-lived intangible assets	1,253	1,244
Total goodwill and other indefinite-lived intangible assets	57,492	37,580
Total intangible assets, gross	$132,333	$71,616

(a) Weighted average life as of March 31, 2018.

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The balances presented in the tables above and below exclude intangible assets and allocated goodwill of Denville as of December 31, 2017. Both balances are reported as long term assets held for sale as of December 31, 2017. Refer to Note 5 for further details.

The change in the carrying amount of goodwill for the three months ended March 31, 2018 is as follows:

	(in thousands)
Balance at December 31, 2017	$ 36,336
Goodwill arising from business combination	18,731
Effect of change in currency translation	1,172
Balance at March 31, 2018	$ 56,239

Amortization of intangible assets

Intangible asset amortization expense was $1.1 million and $0.4 million for the three months ended March 31, 2018 and 2017, respectively. Amortization expense of existing amortizable intangible assets is currently estimated to be $5.5 million for the year ending December 31, 2018, $5.7 million for the year ending December 31, 2019, $5.6 million for the year ending December 31, 2020, $5.6 million for the year ending December 31, 2021 and $5.6 million for the year ending December 31, 2022.

7. Inventories

Inventories consist of the following:

	March 31, 2018	December 31, 2017
	(in thousands)	
Finished goods	$7,652	$5,779
Work in process	4,786	1,042
Raw materials	15,464	10,027
Total	$27,902	$16,848

8. Property, Plant and Equipment

As of March 31, 2018 and December 31, 2017, property, plant and equipment consist of the following:

	March 31, 2018	December 31, 2017
	(in thousands)	
Land, buildings and leasehold improvements	$2,506	$2,197
Machinery and equipment	8,579	7,022
Computer equipment and software	9,404	8,819
Furniture and fixtures	1,159	1,139
Automobiles	124	120
	21,772	19,297
Less: accumulated depreciation	(15,951)	(15,554)
Property, plant and equipment, net	$5,821	$3,743

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9. Related Party Transactions

As part of the acquisitions of Multi Channel Systems MCS GmbH (MCS) and Triangle BioSystems, Inc. (TBSI) in 2014, the Company signed lease agreements with the former owners of the acquired companies. The principals of such former owners of MCS and TBSI were employees of the Company as of March 31, 2018 and 2017. Pursuant to a lease agreement, the Company made rent payments of approximately $79 thousand and $58 thousand to the former owners of MCS for the three months ended March 31, 2018 and 2017, respectively. The Company made rent payments of approximately $11 thousand to the former owner of TBSI for both the three months ended March 31, 2018 and 2017.

10. Warranties

Warranties are estimated and accrued at the time revenues are recorded. A rollforward of the Company's product warranty accrual is as follows:

	Beginning Balance	(Payments) Credits	Additions	Ending Balance
	(in thousands)			
Year ended December 31, 2017	$193	(7)	60	$ 246
Three months ended March 31, 2018	$246	3	166	$ 415

11. Employee Benefit Plans

The Company's subsidiary in the United Kingdom, Biochrom Limited, maintains contributory, defined benefit pension plans for substantially all of its employees. These defined benefit pension plans have been closed to new employees since 2014, as well as closed to the future accrual of benefits for existing employees. The components of the Company's defined benefit pension expense were as follows:

	Three Months Ended March 31,	
	2018	2017
	(in thousands)	
Components of net periodic benefit cost:		
Interest cost	$132	$125

Expected return on plan assets	(204)	(159)
Net amortization loss	58	87
Net periodic benefit (income) cost	$(14)	$53

For the three months ended March 31, 2018 and 2017, the Company contributed $0.2 million, for both periods, to its defined benefit pension plans. The Company expects to contribute approximately $0.5 million to its defined benefit pension plans during the remainder of 2018.

The Company had an underfunded pension liability of approximately $1.2 million as of March 31, 2018 and December 31, 2017, respectively, included in the other long term liabilities line item in the consolidated balance sheets.

12. Leases

The Company has noncancelable operating leases for office and warehouse space expiring at various dates through 2023 and thereafter. Rent payments are estimated to be $3.9 million for the year ended December 31, 2018. Rent payments were approximately $1.0 million and $0.4 million for the three months ended March 31, 2018 and 2017, respectively.

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Future minimum lease payments for operating leases, with initial or remaining terms in excess of one year at March 31, 2018, are as follows:

	Operating Leases (in thousands)
2019	$ 3,593
2020	2,521
2021	1,149
2022	1,105
2023	1,111
Thereafter	785
Net minimum lease payments	$ 10,264

13. Capital Stock

Common Stock

On February 5, 2008, the Company's Board of Directors adopted a Shareholder Rights Plan and declared a dividend distribution of one preferred stock purchase right for each outstanding share of the Company's common stock to shareholders of record as of the close of business on February 6, 2008. These rights were not initially exercisable and would trade with the shares of the Company's common stock. The rights would become exercisable under various conditions according to the terms of the plan. The Shareholder Rights Plan expired, with no rights having become exercisable, in accordance with its terms on the close of business on February 6, 2018.

Preferred Stock

The Company's Board of Directors has the authority to issue up to 5.0 million shares of preferred stock and to determine the price privileges and other terms of the shares. The Board of Directors may exercise this authority without any further approval of stockholders. As of March 31, 2018, the Company had no preferred stock issued or outstanding.

Employee Stock Purchase Plan (as amended, the ESPP)

In 2000, the Company approved the ESPP. Under this ESPP, participating employees can authorize the Company to withhold a portion of their base pay during consecutive six-month payment periods for the purchase of shares of the Company's common stock. At the conclusion of the period, participating employees can purchase shares of the Company's common stock at 85% of the lower of the fair market value of the Company's common stock at the beginning or end of the period. Shares are issued under the ESPP for the six-month periods ending June 30 and December 31. On May 18, 2017, the stockholders of the Company approved an increase of 300,000 shares of common stock in the number of shares available for issuance under the ESPP. Following such amendment, 1,050,000 shares of common stock are authorized for issuance, of which 801,454 shares were issued as of March 31, 2018. There were no shares issued under the ESPP during the three months ended March 31, 2018 and 2017, respectively.

Stock Option and Equity Incentive Plans

Third Amended and Restated 2000 Stock Option and Incentive Plan (as amended, the Third A&R Plan)

The Second Amendment to the Third A&R Plan (the Amendment) was adopted by the Board of Directors on April 3, 2015. Such Amendment was approved by the stockholders at the Company's 2015 Annual Meeting of Stockholders. Pursuant to the Amendment, the aggregate number of shares authorized for issuance under the Third A&R Plan was increased by 2,500,000 shares to 17,508,929.

Restricted Stock Units with a Market Condition (the Market Condition RSU's)

On August 3, 2015, the Compensation Committee of the Board of Directors of the Company approved and granted deferred stock awards of Market Condition RSU's to certain members of the Company's management team under the Third A&R Plan. The vesting of these Market Condition RSU's is cliff-based and linked to the achievement of a relative total shareholder return of the Company's common stock from August 3, 2015 to the earlier of (i) August 3, 2018 or (ii) upon a change of control (measured relative to the Russell 3000 index and based on the 20-day trading average price before each such date). As of March 31, 2018, the target number of these restricted stock units that may be earned is 147,799 shares; the maximum amount is 150% of the target number.

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Stock-Based Payment Awards

The Company accounts for stock-based payment awards in accordance with the provisions of FASB ASC 718, which requires it to recognize compensation expense for all stock-based payment awards made to employees and directors including stock options, restricted stock units, Market Condition RSU's and employee stock purchases related to the ESPP.

The Company adopted ASU 2016-09 as of January 1, 2017. As a result of this adoption, the Company has elected as an accounting policy to account for forfeitures for service based awards as they occur, with no adjustment for estimated forfeitures. The Company recognized as of January 1, 2017, a cumulative effect adjustment of $0.1 million to reduce retained earnings as required under the modified retrospective approach.

