PDF SOLUTIONS INC
Form 10-Q
May 10, 2018

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UNITED STATES SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-Q

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

For the Quarterly Period ended March 31, 2018

or

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

For the transition period from _____ to _____

Commission File Number 000-31311

PDF SOLUTIONS, INC.

(Exact name of Registrant as Specified in its Charter)

Delaware	**25-1701361**
(State or Other Jurisdiction of Incorporation or Organization)	(I.R.S. Employer Identification No.)
333 West San Carlos Street, Suite 1000 **San Jose, California**	**95110**
(Address of Principal Executive Offices)	(Zip Code)

(408) 280-7900

(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 Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes No

Indicate by check mark whether the registrant has submitted electronically 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). 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
Non-accelerated filer (Do not check if a smaller reporting company)	Smaller reporting company
Emerging growth company	

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

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes No

There were 31,975,853 shares of the Registrant's Common Stock outstanding as of May 7, 2018.

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PART I — FINANCIAL INFORMATION

Item 1. Financial Statements

PDF SOLUTIONS, INC.

CONDENSED CONSOLIDATED BALANCE SHEETS

(unaudited)

(in thousands, except par value)

	March 31, 2018	December 31, 2017
ASSETS		
Current assets:		
Cash and cash equivalents	$98,522	$101,267
Accounts receivable, net of allowance of $374 in both 2018 and in 2017	58,436	57,564
Prepaid expenses and other current assets	9,654	5,069
Total current assets	166,612	163,900
Property and equipment, net	26,536	25,386
Goodwill	1,923	1,923
Intangible assets, net	5,821	6,074
Deferred tax assets	15,896	16,348
Other non-current assets	9,752	10,545
Total assets	$226,540	$224,176
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$2,588	$2,536
Accrued compensation and related benefits	5,322	6,493
Accrued and other current liabilities	2,151	2,627
Deferred revenues – current portion	8,474	7,981
Total current liabilities	18,535	19,637
Long-term income taxes payable	4,824	3,902
Other non-current liabilities	1,122	2,269
Total liabilities	24,481	25,808
Commitments and contingencies (Note 9)		
Stockholders' equity:		
	-	-

Preferred stock, $0.00015 par value, 5,000 shares authorized, no shares issued and outstanding		
Common stock, $0.00015 par value, 70,000 shares authorized: shares issued 40,026 and 39,799, respectively; shares outstanding 31,964 and 32,112, respectively	5	5
Additional paid-in-capital	301,867	297,950
Treasury stock at cost, 8,062 and 7,688 shares, respectively	(76,473)	(71,793)
Accumulated deficit	(23,160)	(27,089)
Accumulated other comprehensive loss	(180)	(705)
Total stockholders' equity	202,059	198,368
Total liabilities and stockholders' equity	$226,540	$224,176

See accompanying Notes to Condensed Consolidated Financial Statements (unaudited).

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PDF SOLUTIONS, INC.

CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE INCOME

(unaudited)

(in thousands, except per share amounts)

	Three Months Ended March 31,	
	2018	**2017**
Revenues:		
Design-to-silicon-yield solutions	$18,190	$19,698
Gainshare performance incentives	6,547	4,591
Total revenues	24,737	24,289
Costs of Design-to-silicon-yield solutions		
Direct costs of Design-to-silicon-yield solutions	$11,338	$11,335
Amortization of acquired technology	144	96
Total cost of Design-to-silicon-yield solutions	11,482	11,431
Gross profit	13,255	12,858
Operating expenses:		
Research and development	7,245	7,282
Selling, general and administrative	6,375	5,899
Amortization of other acquired intangible assets	109	92
Total operating expenses	13,729	13,273
Income (loss) from operations	(474)	(415)
Interest and other income (expense), net	(331)	(230)
Income (loss) before income taxes	(805)	(645)
Income tax provision (benefits)	(381)	(1,162)
Net income (loss)	$(424)	$517
Net income (loss) per share:		
Basic	$(0.01)	$0.02
Diluted	$(0.01)	$0.02
Weighted average common shares:		
Basic	32,168	31,991
Diluted	32,168	33,594

Net income (loss)	$(424)	$517
Other comprehensive income:		
Foreign currency translation adjustments, net of tax	525	273
Comprehensive income (loss)	$101	$790

See accompanying Notes to Condensed Consolidated Financial Statements (unaudited).

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CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS

(unaudited)

(in thousands)

	Three Months Ended March 31,	
	2018	**2017**
Operating activities:		
Net income (loss)	$(424)	$517
Adjustments to reconcile net income to net cash provided by operating activities:		
Depreciation and amortization	1,261	1,091
Stock-based compensation expense	2,856	2,884
Amortization of acquired intangible assets	253	188
Deferred taxes	117	(580)
Loss on disposal of property and equipment	3	-
Unrealized loss (gain) on foreign currency forward contract	58	92
Changes in operating assets and liabilities:		
Accounts receivable, net of allowance	(80)	(1,931)
Prepaid expenses and other current assets	(2,183)	(1,395)
Accounts payable	497	476
Accrued compensation and related benefits	(1,278)	(1,040)
Accrued and other liabilities	(532)	(587)
Deferred revenues	1,906	1,734
Billings in excess of recognized revenues	-	112
Other non-current assets	798	(1,977)
Net cash (used in) provided by operating activities	3,252	(416)
Investing activities:		
Purchases of property and equipment	(2,447)	(2,313)
Net cash used in investing activities	(2,447)	(2,313)
Financing activities:		
Proceeds from exercise of stock options	39	717
Repurchases of common stock	(4,123)	-
Proceeds from employee stock purchase plan	1,007	909
Payments for taxes related to net share settlement of equity awards	(556)	(844)
Net cash (used in) provided by financing activities	(3,633)	782

Effect of exchange rate changes on cash and cash equivalents	83	86
Net change in cash and cash equivalents	(2,745)	(1,861)
Cash and cash equivalents, beginning of period	101,267	116,787
Cash and cash equivalents, end of period	$98,522	$114,926
Supplemental disclosure of cash flow information:		
Cash paid during the period for:		
Taxes	$622	$681
Property and equipment received and accrued in accounts payable and accrued and other liabilities	$1,185	$885

See accompanying Notes to Condensed Consolidated Financial Statements (unaudited).

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PDF SOLUTIONS, INC.

NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS (UNAUDITED)

1. BASIS OF PRESENTATION AND SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Basis of Presentation —

The interim unaudited condensed consolidated financial statements included herein have been prepared by PDF Solutions, Inc. (the "Company") pursuant to the rules and regulations of the Securities and Exchange Commission ("SEC"), including the instructions to the Quarterly Report on Form 10-Q and Article 10 of Regulation S-X. Certain information and footnote disclosures normally included in annual financial statements prepared in accordance with accounting principles generally accepted in the United States of America have been condensed or omitted. The interim unaudited condensed consolidated financial statements reflect, in the opinion of management, all adjustments necessary (consisting only of normal recurring adjustments), to present a fair statement of results for the interim periods presented. The operating results for any interim period are not necessarily indicative of the results that may be expected for other interim periods or the full fiscal year. The accompanying interim unaudited condensed consolidated financial statements should be read in conjunction with the audited consolidated financial statements and notes thereto in the Company's Annual Report on Form 10-K for the year ended December 31, 2017.