Stock option and restricted stock unit activity under the Company's Third A&R Plan for the three months ended March 31, 2018 was as follows:

	Stock Options		Restricted Stock Units		Market Condition RSU's	
	Stock Options Outstanding	Weighted Average Exercise Price	Restricted Stock Units Outstanding	Grant Date Fair Value	Market Condition RSU's Outstanding	Grant Date Fair Value
Balance at December 31, 2017	3,780,244	$ 3.95	1,796,927	$2.69	164,127	$4.81
Granted	-	-	140,763	3.61	-	-
Exercised	(297,874)	3.06	-	-	-	-
Vested (RSUs)	-	-	(531,999)	3.00	-	-
Cancelled / forfeited	(119,554)	4.90	(17,078)	2.90	(16,328)	4.81
Balance at March 31, 2018	3,362,816	$ 3.99	1,388,613	$2.66	147,799	$4.81

There were no options granted under the Third A&R Plan during the three months ended March 31, 2018. The weighted average fair value of the options granted under the Third A&R Plan during the three months ended March 31, 2017 was $1.27. The following assumptions were used to estimate the fair value, using the Black-Scholes option pricing model, of stock options granted during the three months ended March 31, 2017:

	Three Months Ended March 31, 2017
Volatility	41.07
Risk-free interest rate	1.89
Expected holding period (in years)	5.20
Dividend yield	-

The Company used historical volatility to calculate the expected volatility for each grant as of the grant date. Historical volatility was determined by calculating the mean reversion of the daily adjusted closing stock price. The risk-free interest rate assumption is based upon observed U.S. Treasury bill interest rates (risk-free) appropriate for the term of the Company's stock options and Market Condition RSU's. The expected holding period of stock options represents the period of time options are expected to be outstanding and is based on historical experience. The vesting period ranges from one to four years and the contractual life is ten years. The correlation coefficient, used to value the Market Condition RSU's, represents the way in which entities move in relation to the Russell 3000 index as a whole.

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Stock-based compensation expense related to stock options, restricted stock units, Market Condition RSU's and the ESPP for the three months ended March 31, 2018 and 2017 was allocated as follows:

	Three Months Ended March 31,	
	2018	2017
	(in thousands)	
Cost of revenues	$11	$12
Sales and marketing	124	112
General and administrative	697	687
Research and development	30	29
Discontinued operations	150	23
Total stock-based compensation	$1,012	$863

The Company did not capitalize any stock-based compensation.

Earnings per share

Basic earnings per share is based upon net income divided by the number of weighted average common shares outstanding during the period. The calculation of diluted earnings per share assumes conversion of stock options, restricted stock units and Market Condition RSU's into common stock using the treasury method. The weighted average number of shares used to compute basic and diluted earnings per share consists of the following:

	Three Months Ended March 31,	
	2018	2017
Basic	35,462,989	34,579,473
Effect of assumed conversion of employee and director stock options, restricted stock units and Market Condition RSU's	-	-
Diluted	35,462,989	34,579,473

Excluded from the shares used in calculating the diluted earnings per common share in the above table are options, restricted stock units and Market Condition RSU's of approximately 4,899,228 and 5,413,630 shares of common stock for the three months ended March 31, 2018 and 2017, respectively, as the impact of these shares would be

anti-dilutive.

14. Long Term Debt

On January 22, 2018, in connection with the closing of the Denville Transaction, the Company terminated the Third Amended and Restated Credit Agreement (the Credit Agreement), among the Company, Brown Brothers Harriman & Co. and each of the other lenders party thereto, and Bank of America, as administrative agent. All outstanding amounts under the agreement were repaid in full using a portion of the proceeds of the Denville Transaction. At the time of repayment, there was approximately $11.9 million outstanding.

On January 31, 2018, the Company entered into a financing agreement by and among the Company and certain subsidiaries of the Company parties thereto, as borrowers (collectively, the Borrower), certain subsidiaries of the Company parties thereto, as guarantors, various lenders from time to time party thereto (the Lenders), and Cerberus Business Finance, LLC, as collateral agent and administrative agent for the Lenders (the Financing Agreement).

The Financing Agreement provides for senior secured credit facilities (the Senior Secured Credit Facilities) comprised of a $64.0 million term loan and up to a $25.0 million revolving line of credit. The proceeds of the term loan and $4.8 million of advances under the revolving line of credit were used to fund a portion of the DSI acquisition, and to pay fees and expenses related thereto and the closing of the Senior Secured Credit Facilities. In addition, the revolving facility is available for use by the Company and its subsidiaries for general corporate and working capital needs, and other purposes to the extent permitted by the Financing Agreement. The Senior Secured Credit Facilities have a maturity of five years.

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Commencing on March 31, 2018, the outstanding term loans amortize in equal quarterly installments equal to $0.4 million per quarter on such date and during each of the next three quarters thereafter, $0.6 million per quarter during the next four quarters thereafter and $0.8 million per quarter thereafter, with a balloon payment at maturity.

The obligations of the Borrower under the Senior Secured Credit Facilities are unconditionally guaranteed by the Company and certain of the Company's existing and subsequently acquired or organized subsidiaries. The Senior Secured Credit Facilities and related guarantees are secured on a first-priority basis (subject to certain liens permitted under the Financing Agreement) by a lien on substantially all the tangible and intangible assets of the Borrower and the subsidiary guarantors, including all of the capital stock held by such obligors (subject to a 65% limitation on pledges of capital stock of foreign subsidiaries), subject to certain exceptions.

Interest on all loans under the Senior Secured Credit Facilities is paid monthly. Borrowings under the Financing Agreement accrue interest at a per annum rate equal to, at the Borrower's option, a base rate plus 4.75% or a London Interbank Offered Rate (LIBOR) rate plus 6.25%. The loans are also subject to a 1.25% interest rate floor for LIBOR loans and a 4.25% interest rate floor for base rate loans.

The Financing Agreement contains customary representations and warranties and affirmative covenants applicable to the Company and its subsidiaries and also contains certain restrictive covenants, including, among others, limitations on the incurrence of additional debt, liens on property, acquisitions and investments, loans and guarantees, mergers, consolidations, liquidations and dissolutions, asset sales, dividends and other payments in respect of the Company's capital stock, prepayments of certain debt, transactions with affiliates and modifications of organizational documents, material contracts, affiliated practice agreements and certain debt agreements. The Financing Agreement also contains customary events of default. As of March 31, 2018, the Company was in compliance with all financial covenants contained in the Financing Agreement, was subject to covenant and working capital borrowing restrictions and had available borrowing capacity under its Financing Agreement of $14.6 million.

As of March 31, 2018 and December 31, 2017, the Company had borrowings net of debt issuance costs of $63.0 million and $11.7 million respectively, outstanding. The carrying value of the debt approximates fair value because the interest rate under the obligation approximates market rates of interest available to the Company for similar instruments.

As of March 31, 2018, the weighted effective interest rate, net of the impact of the Company's interest rate swap, on its Term Loan and its Revolving Line was 8.43% and 8.13%, respectively.

As of March 31, 2018 and December 31, 2017, the Company's borrowings were comprised of:

	March 31, 2018	December 31, 2017
	(in thousands)	
Long-term debt:		
Term loan	$63,552	$11,899
Revolving line	1,300	-
Total unamortized deferred financing costs	(1,870)	(151)
Total debt	62,982	11,748
Less: current installments	(1,800)	(2,800)
Current unamortized deferred financing costs	387	35
Long-term debt	$61,569	$8,983

15. Derivatives

The Company uses interest-rate-related derivative instruments to manage its exposure related to changes in interest rates on its variable-rate debt instruments. The Company does not enter into derivative instruments for any purpose other than cash flow hedging. The Company does not speculate using derivative instruments.

By using derivative financial instruments to hedge exposures to changes in interest rates, the Company exposes itself to credit risk and market risk. Credit risk is the failure of the counterparty to perform under the terms of the derivative contract. When the fair value of a derivative contract is positive, the counterparty owes the Company, which creates credit risk for the Company. When the fair value of a derivative contract is negative, the Company owes the counterparty and, therefore, the Company is not exposed to the counterparty’s credit risk in those circumstances. The Company minimizes counterparty credit risk in derivative instruments by entering into transactions with carefully selected major financial institutions based upon their credit profile.

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Market risk is the adverse effect on the value of a derivative instrument that results from a change in interest rates. The market risk associated with interest-rate contracts is managed by establishing and monitoring parameters that limit the types and degree of market risk that may be undertaken.