The condensed consolidated financial statements include the accounts of the Company and its wholly-owned subsidiaries after the elimination of all intercompany balances and transactions.

The condensed consolidated balance sheet at December 31, 2017, has been derived from the audited consolidated financial statements but does not include all disclosures required by accounting principles generally accepted in the United States of America.

Use of Estimates —

The preparation of financial statements in conformity with generally accepted accounting principles in the United States ("U.S. GAAP") requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Significant estimates in these financial

statements include significant estimates and judgments made in recognizing revenue, accounting for goodwill and intangible assets, stock-based compensation expense and accounting for income taxes. Actual results could differ from those estimates. For a discussion of significant estimates and judgments made in recognizing revenue under the new revenue standard, see Note 2. Revenue Recognition.

Recent Accounting Pronouncements –

Recently Adopted Accounting Standards

In May 2014, the Financial Accounting Standards Board (or FASB) issued ASU No. 2014-09, Revenue from Contracts with Customers (Topic 606), which supersedes the revenue recognition requirements in "Revenue Recognition (Topic 605)." Subsequently, the FASB has issued several amendments to the standard, including clarification on accounting for licenses of intellectual property and identifying performance obligations. Under Topic 606, the new revenue recognition standard provides a five-step analysis of transactions to determine when and how revenue is recognized. The core principle is that a company should recognize revenue to reflect the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. The Company adopted this new standard on the first day of the first fiscal quarter of fiscal 2018. The Company chose to adopt the standard using the modified retrospective transition method. See Note 2. Revenue recognition, below for further information, including further discussion on the impact of adoption and changes in accounting policies relating to revenue recognition.

In August 2016, the FASB issued ASU No. 2016-15, Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments. The purpose of this standard is to clarify the treatment of several cash flow categories. This update is effective for annual periods beginning after December 15, 2017, and interim periods within those fiscal years. The Company adopted this standard on January 1, 2018 and it did not have a material impact on its financial statements and footnote disclosures.

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In November 2016, the FASB issued ASU No. 2016-18, Statement of Cash Flows (Topic 230): Restricted Cash, that will require that the amounts generally described as restricted cash and restricted cash equivalents would be included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period amounts shown on the statement of cash flows. The new guidance also requires certain disclosures to supplement the statement of cash flows. This update is effective for annual periods beginning after December 15, 2017, and interim periods within those fiscal years. The Company adopted this standard on January 1, 2018, and it did not have a material impact on our financial statements and footnote disclosures.

In January 2017, the FASB issued ASU No. 2017-01, Business Combinations: Clarifying the Definition of a Business, which narrows the existing definition of a business and provides a framework for evaluating whether a transaction should be accounted for as an acquisition (or disposal) of assets or a business. The guidance is effective for fiscal years beginning after December 15, 2017. The Company adopted this standard on January 1, 2018, and it did not have a material impact on its financial statements and footnote disclosures.

In May 2017, the FASB issued ASU No. 2017-09, Compensation-Stock Compensation (Topic 718) Scope of Modification Accounting. This standard clarifies which changes to the terms or conditions of a share-based payment award require an entity to apply modification accounting in Topic 718. The standard is effective for interim and annual reporting periods beginning after December 15, 2017. The Company adopted this standard on January 1, 2018, and it did not have a material impact on our financial statements and footnote disclosures.

Accounting Standards Not Yet Effective

In February 2016, the FASB issued ASU No. 2016-02, Leases (Topic 842). The update requires that most leases, including operating leases, be recorded on the balance sheet as an asset and a liability, initially measured at the present value of the lease payments. Subsequently, the lease asset will be amortized generally on a straight-line basis over the lease term, and the lease liability will bear interest expense and be reduced for lease payments. The amendments in this update are effective for public companies' financial statements issued for fiscal years beginning after December 15, 2018, including interim periods within those fiscal years. The Company is still in the process of evaluating the impact of adopting this new accounting standard on its consolidated financial statements and footnote disclosures.

In January 2017, the FASB issued ASU No. 2017-04, Intangibles - Goodwill and Other (Topic 350). This standard eliminates step 2 from the annual goodwill impairment test. This update is effective for annual periods beginning after December 15, 2019, and interim periods within those fiscal years, with early adoption permitted, and is to be applied on a prospective basis. The Company does not anticipate that the adoption of this standard will have a significant impact on its consolidated financial statements or the related disclosures.

In February 2018, the FASB issued ASU No. 2018-02, Income Statement – Reporting Comprehensive Income (Topic 220): Reclassification of Certain Tax Effect from Accumulated Other Comprehensive Income. This update allows a reclassification from accumulated other comprehensive income to retained earnings for stranded tax effects resulting from the Tax Cuts and Job Act enacted in December 2017. This update will be effective for the Company for fiscal years beginning after December 15, 2018 and interim periods within those fiscal years. Early adoption is permitted. The Company does not anticipate that the adoption of this standard will have a significant impact on its consolidated financial statements or the related disclosures.

In March 2018, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2018-05, "Income Taxes (Topic 740): Amendments to SEC Paragraphs Pursuant to SEC Staff Accounting Bulletin No. 118". The staff of the U.S. Securities and Exchange Commission (SEC) recognized the complexity of reflecting the impacts of the Tax Cuts Job Act (TCJA), and on December 22, 2017 issued guidance in Staff Accounting Bulletin 118 (SAB 118), which clarifies accounting for income taxes under Accounting Standards Codification (ASC) 740 if information is not yet available or complete and provides for up to a one year period in which to complete the required analysis and accounting (the measurement period). Refer to Note 5, Income Taxes, for further discussion regarding the impact of this standard to the Company's consolidated financial statements.

2. REVENUE RECOGNITION

On January 1, 2018, the Company adopted Topic 606, using the modified retrospective transition method applied to those contracts which were not completed as of January 1, 2018. Under this method, the Company evaluated contracts that were in effect at the beginning of fiscal 2018 as if those contracts had been accounted for under Topic 606 from the beginning of their terms. Upon adoption, the Company recognized the cumulative effect of adopting this guidance as an adjustment to accumulated deficit on the date of initial application. The comparative information in prior periods has not been restated and continues to be reported under the accounting standards in effect for those periods.

The Company also considered the impact of subtopic ASC 340-40. Prior to the adoption of Topic 606, the Company expensed commission costs and related fringe benefits as incurred. Under ASC 340-40, the Company is required to capitalize and amortize incremental costs of obtaining or fulfilling a contract over the period of the expected benefit. Incremental costs of obtaining and fulfilling a contract are recognized as an asset if the costs are expected to be recovered.

The most significant impacts of the adoption of Topic 606 are as follows:

At the adoption date, the Company recorded a net decrease of $4.4 million to accumulated deficit related to the acceleration of revenue required by the adoption of Topic 606 using the modified retrospective method and the capitalization of incremental sales commission costs, net of related deferred tax impact. Under the modified retrospective method, a portion of revenue for uncompleted contracts, which would have been recognized in future

periods under Topic 605, was accelerated and recognized as an adjustment to accumulated deficit as of the date of adoption. As a result, the beginning balance of accounts receivable increased by $0.8 million, contract assets were established at $1.9 million and deferred revenue decreased by $2.5 million. The Company capitalized $0.5 million of incremental sales commission costs at the adoption date directly related to obtaining customer contracts and will amortize these costs over the lives of the contracts for which such commissions are paid.

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For fiscal 2018, revenue generated under Topic 606 is expected to be slightly lower than revenue would have been under Topic 605. This is the result of a combination of factors, including the reduction of deferred revenue that under Topic 605 would continue to be recognized into revenue in 2018 and beyond, as well as changes in the timing of revenue recognition as discussed below. The actual effect on revenue recognized for the first quarter of fiscal 2018 was not significant; and

The adoption of Topic 606 impacted the Company's accounting for certain commercial software multi-element arrangements ("MEA") that combine software-related deliverables, which may include software contracts with varying terms and service elements. Topic 605 required establishing vendor specific objective evidence of fair value or, VSOE, for undelivered elements to recognize revenue separately for each of the different elements. Topic 606 requires the Company to allocate consideration to each separate different performance obligation through the use of stand-alone selling prices ("SSPs") and to recognize the revenue as if those performance obligations had been sold on a standalone basis, either at a point-in-time or over time. The most significant impact of this change relates to the Company's accounting for software license revenue. For the Company's Exensio big data solution software licensed under time-based license model, the Company will recognize a portion of revenue on these types of contracts at the time of delivery rather than ratably over the term of the license. For perpetual software license contracts, the Company will allocate consideration to the different performance obligations based on their SSPs rather than using the VSOE for undelivered elements as required under Topic 605.

In addition, under the Company's previous accounting practices, revenue was recognized from Gainshare performance incentive agreements in the period of receipt of related Gainshare acknowledgement reports, generally one quarter in arrears from the period in which the underlying sales (usage) occurred. Under Topic 606, the Company is now required to record Gainshare revenue in the same period in which the usage occurs. Because the Company generally does not receive the acknowledgment reports during a given quarter within the time frame necessary to adequately review the reports and include the actual amounts in quarterly results for such quarter, the Company accrues the related revenue based on estimates of customer's underlying sales achievement. As a result of accruing revenue for the quarter based on such estimates, adjustments will be required in the following quarter to true-up revenue to the actual amounts reported.

Under Topic 605, the Company recognized revenue for professional services, including revenue from fixed price solution implementation service contracts, either on a percentage of completion method or time and materials method. Under Topic 606 revenue related to these professional services will remain substantially unchanged.

The following table summarizes the effects of adopting Topic 606 on the Company's condensed consolidated balance sheet as of March 31, 2018:

	As reported	**Adjustments**	**Balances under Topic**

	under Topic 606		**605**
		(In thousands)	
Accounts receivable, net of allowance	$58,436	$764	$59,200
Prepaid expenses and other current assets	9,654	(3,959)	5,695
Deferred tax assets	15,896	316	16,212
Other non-current assets	9,752	(289)	9,463
Deferred revenues – current portion	8,474	1,348	9,822
Long-term income taxes payable	4,824	(1,032)	3,792
Other non-current liabilities	1,122	899	2,021
Accumulated deficit	(23,160)	(4,383)	(27,543)

The impact of adopting Topic 606 to revenues, cost of revenues and net income for the three months ended March 31, 2018 was not significant. There was no significant impact to the basic and diluted net income (loss) per share.

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The Company's net cash provided by operating activities for the three months ended March 31, 2018 did not change due to the adoption of Topic 606. The following table summarizes the effects of adopting Topic 606 on the financial statement line items of the Company's condensed consolidated statement of cash flows for the three months ended March 31, 2018:

	As reported under Topic 606	Adjustments	Balances under Topic 605
	(In thousands)		
Net income	$(424)	$ (30)	$ (454)
Changes in operating assets and liabilities:			
Accounts receivable, net of allowance	(80)	(1,556)	(1,636)
Prepaid expenses and other current assets	(2,183)	1,569	(614)
Other non-current assets	798	288	1,086
Deferred revenue	1,906	(271)	1,635

The Company derives revenue from two sources: Design-to-silicon-yield solutions and Gainshare performance incentives.

Revenue is recognized when control of products or services is transferred to customers, in an amount that reflects the consideration the Company expects to be entitled to in exchange for those promised products or services.

The Company determines revenue recognition through the following five steps:

- Identification of the contract, or contracts, with a customer
- Identification of the performance obligations in the contract
- Determination of the transaction price
- Allocation of the transaction price to the performance obligations in the contract
- Recognition of revenue when, or as, performance obligations are satisfied

The Company accounts for a contract when it has approval and commitment from both parties, the rights of the parties are identified, payment terms are identified, the contract has commercial substance and collectability of consideration is probable.

The Company enters into contracts that can include various combinations of licenses, products and services, some of which are distinct and are accounted for as separate performance obligations. For contracts with multiple performance obligations, the Company allocates the transaction price of the contract to each performance obligation, generally on a relative basis using its standalone selling price.

Nature of Products and Services

Design-to-silicon-yield solutions — The Company recognizes revenue for each element of Design-to-silicon-yield solutions as follows:

The Company generates a significant portion of its Design-to-silicon-yield solutions revenue from fixed-price solution implementation service contracts delivered over a specific period of time. Revenue under project–based contracts for solution implementation services is recognized as services are performed using a percentage of completion method based on costs or labor-hours inputs, whichever is the most appropriate measure of the progress towards completion of the contract. Due to the nature of the work performed in these arrangements, the estimation of costs or hours at completion is complex, subject to many variables and requires significant judgment. Key factors reviewed by the Company to estimate costs to complete each contract are future labor and product costs and expected productivity efficiencies. If circumstances arise that change the original estimates of revenues, costs, or extent of progress toward completion, revisions to the estimates are made. These revisions may result in increases or decreases in estimated revenues or costs. Losses on fixed-price solution implementation contracts are recognized in the period when they become probable. Revisions in profit estimates are reflected in the period in which the conditions that require the revisions become known and can be estimated (cumulative catch-up method).

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On occasion, the Company includes its products as a component of its fixed-price service contracts. In such instances, the Company determines whether the services performed and products included, are distinct. In most cases, the arrangement is a single performance obligation and therefore follows the pattern of transfer as the service is provided. The Company applies a measure of progress (typically hours-to-hours or cost-to-cost) to any fixed consideration. As a result, revenue is generally recognized over the period the services are performed using percentage of completion method. This results in revenue recognition that corresponds with the value to the client of the services transferred to date relative to the remaining services promised.

The Company also license our Design-for-Inspection (DFI) system as a separate component of fixed-price service contracts. The Company allocates revenue to all deliverables based on their standalone selling prices, or SSP. In such instances, the Company applies judgment to estimate the range of SSPs for each performance obligation.

The Company licenses some of its software products separately from solution implementations, primarily its Exensio big data platform and related products. The majority of these products are delivered as on-premise software licenses, while others can be delivered entirely or partially through Software-as-a-Service (SaaS) or cloud delivery models. Revenue from perpetual (one-time charge) license software is recognized at a point in time at the inception of the arrangement when control transfers to the client, if the software license is distinct from the services offered by the Company. Revenue from post-contract support subscription is recognized over the contract term on a straight-line basis, because the Company is providing a service of standing ready to provide support, when-and-if needed, and is providing unspecified software upgrades on a when-and-if available basis over the contract term. Revenue from time-based license software is allocated to each performance obligation and is recognized either at a point in time or over time. The license component is recognized at a point in time, at the delivery of the software license, with the post-contract support subscription component being recognized ratably over for the committed term of the contract. Revenue from software hosting or SaaS arrangements that allow for the use of a hosted software product or service over a contractually determined period of time without taking possession of software are accounted for as subscriptions and recognized as revenue ratably, on a straight-line basis, over the coverage period beginning on the date the service is made available to customers.