The Company assesses interest rate risk by continually identifying and monitoring changes in interest rate exposures that may adversely impact expected future cash flows and by evaluating hedging opportunities. The Company maintains risk management control systems to monitor interest rate risk attributable to both the Company's outstanding or forecasted debt obligations as well as the Company's offsetting hedge positions. The risk management control systems involve the use of analytical techniques, including cash flow sensitivity analysis, to estimate the expected impact of changes in interest rates on the Company's future cash flows.

The Company uses variable-rate LIBOR debt to finance its operations. The debt obligations expose the Company to variability in interest payments due to changes in interest rates. Management believes that it is prudent to limit the variability of a portion of its interest payments. To meet this objective, management enters into LIBOR based interest rate swap agreements to manage fluctuations in cash flows resulting from changes in the benchmark interest rate of LIBOR. These swaps change the variable-rate cash flow exposure on the debt obligations to fixed cash flows. Under the terms of the interest rate swaps, the Company receives LIBOR based variable interest rate payments and makes fixed interest rate payments, thereby creating the equivalent of fixed-rate debt for the notional amount of its debt hedged.

As disclosed in Note 14, on January 31, 2018, the Company entered into a Financing Agreement comprised of a $64.0 million term loan and up to a $25.0 million revolving line of credit. Shortly after entering into this Credit Agreement, the Company entered into an interest rate swap contract with PNC Bank with a notional amount of $36.0 million and a termination date of January 1, 2023 in order to hedge the risk of changes in the effective benchmark interest rate (LIBOR) associated with the Company's Term Loan. The swap contract converted specific variable-rate debt into fixed-rate debt and fixed the LIBOR rate associated with a portion of the term loan under the Financing Agreement at 2.72%. The interest rate swap was designated as a cash flow hedge instrument in accordance with ASC 815 "Derivatives and Hedging".

The notional amount of the Company's derivative instruments as of March 31, 2018 was $35.8 million.

The following table presents the notional amount and fair value of the Company's derivative instruments as of March 31, 2018 and December 31, 2017.

		March 31, 2018	March 31, 2018
		Notional Amount	Fair Value (a)
Derivatives designated as hedging instruments under ASC 815	Balance sheet classification	(in thousands)	
Interest rate swaps	Other assets (long term liabilities)	$35,809	$(242)

		December 31, 2017	December 31, 2017
		Notional Amount	Fair Value (a)
Derivatives designated as hedging instruments under ASC 815	Balance sheet classification	(in thousands)	
Interest rate swaps	Other assets (long term liabilities)	$11,900	$ 37

(a) See Note 16 for the fair value measurements related to these financial instruments.

All of the Company’s derivative instruments are designated as hedging instruments.

The Company has structured its interest rate swap agreements to be 100% effective and as a result, there was no impact to earnings resulting from hedge ineffectiveness. Changes in the fair value of interest rate swaps designated as hedging instruments that effectively offset the variability of cash flows associated with variable-rate, long-term debt obligations are reported in accumulated other comprehensive income (AOCI). These amounts subsequently are reclassified into interest expense as a yield adjustment of the hedged interest payments in the same period in which the related interest affects earnings. The Company’s interest rate swap agreement was deemed to be fully effective in accordance with ASC 815, and, as such, unrealized gains and losses related to these derivatives were recorded as AOCI.

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The following table summarizes the effect of derivatives designated as cash flow hedging instruments and their classification within comprehensive loss for the Three months ended March 31, 2018 and 2017:

Derivatives in Hedging Relationships	Amount of gain (loss) recognized in OCI on derivative (effective portion) Three Months Ended March 31,	
	2018	2017
	(in thousands)	
Interest rate swaps	$(254)	$ 4

The following table summarizes the reclassifications out of accumulated other comprehensive loss for the three months ended March 31, 2018 and 2017:

Details about AOCI Components	Amount reclassified from AOCI into income (effective portion) Three Months Ended March 31,		Location of amount reclassified from AOCI into income (effective portion)
	2018	2017	
	(in thousands)		
Interest rate swaps	$(25)	$ 3	Interest expense

As of March 31, 2018, $0.2 million of deferred losses on derivative instruments accumulated in AOCI are expected to be reclassified to earnings during the next twelve months. Transactions and events expected to occur over the next twelve months that will necessitate reclassifying these derivatives' losses to earnings include the repricing of

variable-rate debt. As a result of terminating the Credit Agreement, as discussed in Note 14, the Company unwound its previous May 2017 interest rate swap contract and received $0.1 million in proceeds. There were no cash flow hedges discontinued during the three months ended March 31, 2017.

16. Fair Value Measurements

Fair value measurement is defined as the price that would be received to sell an asset or paid to transfer a liability in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants at the measurement date. A fair value hierarchy is established, which prioritizes the inputs used in measuring fair value into three broad levels as follows:

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

Level 2—Inputs, other than the quoted prices in active markets, that are observable either directly or indirectly.

Level 3—Unobservable inputs based on the Company’s own assumptions.

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The following tables present the fair value hierarchy for those assets or liabilities measured at fair value on a recurring basis:

(In thousands)	Fair Value as of March 31, 2018 Level 1	Level 2	Level 3	Total
Assets (Liabilities):				
Interest rate swap agreements	$-	$(242)	$ -	$(242)

(In thousands)	Fair Value as of December 31, 2017 Level 1	Level 2	Level 3	Total
Assets (Liabilities):				
Interest rate swap agreements	$-	$37	$ -	$37

The Company uses the market approach technique to value its financial liabilities. The Company's financial assets and liabilities carried at fair value include derivative instruments used to hedge the Company's interest rate risks. The fair value of the Company's interest rate swap agreements was based on LIBOR yield curves at the reporting date.

17. Revenues

The following table represents a disaggregation of revenue from contracts with customers. Revenue originating from the following geographic areas for the three months ended March 31, 2018 and 2017 consist of:

	Three Months Ended March 31, 2018 (in thousands)				
	United States	United Kingdom	Germany	Rest of the world	Total
Instruments, equipment and accessories	$16,147	$ 3,495	$ 3,707	$2,255	$25,604
Service, maintenance and warranty contracts	896	201	52	6	1,155
Total revenues	$17,043	$ 3,696	$ 3,759	$2,261	$26,759

	Three Months Ended March 31, 2017 (in thousands)				
	United States	United Kingdom	Germany	Rest of the world	Total
Instruments, equipment and accessories	$9,603	$ 3,213	$ 2,428	$2,159	$17,403
Service, maintenance and warranty contracts	400	157	120	6	683
Total revenues	$10,003	$ 3,370	$ 2,548	$2,165	$18,086

Refer to Note 1 for the Company’s revenue recognition policies.

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Deferred revenue

As of March 31, 2018, the Company had approximately $3.9 million in deferred revenue comprised of revenue deferred from service contracts and revenue deferred from advance payments. Changes in deferred revenue from service contracts during the period were as follows:

	Three Months Ended March 31, 2018 (in thousands)
Balance, beginning of period	$ 505
Addition due to business combination	849
Deferral of revenue	1,193
Recognition of deferred revenue	(758)
Effect of foreign currency translation	4
Balance, end of period	$ 1,793

Deferred Revenue from Advance Payments

Changes in deferred revenue from customer advances during the period were as follows:

	Three Months Ended March 31, 2018 (in thousands)
Addition due to business combination	$ 2,128
Deferral of revenue	128
Recognition of deferred revenue	(196)

Balance, end of period	$ 2,060

Allowance for doubtful accounts

Activity in the allowance for doubtful accounts was as follows:

	Three Months Ended March 31, 2018 (in thousands)
Balance, beginning of period	$ 193
Bad debt expense	5
Other	36
Balance, end of period	$ 234

Acquisition of DSI

As discussed in Note 4, the Company acquired DSI, a previously privately held company on January 31, 2018. The Company has adopted ASC 606 with respect to DSI as of January 31, 2018. The tables, revenue recognition policies applied, and product descriptions noted above are thus inclusive of and reflect revenues of DSI.

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18. Income Tax

Income tax from continuing operations was an expense of approximately $0.6 million and a benefit of $7 thousand for the three months ended March 31, 2018 and 2017, respectively. The effective tax rate on continuing operations was (11.5%) for the three months ended March 31, 2018, compared with 1.0% for the same period in 2017.