Gainshare Performance Incentives — When the Company enters into a contract to provide yield improvement services, the contract usually includes two components: (1) a fixed fee for performance by the Company of services delivered over a specific period of time; and (2) a Gainshare performance incentive component where the customer pays a variable fee, usually after the fixed fee period has ended, related to the usage of the Company's intellectual property. Revenue derived from Gainshare performance incentives is contingent upon the Company’s customers reaching certain defined production yield levels. Gainshare performance incentive periods are usually subsequent to the delivery of all contractual services and performance obligations. The Company recorded Gainshare revenue as a usage-based royalty based on customers' usage of intellectual property and recorded in the same period in which the usage occurs.

Disaggregation of revenue

In accordance with ASC 606-10-50, the Company disaggregates revenue from contracts with customers into geographical regions, major contract performance obligations and timing of transfer of goods and services. The Company determined that disaggregating revenue into these categories achieves the disclosure objective to depict how the nature, amount, timing, and uncertainty of revenue and cash flows are affected by economic factors.

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The following table shows the revenues from contracts with customers by the nature of transactions for the three months ended March 31, 2018:

	March 31, 2018
Product and licenses	$7,487
Support and Services	16,989
Other	261
Total	$24,737

Product and licenses include a portion of time-based software, perpetual software which is recognized in the period and Gainshare performance incentives. The remaining portions of revenue from these contracts correspond to services or other types of performance obligations are reported as either services revenue or other revenue.

Under Topic 606, the Company’s performance obligations are satisfied either over-time or at a point-in-time. Revenue from performance obligations satisfied over time and at a point-in-time accounted for approximately 69% and 31%, respectively, of the Company’s total revenue for the three months ended March 31, 2018. International revenues accounted for approximately 59% of our total revenues for the three months ended March 31, 2018 as compared to 53% for the three months ended March 31, 2017. See Note 7. Customer and Geographic Information.

Significant Judgments

More judgments and estimates are required under Topic 606 than were required under Topic 605. Due to the complexity of certain contracts, the actual revenue recognition treatment required under Topic 606 for the Company’s arrangements may be dependent on contract-specific terms and may vary in some instances.

In services arrangements, the Company typically satisfies the performance obligation and recognizes revenue over time. In Design-to-silicon-yield service arrangements, the performance obligation is satisfied over time either because the client controls the asset as it is created (e.g., when the asset is built at the customer site) or because the Company’s performance does not create an asset with an alternative use and the Company has an enforceable right to payment plus a reasonable profit for performance completed to date. In most other services arrangements, the performance obligation is satisfied over time because the client simultaneously receives and consumes the benefits provided as the Company performs the services.

For revenue under project–based contracts for fixed-price solution implementation services, revenue is recognized as services are performed using a percentage-of-completion method based on costs or labor-hours input method, whichever is the most appropriate measure of the progress towards completion of the contract. Due to the nature of the work performed in these arrangements, the estimation of percentage of completion method is complex, subject to many variables and requires significant judgment. Key factors reviewed by the Company to estimate costs to complete each contract are future labor and product costs and expected productivity efficiencies. If circumstances arise that change the original estimates of revenues, costs, or extent of progress toward completion, revisions to the estimates are made. These revisions may result in increases or decreases in estimated revenues or costs, and such revisions are reflected in revenue on a cumulative catch-up basis in the period in which the circumstances that gave rise to the revision become known.

The Company’s contracts with customers often include promises to transfer products, licenses and services, including professional services, technical support services, and rights to unspecified updates to a customer. Determining whether products, licenses and services are distinct performance obligations that should be accounted for separately, or not distinct and thus accounted for together, requires significant judgment. The Company rarely licenses or sells products on a standalone basis, so the Company is required to estimate the range of SSPs for each performance obligation. In instances where SSP is not directly observable because the Company does not sell the license, product or service separately, the Company determines the SSP using information that may include market conditions and other observable inputs. The Company, in some cases, has more than one SSP for individual performance obligations. In these instances, the Company may use information such as the size of the customer and geographic region of the customer in determining the SSP.

The Company is required to record Gainshare royalty revenue in the same period in which the usage occurs. Because the Company generally does not receive the acknowledgment reports during a given quarter within the time frame necessary to adequately review the reports and include the actual amounts in quarterly results for such quarter, the Company accrues the related revenue based on estimates of customer's underlying sales achievement. The Company estimation process can be based on historical data, trends, seasonality, changes in the contract rate, knowledge of the changes in the industry and changes in the customer’s manufacturing environment learned through discussions with customers and sales personnel. As a result of accruing revenue for the quarter based on such estimates, adjustments will be required in the following quarter to true-up revenue to the actual amounts reported.

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Contract Balances

The Company performs its obligation under a contract with a customer by transferring products or services in exchange for consideration from the customer. The timing of the Company's performance often differs from the timing of the customer's payment, which results in the recognition of a receivable, a contract asset or a contract liability. The Company classifies the right to consideration in exchange for products or services transferred to a client as either a receivable or a contract asset. A receivable is a right to consideration that is unconditional as compared to a contract asset which is a right to consideration that is conditional upon factors other than the passage of time. The majority of the Company's contract assets represent unbilled amounts related to fixed-price solution implementation service contracts when the costs or labor-hours input method of revenue recognition is utilized and revenue recognized exceeds the amount billed to the client, and the right to consideration is subject to milestone completion or client acceptance. The contract assets are generally classified as current and are recorded on a net basis with deferred revenue (i.e., contract liabilities) at the contract level. The contract assets is included in prepaid expenses and other in the condensed consolidated balance sheets. At March 31, 2018 and January 1, 2018, contract assets of $3.7 million and $1.9 million, respectively, are included in prepaid expenses and other current assets in the condensed consolidated balance sheets. Deferred revenues consist substantially of amounts invoiced in advance of revenue recognition and is recognized as the revenue recognition criteria are met. Deferred revenues that will be recognized during the succeeding twelve month period is recorded as current deferred revenues and the remaining portion is recorded as non- current deferred revenues. This balance was recorded in the other non-current liabilities in the accompanying condensed consolidated balance sheets. Non-current portion of deferred revenue was $0.5 million and $0.9 million, respectively, as of March 31, 2018 and January 1, 2018.

During the three months ended March 31, 2018, the Company recognized $2.6 million of revenue that was included in the deferred revenue balance, as adjusted for Topic 606, at the beginning of the period.

At March 31, 2018, the aggregate amount of the transaction price allocated to the remaining performance obligations related to customer contracts that were unsatisfied or partially unsatisfied was approximately $45.0 million. Given the applicable contract terms, the majority of this amount is expected to be recognized as revenue over the next 2 years, with the remainder in the following 5 years. This amount does not include contracts to which the customer is not committed, nor contracts with original expected lengths of one year or less, nor contracts for which we recognize revenue equal to the amount we have the right to invoice for services performed, or future sales-based or usage-based royalty payments in exchange for a license of intellectual property. This amount is subject change due to future revaluations of variable consideration, terminations, other contract modifications, or currency adjustments. The estimated timing of the recognition remaining unsatisfied performance obligations is subject to change and are affected by changes to the scope, change in timing of delivery of products and services, or contract modifications.

Payment terms and conditions vary by contract type, although terms generally include a requirement of payment within 30 to 90 days. In instances where the timing of revenue recognition differs from the timing of invoicing, the Company has determined that its contracts generally do not include a significant financing component. The primary purpose of invoicing terms is to provide customers with simplified and predictable ways of purchasing the Company's

products and services, and not to facilitate financing arrangements.

The amount of revenue recognized in the three months ended March 31, 2018 from performance obligations satisfied (or partially satisfied) in previous periods was $0.5 million. This amount primarily represents changes in estimated on percentage-of –completion based contracts and changes in estimated Gainshare performance incentives for those customers that reported actual Gainshare revenue with some time lag.

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Costs to obtain or fulfill a contract

The Company capitalizes the incremental costs to obtain or fulfill a contract with a customer, including direct sales commissions and related fees, when it expects to recover those costs. As a result, these costs will need to be capitalized and amortized over an appropriate period, which may exceed the initial contract term. The incremental costs of obtaining a contract are costs that would not have been incurred if the contract had not been obtained. The Company uses the portfolio method to recognize the amortization expense related to these capitalized costs related to initial contracts and renewals and such expense is recognized over the period associated with the revenue of the related portfolio. Total capitalized direct sales commission costs as of March 31, 2018 were $0.5 million and the amortization of these assets were $0.1 million during the three months ended March 31, 2018. There was no impairment loss in relation to the costs capitalized for the periods presented. Certain eligible initial project costs are capitalized when the costs relate directly to the contract, the costs generate or enhance resources of the company that will be used in satisfying the performance obligation in the future, and the costs are expected to be recovered. These costs primarily consist of transition and set-up costs related to the installation of systems and processes and other deferred fulfillment costs eligible for capitalization. Capitalized costs are amortized consistent with the transfer to the client of the services to which the asset relates and recorded as a component of cost of revenues. The Company also incurred certain direct costs to provide solution implementation services in relation to the specific anticipated contracts. The Company recognizes such costs as a component of cost of revenues, the timing of which is dependent upon identification of a contract arrangement. The Company also defers costs from arrangements that required us to defer the revenues, typically due to the pattern of transfer of the performance obligations in the contract. These costs are recognized in proportion to the related revenue. At the end of the reporting period, the Company evaluates its deferred costs for their probable recoverability. The Company recognizes impairment of deferred costs when it is determined that the costs no longer have future benefits and are no longer recoverable. Deferred costs balance was $0.5 million and $0.6 million as of March 31, 2018 and December 31, 2017, respectively. The balance was included in prepaid expenses and other current assets and other non-current assets in the accompanying condensed consolidated balance sheets.

3. BALANCE SHEET COMPONENTS

Accounts receivable include amounts that are unbilled at the end of the period that are expected to be billed and collected within 12-month period. Unbilled accounts receivable, included in accounts receivable, totaled $23.1 million and $22.2 million as of March 31, 2018, and December 31, 2017, respectively. Unbilled accounts receivable that are not expected to be billed and collected during the succeeding 12-month period are recorded in other non-current assets and totaled $7.7 million and $8.6 million as of March 31, 2018, and December 31, 2017, respectively.

Property and equipment, net consists of (in thousands):

	March 31, 2018	December 31, 2017
Property and equipment, net:		
Computer equipment	$10,725	$10,729
Software	3,391	3,348
Furniture, fixtures and equipment	4,102	3,676
Leasehold improvements	2,025	1,980
Test equipment	14,209	13,796
Construction-in-progress	13,761	12,527
	48,213	46,056
Less: accumulated depreciation	(21,677)	(20,670)
Total	$26,536	$25,386

Test equipment includes DFI assets at customer sites that are contributing to DFI solution revenues. The construction-in-progress balance as of March 31, 2018 and December 31, 2017 was primarily related to construction of DFI assets. Depreciation and amortization expense was $1.3 million and $1.1 million for the three months ended March 31, 2018 and 2017, respectively.

As of both March 31, 2018, and December 31, 2017, the carrying amount of goodwill was $1.9 million.

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Intangible assets balance was $5.8 million and $6.1 million as of March 31, 2018, and December 31, 2017, respectively. Intangible assets as of March 31, 2018 and December 31, 2017 consist of the following (in thousands):

		March 31, 2018			December 31, 2017		
	Amortization Period (Years)	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
Acquired identifiable intangibles:							
Customer relationships	1 - 9	$6,740	$ (4,237)	$ 2,503	$6,740	$ (4,145)	$ 2,595
Developed technology	4 - 6	15,820	(12,974)	2,846	15,820	(12,829)	2,991
Tradename	2 - 4	790	(628)	162	790	(622)	168
Backlog	1	100	(100)	-	100	(100)	-
Patent	7 - 10	1,800	(1,490)	310	1,800	(1,480)	320
Other acquired intangibles	4	255	(255)	-	255	(255)	-
Total		$25,505	$ (19,684)	$ 5,821	$25,505	$ (19,431)	$ 6,074

The weighted average amortization period for acquired identifiable intangible assets was 6.52 years as of March 31, 2018. For the three months ended March 31, 2018, and 2017, intangible asset amortization expense was $0.3 million and $0.2 million, respectively. The Company expects annual amortization of acquired identifiable intangible assets to be as follows (in thousands):

Year ending December 31,	Amount
2018 (remaining nine months)	$ 757
2019	1,009
2020	1,009
2021	833
2022	626
2023 and thereafter	1,587
Total future amortization expense	$ 5,821

Intangible assets are amortized over their useful lives unless these lives are determined to be indefinite. Intangible assets are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset or asset group may not be recoverable. During the three months ended March 31, 2018, there were no indicators of impairment related to the Company’s intangible assets.

4. STOCKHOLDERS’ EQUITY

Stock-based compensation is estimated at the grant date based on the award's fair value and is recognized on a straight-line basis over the vesting periods, generally four years. Stock-based compensation expense before taxes related to the Company's stock plans and employee stock purchase plan was allocated as follows (in thousands):

	Three Months Ended March 31,	
	2018	**2017**
Cost of Design-to-silicon-yield solutions	$1,014	$1,192
Research and development	879	834
Selling, general and administrative	963	858
Stock-based compensation expenses	$2,856	$2,884

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On March 31, 2018, the Company had the following stock-based compensation plans:

Stock Plans — At the annual meeting of stockholders on November 16, 2011, the Company's stockholders approved the 2011 Stock Incentive Plan, which was amended and restated at the 2017 annual meeting of stockholders on May 31, 2017, when the Company's stockholders approved the third amended and restated 2011 Stock Incentive Plan (as amended, the "2011 Plan"). Under the 2011 Plan, the Company may award stock options, stock appreciation rights, stock grants or stock units covering shares of the Company's common stock to employees, directors, non-employee directors and contractors. The aggregate number of shares reserved for awards under this plan is 7,800,000 shares, plus up to 3,500,000 shares previously issued under the 2001 Plan that are forfeited or repurchased by the Company or shares subject to awards previously issued under the 2001 Plan that expire or that terminate without having been exercised or settled in full on or after November 16, 2011. In case of awards other than options or stock appreciation rights, the aggregate number of shares reserved under the plan will be decreased at a rate of 1.33 shares issued pursuant to such awards. The exercise price for stock options must generally be at prices no less than the fair market value at the date of grant. Stock options generally expire ten years from the date of grant and become vested and exercisable over a four-year period.