Tax expense for the three months ended March 31, 2018 reflects expense determined under the annualized effective tax method. The income tax benefit for the three months ended March 31, 2017 reflects the incremental expense associated with the actual results for the three-month period.

The tax rate for the three months ended March 31, 2017 was based on actual results for the three-month period rather than an annual effective rate estimated for the entire year. In 2017 the Company determined that using a year-to-date approach resulted in a better estimate of income tax expense/benefit based on its forecast of pre-tax income/loss, the mix of taxable income/loss across several jurisdictions with different statutory tax rates, and the impact of the full valuation allowance against U.S. deferred tax assets. The impact of recent events including U.S. tax reform and a major acquisition in January 2018 have significantly contributed to a change in the Company's determination regarding the use of the year-to-date method, which has been discontinued effective in the first quarter of 2018, the annualized effective tax rate method is used instead.

Discrete items included in the tax expense for the three months ended March 31, 2018 included foreign currency gains and losses. Discrete items included in the tax benefit for the three months ended March 31, 2017 changes to reserves for uncertain tax positions and tax impact of stock-based compensation.

On December 22, 2017, tax reform legislation known as the Tax Cuts and Jobs Act (the Tax Act) was signed into law. For the year ended December 31, 2017, the Company recorded provisional amounts relating to the revaluation of deferred tax assets and liabilities, the impact of the mandatory repatriation of foreign earnings after electing the utilization of existing tax attributes, and for the reduction in valuation allowance on net federal deferred tax assets. In accordance with SEC guidance in Staff Accounting Bulletin No. 118, the Company is utilizing the measurement period approach for the income tax effects of tax reform for which the accounting is incomplete. Since these provisions are still based on estimates, the Company will continue to measure the impact of these areas and record any changes in subsequent quarters when information and guidance become available.

As part of the 2017 Tax Act, there is a provision for the taxation of certain off-shore earnings referred to as the Global Intangible Low-Taxed Income ("GILTI") provision. This new provision, first effective in 2018, taxes the off-shore earnings at a rate of 10.5%, potentially offset in part with foreign tax credits. In connection with this new provision, the Company has recorded current expense within the period but continues the process of determining its

final accounting policy in regard to this new tax.

The difference between the Company's effective tax rate period over period was primarily attributable to higher pre-tax income at certain individual subsidiaries in 2018 versus 2017, despite an overall pre-tax loss in both periods, as well as the impact of non-deductible acquisition costs and certain provisions of U.S. tax reform in 2018. An additional factor was the impact of changes in the valuation allowance position recorded in certain countries.

For the period ended March 31, 2018, an income tax benefit of $0.8 million was recorded for discontinued operations. In the same period in 2017, income tax expense for discontinued operations was $30 thousand.

The Company adopted ASU 2016-09 as of January 1, 2017. As a result, the Company recorded a cumulative increase in retained earnings of $0.5 million at the beginning of the first quarter of 2017 with a corresponding increase in deferred tax assets related to the prior years' unrecognized excess tax benefits. An equal amount of valuation allowance was also recorded against these deferred tax assets with a corresponding decrease to retained earnings resulting in a net impact of $0. In addition, vesting of restricted stock units during the three months ended March 31, 2018 has been recognized in the current period's income statement.

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Item 2. ***Management's Discussion and Analysis of Financial Condition and Results of Operations.***

Forward-Looking Statements

This Quarterly Report on Form 10-Q contains statements that are not statements of historical fact and are forward-looking statements within the meaning of Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934 (the Exchange Act). The forward-looking statements are principally, but not exclusively, contained in "Item 2: Management's Discussion and Analysis of Financial Condition and Results of Operations." These statements involve known and unknown risks, uncertainties and other factors that may cause our actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by the forward-looking statements. Forward-looking statements include, but are not limited to, statements about management's confidence or expectations, and our plans, objectives, expectations and intentions that are not historical facts. In some cases, you can identify forward-looking statements by terms such as "may," "will," "should," "could," "would," "seek," "expects," "plans," "aim," "anticipates," "believes," "estimates," "projects," "predicts," "intends," "think," "potential," "objectives," "optimistic," "strategy," "goals," "sees," "new," "guidance," "future," "continue," "drive," "growth," "long-term," "projects," "develop," "possible," "emerging," "opportunity," "pursue" and similar expressions intended to identify forward-looking statements. These statements reflect our current views with respect to future events and are based on assumptions and subject to risks and uncertainties. Given these uncertainties, you should not place undue reliance on these forward-looking statements. Factors that may cause our actual results to differ materially from those in the forward-looking statements include reductions in customers' research budgets or government funding; domestic and global economic conditions; economic, political and other risks associated with international revenues and operations; newly enacted U.S. government tax reform; currency exchange rate fluctuations; economic and political conditions generally and those affecting pharmaceutical and biotechnology industries; the seasonal nature of purchasing in Europe; our failure to expand into foreign countries and international markets; our inability to manage our growth; competition from our competitors; failure or inadequacy of the our information technology structure; impact of difficulties implementing our enterprise resource planning systems; information security incidents or cybersecurity breaches; our failure to identify potential acquisition candidates and successfully close such acquisitions with favorable pricing or integrate acquired businesses or technologies; unanticipated costs relating to acquisitions and known and unknown costs arising in connection with our consolidation of business functions and any restructuring initiatives; failure of any banking institution in which we deposit our funds or its failure to provide services; our substantial debt and our ability to meet the financial covenants contained in our credit facility; our failure to raise or generate capital necessary to implement our acquisition and expansion strategy; the failure of Biostage to indemnify us for any liabilities associated with Biostage's business; impact of any impairment of our goodwill or intangible assets; our ability to retain key personnel; failure or inadequacy or our information technology structure; rising commodity and precious metals costs; our ability to protect our intellectual property and operate without infringing on others' intellectual property; exposure to product and other liability claims; global stock market volatility, currency exchange rate fluctuations and regulatory changes caused by the United Kingdom's likely exit from the European Union; plus other factors described under the heading "Item 1A. Risk Factors" in our Annual Report on Form 10-K for the year ended December 31, 2017, or described in our other public filings. Our results may also be affected by factors of which we are not currently aware. We may not update these forward-looking statements, even though our situation may change in the future, unless we have obligations under the federal securities laws to update and disclose material developments related to previously disclosed information.

Overview

Harvard Bioscience, Inc., a Delaware corporation, is a global developer, manufacturer and marketer of a broad range of scientific instruments and systems used to advance life science for basic research, drug discovery, clinical and environmental testing. Our products are sold to thousands of researchers around the world through our global sales organization, websites, catalogs, and through distributors including Thermo Fisher Scientific Inc., VWR, and other specialized distributors. We have sales and manufacturing operations in the United States, the United Kingdom, Germany, Sweden, Spain, France, Canada, and China.

Led by President and CEO Jeffrey A. Duchemin, we have conducted a multi-year restructuring program to reduce costs, align global functions, consolidate facilities to optimize our global footprint, divest non-core businesses and to reinvest in key areas such as sales and common IT systems. As part of these efforts, we divested our AHN Biotechnologie GmbH subsidiary (AHN) in the fourth quarter of 2016 and, during the first quarter of 2018, we sold substantially all the assets of our wholly-owned subsidiary, Denville Scientific, Inc. (Denville).

We are also pursuing a strategy to grow the business through strategic, accretive acquisitions, including four acquisitions since the fourth quarter of 2014.

Most recently, in January 2018, we acquired Data Sciences International, Inc. (DSI) for approximately $70.0 million. DSI, a St. Paul, Minnesota-based life science research company, is a recognized leader in physiologic monitoring focused on delivering preclinical products, systems, services and solutions to its customers. Its customers include pharmaceutical and biotechnology companies, as well as contract research organizations, academic labs and government researchers. This acquisition diversifies our customer base into the biopharmaceutical and contract research organization markets and offers revenue and cost synergies.

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Our Strategy

Our vision is to be a world leading life science company that excels in meeting the needs of our customers by providing a wide breadth of innovative products and solutions, while providing exemplary customer service. Our business strategy is to grow our top-line and bottom-line, and build shareholder value through a commitment to:

- commercial excellence;
- strategic acquisitions;
- operational efficiencies; and
- new product development;

Components of Operating Income

As previously described above, on January 22, 2018, we sold substantially all the assets of our operating subsidiary, Denville. The sale of Denville represented a strategic shift that has and will have a major effect on the Company's operations and financial results. As such and pursuant to the accounting standards, the operating results of Denville for the three months ended March 31, 2018 and 2017 have been presented in discontinued operations in the consolidated statements of operations. Therefore the amounts and percentages described below exclude the revenues and expenses of Denville unless otherwise described.

Revenues. We generate revenues by selling apparatus, instruments, devices and consumables through our distributors, direct sales force, websites and catalogs. Our websites and catalogs serve as the primary sales tools for our various product lines. These product lines include both proprietary manufactured products and complementary products from various suppliers. Our reputation as a leading producer in many of our manufactured products creates traffic to our website, enables cross-selling and facilitates the introduction of new products. We have field sales teams in the U.S., Canada, the United Kingdom, Germany, France, Spain and China. In those regions where we do not have a direct sales team, we use distributors. Revenues from direct sales to end users represented approximately 53% and 55% of our revenues for the three months ended March 31, 2018 and 2017, respectively.

Our products consist of instruments, consumables, and systems that are made up of several individual products. Sales prices of these products range from under $100 to over $100,000, although are mostly priced in the range of $5,000 to $15,000. They are mainly scientific instruments like spectrophotometers and plate readers that analyze light to detect and quantify a wide range of molecular and cellular processes, or apparatus like gel electrophoresis units. Following

the acquisition of DSI, our products and services also include wireless monitors, data acquisition and analysis products and software, and ancillary services including post-contract customer support, training and installation.

We use distributors for both our catalog products and our higher priced products, as well as for sales in locations where we do not have subsidiaries or where we have existing distributors in place from acquired businesses. For the three months ended March 31, 2018 and 2017, approximately 47% and 45% of our total revenues, respectively, were derived from sales to distributors.

For the three months ended March 31, 2018 and 2017, approximately 86% and 82% of our revenues, respectively, were derived from products we manufacture and approximately 14% and 18%, respectively, were derived from complementary products we distribute in order to provide the researcher with a single source for all equipment needed to conduct a particular experiment.

For the three months ended March 31, 2018 and 2017, approximately 36% and 45% of our revenues, respectively, were derived from sales made by our non-United States operations. As discussed later under “Selected Results of Operations”, the increase in revenues is primarily attributable to currency translation and the acquisition of DSI.

Changes in the relative proportion of our revenue sources between direct sales and distribution sales, and the proportion of U.S. and non-U.S sales are primarily the result of the acquisition of DSI.

Cost of revenues. Cost of revenues includes material, labor and manufacturing overhead costs, obsolescence charges, packaging costs, warranty costs, shipping costs and royalties. Our cost of revenues may vary over time based on the mix of products sold. We sell products that we manufacture and products that we purchase from third parties. The products that we purchase from third parties typically have a higher cost of revenues as a percent of revenues because the profit is effectively shared with the original manufacturer. We anticipate that our manufactured products will continue to have a lower cost of revenues as a percentage of revenues as compared with the cost of non-manufactured products for the foreseeable future. Additionally, our cost of revenues as a percent of revenues will vary based on mix of direct to end user sales and distributor sales, mix by product line and mix by geography.

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Sales and marketing expenses. Sales and marketing expense consists primarily of salaries and related expenses for personnel in sales, marketing and customer support functions. We also incur costs for travel, trade shows, demonstration equipment, public relations and marketing materials, consisting primarily of the printing and distribution of our catalogs, supplements and the maintenance of our websites. We may from time to time expand our marketing efforts by employing additional technical marketing specialists in an effort to increase sales of selected categories of products. We may also from time to time expand our direct sales organizations in an effort to concentrate on key accounts or promote certain product lines.

General and administrative expenses. General and administrative expense consists primarily of salaries and other related costs for personnel in executive, finance, accounting, information technology and human resource functions. Other costs include professional fees for legal and accounting services, information technology infrastructure, facility costs, investor relations, insurance and provision for doubtful accounts.

Research and development expenses. Research and development expense consists primarily of salaries and related expenses for personnel and spending to develop and enhance our products. Other research and development expense includes fees for consultants and outside service providers, and material costs for prototype and test units. We expense research and development costs as incurred. Grants received from governmental entities related to research projects are accounted for as a reduction in research and development expense over the period of the project. We believe that investment in product development is a competitive necessity and plan to continue to make these investments in order to realize the potential of new technologies that we develop, license or acquire for existing markets.

Stock-based compensation expenses. Stock-based compensation expense for the three months ended March 31, 2018 and 2017 was $1.0 million and $0.8 million, respectively. These amounts include stock-based compensation related to discontinued operations of $0.2 million and $23 thousand, respectively. The stock-based compensation expense related to stock options, restricted stock units, restricted stock units with a market condition and the employee stock purchase plan and was recorded as a component of cost of revenues, sales and marketing expenses, general and administrative expenses and research and development expenses.

Selected Results of Operations

Three Months Ended March 31, 2018 compared to Three Months Ended March 31, 2017

	Three Months Ended March 31,			
	2018	2017	Dollar Change	% Change

	(dollars in thousands)			
Revenues	$26,759	$18,086	$8,673	48.0 %
Cost of revenues	13,490	8,509	4,981	58.5 %
Gross margin percentage	49.6 %	53.0 %	N/A	-6.4 %
Sales and marketing expenses	5,646	3,478	2,168	62.3 %
General and administrative expenses	5,384	4,788	596	12.4 %
Research and development expenses	2,402	1,285	1,117	86.9 %
Amortization of intangible assets	1,103	376	727	193.4 %
Other expense, net	3,979	400	3,579	894.8 %
Income (loss) from discontinued operations	1,786	(323)	2,109	-652.9 %

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Revenues

Revenues for the three months ended March 31, 2018 were $26.8 million, an increase of approximately 48.0%, or $8.7 million, compared to revenues of $18.1 million for the three months ended March 31, 2017.

The increase in revenues reflects the addition of revenues from DSI in the quarter of approximately $7.6 million, while the impact of currency translation positively impacted revenues in the quarter by approximately $1.0 million. The favorability in currency translation in the quarter was primarily from the strengthening of the euro and British pound against the U.S. dollar.

Reconciliation of Changes In Revenues Compared to the Same Period of the Prior Year

	For the Three Months Ended **March 31, 2018**	
Organic and DSI change	41.8	%
Foreign exchange effect	6.2	%
Total revenue change	48.0	%

Each reporting period, we face currency exposure that arises from translating the results of our worldwide operations to the United States dollar at exchange rates that fluctuate from the beginning of such period. We evaluate our results of operations on both a reported and a foreign currency-neutral basis, which excludes the impact of fluctuations in foreign currency exchange rates. We believe that disclosing this non-GAAP financial information provides investors with an enhanced understanding of the underlying operations of the business. This non-GAAP financial information is used by our management to internally evaluate our operating results. The non-GAAP financial information provided in the table above should be considered in addition to, not as a substitute for, the financial information provided and presented in accordance with accounting principles generally accepted in the United States, or GAAP and may be different than other companies' non-GAAP financial information.

Cost of revenues

Cost of revenues were $13.5 million for the three months ended March 31, 2018, an increase of $5.0 million, or 58.5%, compared with $8.5 million for the three months ended March 31, 2017. The increase in cost of revenues was primarily due to the increase in revenues in comparison to the prior period. Gross profit margin as a percentage of revenues decreased to 49.6% for the three months ended March 31, 2018 compared with 53.0% for 2017. The decrease in gross profit margin is primarily attributable to a $1.5 million charge recognized in cost of revenues related to purchase accounting inventory fair value step up amortization. The total inventory fair value step up was preliminarily valued at $3.8 million and will be recognized into cost of revenues over one inventory turn, or approximately five months.

Sales and marketing expenses

Sales and marketing expenses increased $2.1 million or 62.3% to $5.6 million for the three months ended March 31, 2018 compared to $3.5 million during the same period in 2016. The increase in sales and marketing expenses was primarily due to the impact of the acquisition of DSI.