In 2001, the Company adopted a 2001 Stock Plan (the "2001 Plan"). In 2003, in connection with its acquisition of IDS Systems Inc., the Company assumed IDS' 2001 Stock Option / Stock Issuance Plan (the "IDS Plan"). Both of the 2001 and the IDS Plans expired in 2011. Stock options granted under the 2001 and IDS Plans generally expire ten years from the date of grant and become vested and exercisable over a four -year period. Although no new awards may be granted under the 2001 or IDS Plans, awards made under the 2001 and IDS Plans that are currently outstanding remain subject to the terms of each such plan.

As of March 31, 2018, 9.6 million shares of common stock were reserved to cover stock-based awards under the 2011 Plan, of which 4.0 million shares were available for future grant. The number of shares reserved and available under the 2011 Plan includes 0.5 million shares that were subject to awards previously made under the 2001 Plan and were forfeited, expired or repurchased by the Company after adoption of the 2011 Plan through March 31, 2018. As of March 31, 2018, there were no outstanding awards that had been granted outside of the 2011, 2001 or the IDS Plans (collectively, the "Stock Plans").

The Company estimated the fair value of share-based awards granted under the 2011 Stock Plan during the period using the Black-Scholes-Merton option-pricing model with the following weighted average assumptions, resulting in the following weighted average fair values:

	Three Months Ended March 31,

	2018	2017
Expected life (in years)	4.43	4.41
Volatility	42.22%	40.57%
Risk-free interest rate	2.52 %	1.87 %
Expected dividend	—	—
Weighted average fair value per share of options granted during the period	$4.28	$7.85

Stock option activity under the Company's Stock Plans during the three months ended March 31, 2018, was as follows:

	Number of Options (in thousands)	Weighted Average Exercise Price per Share	Weighted Average Remaining Contractual Term (years)	Aggregate Intrinsic Value (in thousands)
Outstanding, January 1, 2018	1,045	$ 9.65		
Granted (weighted average fair value of $4.28 per share)	10	$ 11.26		
Exercised	(8)	$ 4.86		
Canceled	(4)	$ 13.77		
Expired	(1)	$ 20.39		
Outstanding, March 31, 2018	1,042	$ 9.67	4.69	$ 3,398
Vested and expected to vest, March 31, 2018	1,024	$ 9.56	4.61	$ 3,396
Exercisable, March 31, 2018	831	$ 8.17	3.60	$ 3,378

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The aggregate intrinsic value in the table above represents the total intrinsic value based on the Company's closing stock price of $11.66 per share as of March 31, 2018. The total intrinsic value of options exercised during the three months ended March 31, 2018, was $0.1 million.

As of March 31, 2018, there was $1.0 million of total unrecognized compensation cost related to unvested stock options. That cost is expected to be recognized over a weighted average period of 3.1 years. The total fair value of shares vested during the three months ended March 31, 2018, was $0.1 million.

Nonvested restricted stock units activity during the three months ended March 31, 2018, was as follows:

	Shares (in thousands)	**Weighted Average Grant Date Fair Value Per Share**
Nonvested, January 1, 2018	1,617	$ 15.66
Granted	10	$ 11.26
Vested	(110)	$ 14.41
Forfeited	(48)	$ 15.62
Nonvested, March 31, 2018	1,469	$ 15.73

As of March 31, 2018, there was $17.9 million of total unrecognized compensation cost related to nonvested restricted stock units. That cost is expected to be recognized over a weighted average period of 2.4 years. Restricted stock units do not have rights to dividends prior to vesting.

Employee Stock Purchase Plan — In July 2001, the Company adopted a ten-year Employee Stock Purchase Plan (as amended, the "Purchase Plan") under which eligible employees can contribute up to 10% of their compensation, as defined in the Purchase Plan, towards the purchase of shares of PDF common stock at a price of 85% of the lower of the fair market value at the beginning of the offering period or the end of the purchase period. The Purchase Plan consists of twenty-four-month offering periods with four six-month purchase periods in each offering period. Under the Purchase Plan, on January 1 of each year, starting with 2002, the number of shares reserved for issuance will automatically increase by the lesser of (1) 675,000 shares, (2) 2% of the Company's outstanding common stock on the last day of the immediately preceding year, or (3) the number of shares determined by the board of directors. At the annual meeting of stockholders on May 18, 2010, the Company's stockholders approved an amendment to the Purchase Plan to extend it through May 17, 2020.

The Company estimated the fair value of purchase rights granted under the Purchase Plan during the period using the Black-Scholes-Merton option-pricing model with the following weighted average assumptions, resulting in the following weighted average fair values:

	Three Months Ended March 31,	
	2018	**2017**
Expected life (in years)	1.25	1.25
Volatility	37.23%	33.32%
Risk-free interest rate	1.93 %	0.93 %
Expected dividend	—	—
Weighted average fair value per share of options granted during the period	$4.32	$6.78

During the three months ended March 31, 2018 and 2017, a total of 108,000 and 100,000 shares, respectively, were issued at a weighted-average purchase price of $9.29 and $9.13 per share, respectively. As of March 31, 2018, there was $1.7 million of unrecognized compensation cost related to the Purchase Plan. That cost is expected to be recognized over a weighted average period of 1.83 years. As of March 31, 2018, 4.3 million shares were available for future issuance under the Purchase Plan.

Stock Repurchase Program - On October 25, 2016, the Board of Directors adopted a program, effective immediately, to repurchase up to $25.0 million of the Company’s common stock both on the open market and in privately negotiated transactions over the next two years. During the three months ended March 31, 2018, the Company repurchased 338,207 shares under this program. As of March 31, 2018, 1,180,389 shares had been repurchased at an average price of $14.86 per share under this program for a total purchase of $17.5 million, and $7.5 million remained available for future repurchases.

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5. INCOME TAXES

Income tax benefit decreased $0.8 million for the three months ended March 31, 2018, to a $0.4 million income tax benefit as compared to an income tax benefit of $1.2 million for the three months ended March 31, 2017. The Company’s effective tax rate benefit was 47% and 180% for the three months ended March 31, 2018 and 2017, respectively. The Company’s effective tax rate benefit decreased in the three months ended March 31, 2018, as compared to the same period in 2017, primarily due to lower excess tax benefits related to employee stock compensation and impacts of the recently enacted U.S. Tax Cuts and Jobs Act ("Tax Act"), such as, a decrease in the maximum federal tax rate from 35% to 21%, global intangible low-taxed income (“GILTI”), and foreign derived intangible income (“FDII”).

The Company’s total amount of unrecognized tax benefits, excluding interest and penalties, as of March 31, 2018, was $13.4 million, of which $7.9 million, if recognized, would affect the Company’s effective tax rate. The Company’s total amount of unrecognized tax benefits, excluding interest and penalties, as of December 31, 2017, was $12.9 million, of which $7.7 million, if recognized, would affect the Company's effective tax rate. As of March 31, 2018, the Company has recorded unrecognized tax benefits of $3.0 million, including interest and penalties, as long-term taxes payable in its condensed consolidated balance sheet. The remaining $10.4 million has been recorded net of our deferred tax assets, of which $5.5 million is subject to a full valuation allowance.