General and administrative expenses

General and administrative expenses were $5.4 million for the three months ended March 31, 2018, an increase of $0.6 million, or 12.4%, compared with $4.8 million for the three months ended March 31, 2017. The increase in these expenses was primarily due to the impact of the acquisition of DSI, as well as an increase in employee, consulting and purchased services costs.

Research and development expenses

Research and development expenses were $2.4 million for the three months ended March 31, 2018, an increase of $1.1 million, or 86.9%, compared with $1.3 million for the three months ended March 31, 2017. The increase in expense was primarily due to the impact of the acquisition of DSI.

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Amortization of intangible assets

Amortization of intangible asset expenses was $1.1 million and $0.4 million for the three months ended March 31, 2018 and 2017, respectively. The increase in amortization expense was primarily due to the addition of definite-lived intangible assets as a result of the DSI acquisition.

Other expense, net

Other expense, net, was $4 million and $0.4 million for the three months ended March 31, 2018 and 2017, respectively. Included in other expense, net for three months ended March 31, 2018 and 2017 was interest expense of $0.9 million and $0.2 million, respectively. The increase in other expense, net was primarily due to approximately $2.8 million in transaction costs that were incurred in connection with the DSI acquisition and the Denville disposition. Currency exchange rate fluctuations included as a component of net loss resulted in approximately $0.3 million and $0.1 million in currency losses for the three months ended March 31, 2018 and 2017, respectively.

Income taxes

Income tax from continuing operations was an expense of approximately $0.6 million and a benefit of $7 thousand for the three months ended March 31, 2018 and 2017, respectively. Tax expense for the three months ended March 31, 2018 reflects expense determined under the annualized effective tax method. Tax benefit for the three months ended March 31, 2017 reflects the benefit associated with the actual results for the three-month period. Discrete items included in the tax expense for the three months ended March 31, 2018 included foreign currency gains and losses. Discrete items for the three months ended March 31, 2017 included changes to reserves for uncertain tax positions and tax impact of stock-based compensation.

On December 22, 2017, tax reform legislation known as the Tax Cuts and Jobs Act (the “Tax Act”) was signed into law. For the year ended December 31, 2017, we recorded provisional amounts relating to the revaluation of deferred tax assets and liabilities, the impact of the mandatory repatriation of foreign earnings after electing the utilization of existing tax attributes, and for the reduction in valuation allowance on net federal deferred tax assets. Since these provisions are still based on estimates, we will continue to measure the impact of these areas and record any changes in subsequent quarters when information and guidance become available.

As part of the 2017 Tax Act, there is a provision for the taxation of certain off-shore earnings referred to as the Global Intangible Low-Taxed Income ("GILTI") provision. This new provision, first effective in 2018, taxes the off-shore earnings at a rate of 10.5%, potentially offset in part with foreign tax credits. In connection with this new provision, we have recorded current expense within the period but continues the process of determining its final accounting policy in regard to this new tax.

The difference between our effective tax rate period over period was primarily attributable to higher pre-tax income at certain individual subsidiaries in 2018 versus 2017, despite an overall pre-tax loss in both periods, as well as the impact of non-deductible acquisition costs and certain provisions of U.S. tax reform in 2018. An additional factor was the impact of changes in the valuation allowance position recorded in certain countries.

We have operations in the UK and several European countries where we historically had material current and deferred income tax balances related to those activities. As such, the UK's 2016 decision to withdraw from the European Union or the EU could have a material effect on our current and deferred income taxes. In March 2017, the UK initiated, through letter submission to the EU, a formal two-year process to officially withdraw its membership. During this two-year period, the UK and EU member states are expected to negotiate many provisions in the UK bilateral agreements and tax treaties with EU member states as well as EU rules governing the income tax treatment of deferred intercompany profits. The final outcome of these negotiations will not be known until both the EU and the UK approve them and the UK enacts the related changes in its tax laws. EU law will cease to apply in the UK at the end of the two-year process in March 2019, unless the negotiations are extended. The letter submission in March 2017 is an administrative step required to begin the formal withdrawal process and is not considered a tax law enactment under ASC 740. Additionally, in order to ensure that all EU laws remain in place until specifically repealed, the UK government has announced its intention to enact a 'Repeal Bill' which enshrines all EU law into domestic UK legislation. As of the filing date of this Form 10-Q, this Repeal Bill has not been enacted. Consequently, we plan to adjust our current and deferred taxes when tax law changes related to UK's withdrawal from the EU are actually enacted and/or when EU law ceases to apply in the UK.

Income (loss) from discontinued operations

Discontinued operations resulted in income of $1.8 million for the three months ended March 31, 2018 and a loss of $0.3 million for the same period in the prior year. On January 22, 2018, we sold substantially all the assets of Denville, for approximately $20.0 million, which includes a $3.0 million earn-out provision (the Denville Transaction). The results of Denville were presented in discontinued operations for both the three months ended March 31, 2018 and 2017. The income from discontinued operations for the three months ended March 31, 2018 included a gain on sale of Denville of $1.2 million and an income tax benefit of $0.9 million. The income tax benefit was mainly due to the reversal of deferred tax liabilities associated with indefinite lived intangibles following the Denville Transaction.

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Liquidity and Capital Resources

Historically, we have financed our business through cash provided by operating activities, the issuance of common stock, and bank borrowings. Our liquidity requirements arise primarily from investing activities, including funding of acquisitions, and other capital expenditures.

On January 22, 2018, we sold the operations of Denville, and received approximately $15.7 million, net of cash on hand. Simultaneously, we retired the existing debt balances of approximately $11.9 million. On January 31, 2018, we entered into a financing agreement, which comprised of a $64.0 term loan and up to a $25.0 million line of credit. Finally, on January 31, 2018, we acquired DSI for approximately $67.3 million, net of cash acquired.

As of March 31, 2018, we held cash and cash equivalents of $6.0 million, compared with $5.2 million at December 31, 2017. As of March 31, 2018 and December 31, 2017, we had $63.0 million and $11.7 million of borrowings outstanding under our credit facility, net of deferred financing costs. Total debt, net of cash and cash equivalents was $57.0 million at March 31, 2018, compared to $6.6 million at December 31, 2017, respectively. In addition, we had an underfunded United Kingdom pension liability of approximately $1.2 million at March 31, 2018 and December 31, 2017, respectively.

As of March 31, 2018 and December 31, 2017, cash and cash equivalents held by our foreign subsidiaries was $3.6 million and $5.7 million, respectively. At December 31, 2017, we changed our indefinite reinvestment assertion to provide that all foreign earnings above the level required for local operating expenses would be repatriated to the U.S. in tax years after 2017. At December 31, 2017, as we were considering a potential U.S. acquisition, we changed our assertion and it was anticipated that U.S. needs would require repatriation of all foreign subsidiaries' earnings rather than just France and Canada. As a result of the Tax Act, all prior unremitted earnings are deemed paid and included in the fourth quarter 2017 provision under the required one-time repatriation tax calculation. Prior to 2017, this modified assertion only applied to our subsidiaries in France and Canada. Therefore, as a result of this change in assertion, only $38 thousand of additional withholding has been accrued as of December 31, 2017. At March 31, 2018, an additional $27 thousand of withholding has been accrued related to amounts determined to be available for repatriation.

Condensed Cash Flow Statements
(unaudited)

	Three Months Ended March 31,	
	2018	2017
	(in thousands)	

Cash flows from operations:		
Net loss	$(4,064)	$(1,066)
Other adjustments to operating cash flows	363	1,781
Changes in assets and liabilities	4,149	(1,325)
Net cash provided by (used in) operating activities	448	(610)
Investing activities:		
Additions to property, plant and equipment	(493)	(198)
Acquisition, net of cash acquired	(67,413)	-
Dispostion, net of cash sold	15,730	-
Other investing activities	(13)	(30)
Net cash used in investing activities	(52,189)	(228)
Financing activities:		
Net proceeds from issuance of debt	52,953	(113)
Other financing activities	(1,709)	(155)
Net cash provided by (used in) financing activities	51,244	(268)
Effect of exchange rate changes on cash	755	109
Increase (decrease) in cash and cash equivalents	$258	$(997)

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Our operating activities provided cash of $0.4 million and used cash of $0.6 million for the three months ended March 31, 2018 and 2017, respectively. The increase in net cash flow from operations was primarily due to the effect of changes in working capital quarter over quarter.

Our investing activities used cash of $52.2 million and $0.2 million for the three months ended March 31, 2018 and 2017, respectively. Investing activities during the three months ended March 31, 2018 primarily consisted of $67.4 million paid for the acquisition of DSI and $15.7 million received from the disposition of Denville. Investing activities during the three months ended March 31, 2017 primarily included cash used for purchases of property, plant and equipment. We spent $0.5 million and $0.2 million on capital expenditures during the three months ended March 31, 2018 and 2017, respectively.

Our financing activities have historically consisted of borrowings and repayments under our revolving credit facility and term loans, payments of debt issuance costs and the issuance of common stock. During the three months ended March 31, 2018, financing activities provided cash of $51.2 million, compared with $0.3 million of cash used by financing activities for the three months ended March 31, 2017. During the three months ended March 31, 2018, we borrowed $67.0 million, repaid $14.0 million of debt and ended the quarter with $63.0 million of borrowings, net of deferred financing costs of $0.2 million. Net cash paid for tax withholdings from the issuance of common stock for the three months ended March 31, 2018 and 2017 was $0.2 million, for both periods, which related to the vesting of restricted stock units.

Borrowing Arrangements

On January 22, 2018, in connection with the closing of the sale of Denville, we terminated the Third Amended and Restated Credit Agreement (the Credit Agreement), dated as of May 1, 2017, among us, Brown Brothers Harriman & Co. and each of the other lenders party thereto, and Bank of America, as administrative agent. All outstanding amounts under the agreement were repaid in full using a portion of the proceeds of the Denville sale. At the time of repayment, there was approximately $11.9 million of borrowings outstanding.

On January 31, 2018, we entered into a financing agreement by and among us and certain of our subsidiaries, as borrowers (collectively, the Borrower), certain of our subsidiaries thereto, as guarantors, various lenders from time to time party thereto (the Lenders), and Cerberus Business Finance, LLC, as collateral agent and administrative agent for the Lenders (the Financing Agreement).

The Financing Agreement provides for senior secured credit facilities (the Senior Secured Credit Facilities) comprised of a $64.0 million term loan and up to a $25.0 million revolving line of credit. The proceeds of the term loan and $4.8

million of advances under the revolving line of credit were used to fund a portion of the DSI acquisition, and to pay fees and expenses related thereto and the closing of the Senior Secured Credit Facilities. In addition, the revolving facility is available for use by the Company and its subsidiaries for general corporate and working capital needs, and other purposes to the extent permitted by the Financing Agreement. The Senior Secured Credit Facilities have a maturity of five years. At the closing date of the Financing Agreement, we had approximately $14.5 million of available borrowing capacity under the revolving line of credit.

Commencing on March 31, 2018, the outstanding term loans amortize in equal quarterly installments equal to $0.4 million per quarter on such date and during each of the next three quarters thereafter, $0.6 million per quarter during the next four quarters thereafter and $0.8 million per quarter thereafter, with a balloon payment at maturity.

The obligations of the Borrower under the Senior Secured Credit Facilities are unconditionally guaranteed by the Company and certain of the Company’s existing and subsequently acquired or organized subsidiaries. The Senior Secured Credit Facilities and related guarantees are secured on a first-priority basis (subject to certain liens permitted under the Financing Agreement) by a lien on substantially all the tangible and intangible assets of the Borrower and the subsidiary guarantors, including all of the capital stock held by such obligors (subject to a 65% limitation on pledges of capital stock of foreign subsidiaries), subject to certain exceptions.

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Interest on all loans under the Senior Secured Credit Facilities is paid monthly. Borrowings under the Financing Agreement accrue interest at a per annum rate equal to, at the Borrower's option, a base rate plus 4.75% or a LIBOR rate plus 6.25%. The loans are also subject to a 1.25% interest rate floor for LIBOR loans and a 4.25% interest rate floor for base rate loans.

The Financing Agreement contains customary representations and warranties and affirmative covenants applicable to us and our subsidiaries and also contains certain restrictive covenants, including, among others, limitations on the incurrence of additional debt, liens on property, acquisitions and investments, loans and guarantees, mergers, consolidations, liquidations and dissolutions, asset sales, dividends and other payments in respect of our capital stock, prepayments of certain debt, transactions with affiliates and modifications of organizational documents, material contracts, affiliated practice agreements and certain debt agreements. The Financing Agreement also contains customary events of default.

As of March 31, 2018 and December 31, 2017, we had borrowings net of debt issuance costs of $63.0 million and $11.7 million respectively, outstanding. The carrying value of the debt approximates fair value because the interest rate under the obligation approximates market rates of interest available to us for similar instruments. As of March 31, 2018, we were in compliance with all financial covenants contained in the Financing Agreement, were subject to covenant and working capital borrowing restrictions and had available borrowing capacity under our Financing Agreement of $14.6 million.

As of March 31, 2018, the weighted effective interest rate, net of the impact of our interest rate swap, on our Term Loan and our Revolving Line was 8.43% and 8.13%, respectively.

Our forecast of the period of time through which our financial resources will be adequate to support our operations is a forward-looking statement that involves risks and uncertainties, and actual results could vary as a result of a number of factors. Based on our current operations and current operating plans, we expect that our available cash, cash generated from current operations and debt capacity will be sufficient to finance current operations and capital expenditures for the next 12 months and beyond. We may however need to incur additional debt or raise equity capital for our business. Additional capital raising activities will dilute the ownership interests of existing stockholders to the extent we raise capital by issuing equity securities and we cannot guarantee that we will be successful in raising additional capital on favorable terms or at all.

Critical Accounting Policies

The critical accounting policies underlying the accompanying unaudited consolidated financial statements are those set forth in Part II, Item 7 included in our Annual Report on Form 10-K for the fiscal year ended December 31, 2017, which was filed with the SEC on March 16, 2018.

Impact of Foreign Currencies

Our international operations in some instances operate in a natural hedge as we sell our products in many countries and a substantial portion of our revenues, costs and expenses are denominated in foreign currencies, especially the British pound, the euro, the Canadian dollar and the Swedish krona.

During the three months ended March 31, 2018, changes in foreign currency exchange rates resulted in an unfavorable translation effect on our consolidated revenues and a neutral effect on our consolidated net loss. Changes in foreign currency exchange rates resulted in an unfavorable effect on revenues of approximately $1.0 million and a favorable effect on expenses of approximately $1.0 million.

The gain associated with the translation of foreign equity into U.S. dollars included as a component of comprehensive loss during the three months ended March 31, 2018, was approximately $1.5 million, compared to a gain of $0.9 million for the three months ended March 31, 2017.

In addition, currency exchange rate fluctuations included as a component of net loss resulted in approximately $0.3 million and $0.1 million in currency losses during the three months ended March 31, 2018 and 2017, respectively.

Recently Issued Accounting Pronouncements

In February 2016, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2016-02, *Leases*, which is intended to improve financial reporting about leasing transactions. The update requires a lessee to record on the balance sheet the assets and liabilities for the rights and obligations created by lease terms of more than 12 months. The update is effective for fiscal years beginning after December 15, 2018. We have commenced the process of evaluating the requirements of the standard as well as collecting information on all its leases. We have not yet concluded on the impact of the adoption on its consolidated financial position, results of operations and cash flows, however, assets and liabilities will increase upon adoption for right-of-use assets and lease liabilities. Our future commitments under lease obligations are summarized in Note 12.

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In August 2017, the FASB issued ASU 2017-12, *Derivatives and Hedging (Topic 815)* which amends the hedge accounting recognition and presentation requirements in ASC 815. The Board's objectives in issuing the ASU are to (1) improve the transparency and understandability of information conveyed to financial statement users about an entity's risk management activities by better aligning the entity's financial reporting for hedging relationships with those risk management activities and (2) reduce the complexity of and simplify the application of hedge accounting by preparers. The ASU is effective for annual reporting periods, including interim periods within those annual reporting periods, beginning after December 15, 2018. Early adoption is permitted, including adoption in any interim period. We are evaluating the requirements of this guidance and has not yet determined the impact of the adoption on its consolidated financial position, results of operations and cash flows.