The valuation allowance was approximately $9.0 million and $9.1 million as of March 31, 2018, and December 31, 2017, respectively, which was related to California R&D tax credits and California net operating losses related to our acquisition of Syntricity that we currently do not believe are more likely than not to be ultimately realized.

In December 2017, the SEC issued Staff Accounting Bulletin No. 118, Income Tax Accounting Implications of the Tax Cuts and Jobs Act (SAB 118), which allows companies to record provisional amounts during a measurement period not to extend more than one year beyond the Tax Act enactment date. Since the Tax Act was passed late in the fourth quarter of 2017, and ongoing guidance and accounting interpretation are expected during the year, we consider the accounting for deferred tax remeasurements, the impact of the transition of U.S. international taxation from a worldwide tax system to a territorial system and other provisions to be incomplete. There have been no material changes to the provisional adjustments disclosed in our 2017 Form 10-K. The Company is continuing to evaluate the estimates used to record and disclose the effects of the Tax Act.

Effective January 1, 2018, the Tax Act creates a new requirement to include in U.S. income global intangible low-taxed income (“GILTI”) earned by controlled foreign corporations (“CFCs”). The GILTI must be included currently in the gross income of the CFCs’ U.S. shareholder. Under U.S. GAAP, we are allowed to make an accounting policy choice of either (1) treating taxes due on future U.S. inclusions related to GILTI as a current-period expense when incurred (the “period cost method”) or (2) factoring such amounts into a company’s measurement of its deferred taxes

(the “deferred method”). During the first quarter of 2018, the Company selected the period cost method in recording the tax effects of GILTI in its financial statements.

The Company conducts business globally and, as a result, files numerous consolidated and separate income tax returns in the U.S. federal, various state and foreign jurisdictions. Because the Company used some of the tax attributes carried forward from previous years to tax years that are still open, statutes of limitation remain open for all tax years to the extent of the attributes carried forward into tax year 2002 for federal and California tax purposes. The Company is not subject to income tax examinations in any of its major foreign subsidiaries’ jurisdictions.

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6. NET INCOME PER SHARE

Basic net income per share is computed by dividing net income by weighted average number of common shares outstanding for the period (excluding outstanding stock options and shares subject to repurchase). Diluted net income per share is computed using the weighted-average number of common shares outstanding for the period plus the potential effect of dilutive securities which are convertible into common shares (using the treasury stock method), except in cases in which the effect would be anti-dilutive. The following is a reconciliation of the numerators and denominators used in computing basic and diluted net income per share (in thousands except per share amount):

	Three Months Ended March 31,	
	2018	2017
Numerator:		
Net income (loss)	$(424)	$517
Denominator:		
Basic weighted-average shares outstanding	32,168	31,991
Effect of dilutive options and restricted stock	-	1,603
Diluted weighted average shares outstanding	32,168	33,594
Net income (loss) per share - Basic	$(0.01)	$0.02
Net income (loss) per share - Diluted	$(0.01)	$0.02

For the period ended March 31, 2018, there are no potential dilutive common shares included in the computation of diluted net income per share because there was a net loss for the period.

The following table sets forth potential shares of common stock that are not included in the diluted net income per share calculation above because to do so would be anti-dilutive for the periods indicated (in thousands):

	Three Months Ended March 31,	
	2018	2017
Outstanding options	-	40
Nonvested restricted stock units	-	-

Employee Stock Purchase Plan	-	30
Total	-	70

7. CUSTOMER AND GEOGRAPHIC INFORMATION

Operating segments are defined as components of an enterprise about which separate financial information is available that is evaluated regularly by the chief operating decision maker, or group, in deciding how to allocate resources and in assessing performance.

The Company's chief operating decision maker, the chief executive officer, reviews discrete financial information presented on a consolidated basis for purposes of regularly making operating decisions and assessing financial performance. Accordingly, the Company considers itself to be in one operating segment, specifically the licensing and implementation of yield improvement solutions for companies designing and/or manufacturing integrated circuits.

The Company had revenues from individual customers in excess of 10% of total revenues as follows:

	Three Months Ended March 31,	
Customer	**2018**	**2017**
A	38%	48 %

The Company had gross accounts receivable from individual customers in excess of 10% of gross accounts receivable as follows:

	March 31,	December 31,
Customer	**2018**	**2017**
A	39 %	41 %
B	17 %	15 %

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Revenues from customers by geographic area based on the location of the customers' work sites are as follows (in thousands):

	Three Months Ended March 31,					
	2018			2017		
	Revenues	Percentage of Revenues		Revenues	Percentage of Revenues	
United States	$10,083	41	%	$11,634	47	%
China	5,182	21		1,686	7	
Taiwan	2,135	9		3,837	16	
Germany	1,544	6		2,308	10	
Rest of the world	5,793	23		4,824	20	
Total revenue	$24,737	100	%	$24,289	100	%

Long-lived assets, net by geographic area are as follows (in thousands):

	March 31, 2018	December 31, 2017
United States	$26,068	$ 24,883
Rest of the world	468	503
Total long-lived assets, net	$26,536	$ 25,386

8. FAIR VALUE MEASUREMENTS

Fair value is the exit price, or the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants as of the measurement date. The multiple assumptions used to value financial instruments are referred to as inputs, and a hierarchy for inputs used in measuring fair value is established, that maximizes the use of observable inputs and minimizes the use of unobservable inputs by requiring that the most observable inputs be used when available. Observable inputs reflect assumptions market participants would use in pricing an asset or liability based on market data obtained from independent sources while unobservable inputs reflect a reporting entity's pricing based upon its own market assumptions. These inputs are ranked according to a fair value hierarchy that prioritizes the inputs to valuation techniques used to measure fair value into three broad levels.

Level 1 - Inputs are quoted prices in active markets for identical assets or liabilities.

Level 2 - Inputs are quoted prices for similar assets or liabilities in an active market, quoted prices for identical or similar assets or liabilities in markets that are not active, inputs other than quoted prices that are observable and market-corroborated inputs which are derived principally from or corroborated by observable market data.

Level 3 - Inputs are derived from valuation techniques in which one or more significant inputs or value drivers are unobservable.

The following table represents the Company's assets measured at fair value on a recurring basis as of March 31, 2018, and the basis for that measurement (in thousands):

Assets	**Total**	**Quoted Prices in Active Markets for Identical Assets (Level 1)**	**Significant Other Observable Inputs (Level 2)**	**Significant Unobservable Inputs (Level 3)**
Money market mutual funds	$26,713	$ 26,713	$ —	$ —

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The following table represents the Company's assets measured at fair value on a recurring basis as of December 31, 2017, and the basis for that measurement (in thousands):

Assets	Total	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Money market mutual funds	$26,638	$ 26,638	$ —	$ —

The Company enters into foreign currency forward contracts to reduce the exposure to foreign currency exchange rate fluctuations on certain foreign currency denominated monetary assets and liabilities, primarily on third-party accounts payables and intercompany balances. The primary objective of the Company's hedging program is to reduce volatility of earnings related to foreign currency exchange rate fluctuations. The counterparty to these foreign currency forward contracts is a large global financial institution that the Company believes is creditworthy, and therefore, the Company believes the credit risk of counterparty nonperformance is not significant. These foreign currency forward contracts are not designated for hedge accounting treatment. Therefore, the change in fair value of these contracts is recorded into earnings as a component of other income (expense), net, and offsets the change in fair value of the foreign currency denominated assets and liabilities, which is also recorded in other income (expense), net. For the three months ended March 31, 2018 and 2017, the Company recognized a realized loss of $46,000 and a realized gain $0.1 million on the contracts, respectively, which was recorded in other income (expense), net in the Company's Statements of Operations and Comprehensive Income.