Recently Adopted Accounting Pronouncements

In May 2014, the FASB issued ASU 2014-09, *Revenue from Contracts with Customers,* a new accounting standard that provides for a comprehensive model to use in the accounting for revenue arising from contracts with customers that will replace most existing revenue recognition guidance within generally accepted accounting principles in the United States. Under this standard, revenue will be recognized to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the Company expects to be entitled in exchange for those goods or services.

We adopted this standard as of January 1, 2018 using the modified retrospective approach. As part of the implementation of the standard, we identified our significant revenue streams, which currently consist primarily of product revenue transactions, and service, maintenance and extended warranty transactions on certain product sales. The timing of recognizing revenues for these revenue streams did not materially change. Additionally, there were no material changes to business processes, systems and controls. Our updated revenue recognition policy and additional disclosures are presented in Note 17.

In May 2017, the FASB issued ASU 2017-09, Stock compensation (Topic 718): Scope of modification accounting which amends the scope of modification accounting for share-based payment arrangements. The ASU provides guidance on the types of changes to the terms or conditions of share-based payment awards to which an entity would be required to apply modification accounting under ASC 718. Specifically, an entity would not apply modification accounting if the fair value, vesting conditions, and classification of the awards are the same immediately before and after the modification. The ASU is effective for annual reporting periods, including interim periods within those annual reporting periods, beginning after December 15, 2017. We adopted this guidance on January 1, 2018, and the new standard did not have a material impact on our consolidated financial position, results of operations and cash flows.

Item 3. ***Quantitative and Qualitative Disclosures about Market Risk.***

The majority of our manufacturing and testing of products occurs in our facilities in the United States, Germany, Sweden and Spain. We sell our products globally through our distributors, direct sales force, websites and catalogs. As a result, our financial results are affected by factors such as changes in foreign currency exchange rates and weak economic conditions in foreign markets.

We collect amounts representing a substantial portion of our revenues and pay amounts representing a substantial portion of our operating expenses in foreign currencies. As a result, changes in currency exchange rates from time to time may affect our operating results.

We are exposed to market risk from changes in interest rates primarily through our financing activities. As of March 31, 2018, we had $63.0 million outstanding under our Financing Agreement, net of deferred financing costs.

As noted above under the heading “Borrowing Arrangements”, on January 22, 2018, we terminated the Credit Agreement, and on January 31, 2018, entered into the Financing Agreement. As a result of terminating the Credit Agreement, we unwound our previously existing swap agreement and received an immaterial amount of proceeds. On February 16, 2018, we entered into a new interest rate swap contract with PNC bank with a notional amount of $36.0 million and a termination date of January 31, 2023 in order to hedge the risk of changes in the effective benchmark interest rate (LIBOR) associated with the Financing Agreement. The swap contract converted specific variable-rate debt into fixed-rate debt and fixed the LIBOR rate associated with a portion of the term loan under the Financing Agreement at 2.72%.

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As of March 31, 2018, the weighted effective interest rates, net of the impact of our interest rate swaps, on our Term Loan was 8.43%. Assuming no other changes which would affect the margin of the interest rate, the estimated effect of interest rate fluctuations on outstanding borrowings under our Financing Agreement as of March 31, 2018 is quantified and summarized as follows:

If compared to the rate as of March 31, 2018	Interest expense increase (in thousands)
Interest rates increase by 1%	$ 293
Interest rates increase by 2%	$ 560

Item 4. ***Controls and Procedures.***

Disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act) are designed to ensure that information required to be disclosed in reports filed or submitted 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 management, including the Chief Executive Officer and the Chief Financial Officer, to allow timely decisions regarding required disclosures.

As required by Rules 13a-15(e) and 15d-15(e) under the Exchange Act, our management, under the supervision and with the participation of our Chief Executive Officer and Chief Financial Officer, conducted an evaluation of the effectiveness of the design and operation of our disclosure controls and procedures as of March 31, 2018. Our disclosure controls and procedures are designed to provide reasonable assurance that information required to be disclosed by us in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms, and our management necessarily was required to apply its judgment in evaluating and implementing our disclosure controls and procedures. Based upon the evaluation described above, our management concluded that our disclosure controls and procedures for the periods covered by this report were effective, as of the end of the period covered by this Quarterly Report on Form 10-Q, in providing reasonable assurance that information required to be disclosed by us in the reports that we file or submit under the Exchange Act is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer, to allow timely decisions regarding required disclosures, and is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms.

We continue to review our internal controls over financial reporting, and may from time to time make changes aimed at enhancing their effectiveness and to ensure that our systems evolve with our business. There were no changes in our internal controls over financial reporting that occurred during the three months ended March 31, 2018 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

PART II. OTHER INFORMATION

Item 1A. ***Risk Factors.***

To our knowledge, and except to the extent additional factual information disclosed in this Quarterly Report on Form 10-Q relates to such risk factors, there has been no material changes in the risk factors described in “Item 1A. Risk Factors” in our Annual Report on Form 10-K for the year ended December 31, 2017, which was filed with the SEC on March 16, 2018.

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Item 6. Exhibits

Exhibit

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2.1[(1)]	Merger Agreement, dated as of January 22, 2018, between Harvard Bioscience, Inc., Plymouth Sub, Inc. and Data Sciences International, Inc.
2.2[(1)]	Purchase Agreement, dated as of January 22, 2018, between Harvard Bioscience, Inc., Denville Scientific, Inc. and Thomas Scientific, LLC.
3.1[(2)]	Certificate of Elimination of Series A Junior Participating Cumulative Preferred Stock, dated as of February 27, 2018.
10.1[(3)]	Lease Agreement, dated as of August 15, 2008, between AX US L.P. (as assigned to it by New Brighton 14th Street LLC), Ryan Companies US, Inc. and Data Sciences International, Inc. (as assigned to it by Transoma Medical, Inc.).
10.2[(3)]	First Amendment to Lease Agreement, dated as of February 26, 2008, between AX US L.P. (as assigned to it by New Brighton 14th Street LLC), Ryan Companies US, Inc. and Data Sciences International, Inc. (as assigned to it by Transoma Medical, Inc.).
10.3[(3)]	Second Amendment to Lease Agreement, dated as of August 4, 2008, between AX US L.P. (as assigned to it by New Brighton 14th Street LLC), Ryan Companies US, Inc. and Data Sciences International, Inc. (as assigned to it by Transoma Medical, Inc.).
10.4[(4)]	Financing Agreement, dated as of January 31, 2018, between Harvard Bioscience, Inc., each of the borrowers named therein, the lenders from time to time party thereto, and Cerberus Business Finance, LLC.
31.1	Certification of Chief Financial Officer of Harvard Bioscience, Inc., pursuant to Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification of Chief Executive Officer of Harvard Bioscience, Inc., pursuant to Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1*	Certification of Chief Financial Officer of Harvard Bioscience, Inc., pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
32.2*	Certification of Chief Executive Officer of Harvard Bioscience, Inc., pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101.INS	XBRL Instance Document

101.SCH XBRL Taxonomy Extension Schema Document

101.CAL XBRL Taxonomy Extension Calculation Linkbase Document

101.LAB XBRL Taxonomy Extension Labels Linkbase Document

101.PRE XBRL Taxonomy Extension Presentation Linkbase Document

101.DEF XBRL Taxonomy Extension Definition Linkbase Document

* This certification shall not be deemed "filed" for purposes of Section 18 of the Securities Exchange Act of 1934, or otherwise subject to the liability of that section, nor shall it be deemed to be incorporated by reference into any filing under the Securities Act of 1933 or the Securities Exchange Act of 1934.

(1) Previously filed as an exhibit to the Company's Current Report on Form 8-K (filed January 26, 2018) and incorporated by reference thereto.

(2) Previously filed as an exhibit to the Company's Current Report on Form 8-K (filed March 2, 2018) and incorporated by reference thereto.

(3) Previously filed as an exhibit to the Company's Annual Report on Form 10-K (filed March 16, 2018) and incorporated by reference thereto.

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SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by undersigned thereunto duly authorized.

Date: May 10, 2018

HARVARD BIOSCIENCE, INC.

By: /S/ JEFFREY A. DUCHEMIN
Jeffrey A. Duchemin
Chief Executive Officer

By: /S/ ROBERT E. GAGNON
Robert E. Gagnon
Chief Financial Officer

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