The Company carries these derivatives financial instruments on its Consolidated Balance Sheets at their fair values. The Company's foreign currency forward contracts are classified as Level 2 because it is not actively traded and the valuation inputs are based on quoted prices and market observable data of similar instruments. As of March 31, 2018, the Company had one outstanding forward contract with a notional amount of $8.6 million and recorded $46,000 other current liabilities associated with this outstanding forward contract. As of December 31, 2017, the Company had one outstanding forward contract with a notional amount of $8.2 million and recorded $12,000 other current assets associated with the outstanding forward contract.

9. COMMITMENTS AND CONTINGENCIES

Leases

The Company leases administrative and sales offices and certain equipment under noncancelable operating leases, which contain various renewal options and, in some cases, require payment of common area costs, taxes and utilities. These operating leases expire at various times through 2024. Rent expense was $0.6 million and $0.5 million for the three months ended March 31, 2018 and 2017, respectively.

Future minimum lease payments under noncancelable operating leases at March 31, 2018, are as follows (in thousands):

Year ending December 31,	**Amount**
2018 (remaining nine months)	$ 1,363
2019	800
2020	726
2021	645
2022	389
2023 and thereafter	51
Total future minimum lease payments	$ 3,974

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As of March 31, 2018, the Company leases approximately 28,600 square feet for its principal executive offices located in San Jose, California. The lease terminates September 2018. In April 2018, the Company entered into a new approximately 20,800 square foot lease, located in Santa Clara, California. The term of the new lease is approximately ten years and is expected to commence on or around July 1, 2018. Total lease obligation over the new lease term is approximately $7.0 million, less a lease abatement allowance of approximately $0.4 million. The terms of the new lease include a tenant improvement allowance of approximately $1.3 million.

Indemnifications — The Company generally provides a warranty to its customers that its software will perform substantially in accordance with documented specifications typically for a period of 90 days following initial delivery of its products. The Company also indemnifies certain customers from third-party claims of intellectual property infringement relating to the use of its products. Historically, costs related to these guarantees have not been significant. The Company is unable to estimate the maximum potential impact of these guarantees on its future results of operations.

Purchase obligations — The Company has purchase obligations with certain suppliers for the purchase of goods and services entered in the ordinary course of business. As of March 31, 2018, total outstanding purchase obligations were $14.7 million, which are primarily due within the next 12 months.

Indemnification of Officers and Directors — As permitted by the Delaware general corporation law, the Company has included a provision in its certificate of incorporation to eliminate the personal liability of its officers and directors for monetary damages for breach or alleged breach of their fiduciary duties as officers or directors, other than in cases of fraud or other willful misconduct.

In addition, the Bylaws of the Company provide that the Company is required to indemnify its officers and directors even when indemnification would otherwise be discretionary, and the Company is required to advance expenses to its officers and directors as incurred in connection with proceedings against them for which they may be indemnified. The Company has entered into indemnification agreements with its officers and directors containing provisions that are in some respects broader than the specific indemnification provisions contained in the Delaware general corporation law. The indemnification agreements require the Company to indemnify its officers and directors against liabilities that may arise by reason of their status or service as officers and directors other than for liabilities arising from willful misconduct of a culpable nature, to advance their expenses incurred as a result of any proceeding against them as to which they could be indemnified, and to obtain directors' and officers' insurance if available on reasonable terms. The Company has obtained directors' and officers' liability insurance in amounts comparable to other companies of the Company's size and in the Company's industry. Since a maximum obligation of the Company is not explicitly stated in the Company's Bylaws or in its indemnification agreements and will depend on the facts and circumstances that arise out of any future claims, the overall maximum amount of the obligations cannot be reasonably estimated.

Litigation — From time to time, the Company is subject to various claims and legal proceedings that arise in the ordinary course of business. The Company accrues for losses related to litigation when a potential loss is probable and the loss can be reasonably estimated in accordance with FASB requirements. As of March 31, 2018, the Company was not party to any material legal proceedings, thus no loss was probable and no amount was accrued.

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

Forward-Looking Statements

The following discussion of our financial condition and results of operations contains 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. All statements other than statements of historical fact may be forward-looking statements. In some cases, you can identify forward-looking statements by terminology such as "may," "could," "should," "expect," "plan," "anticipate," "beli "estimate," "predict," "potential", "target" or "continue," the negative effect of terms like these or other similar expressions. A statement concerning future financial performance (including future revenues, earnings or growth rates), ongoing business strategies or prospects, and possible actions taken by us or our subsidiaries, which may be provided by us are also forward-looking statements. These forward-looking statements are only predictions. Forward-looking statements are based on current expectations and projections about future events and are inherently subject to a variety of risks and uncertainties, many of which are beyond our control, which could cause actual results to differ materially from those anticipated or projected. All forward-looking statements included in this document are based on information available to us on the date of filing and we further caution investors that our business and financial performance are subject to substantial risks and uncertainties. We assume no obligation to update any such forward-looking statements. In evaluating these statements, you should specifically consider various factors, including the risk factors set forth in Item 1. "Business" and Item 7. "Management's Discussion and Analysis of Financial Condition and Results of Operations" in our Annual Report on Form 10-K for the year ended December 31, 2017, filed with the Securities and Exchange Commission on March 16, 2018. All references to "we", "us", "our", "PDF", "PDF Solutions" or "the Company" refer to PDF Solutions, Inc.

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Overview

We analyze our customers' IC design and manufacturing processes to identify, quantify, and correct the issues that cause yield loss to improve our customers' profitability by improving time-to-market, increasing yield and reducing total design and manufacturing costs. We package our solutions in various ways to meet our customers' specific business and budgetary needs, each of which provides us various revenue streams. We receive a mix of fixed fees and variable, performance-based fees for the vast majority of our yield improvement solutions. The fixed fees are typically reflective of the length of time and the resources needed to characterize a customer's manufacturing process and receive preliminary results of proposed yield improvement suggestions. We receive license fees and service fees for related installation, integration, training, and maintenance and support services for our software and hardware that we license on a stand-alone basis.

Industry Trend

Consistent with the trend since 2010, in 2018, we expect that the largest logic foundries will continue to invest significantly in leading edge nodes. However, capacity levels in 2018 at advanced nodes, such as 10 and 7 nanometers, may be significantly lower at introduction than some previous nodes, such as 28 nanometers. We also expect that most logic foundries will increase investment in 2018 in derivatives of older process nodes to extract additional value as many of their customers will not move to advanced nodes due to either technological barriers or restrictive economics. Leading foundries are expected to continue to invest in new technologies such as 3-D transistors, memory, and packaging, multi-patterned and EUV lithography, as well as new innovations in process control and variability management. We expect China's investment in 2018 in semiconductors to continue to accelerate the growth of the industry for the next few years. All these trends provide opportunities to increase our business.

Generally, the demand for consumer electronics and communications devices continues to drive technological innovation in the semiconductor industry as the need for products with greater performance, lower power consumption, reduced costs and smaller size continues to grow with each new product generation. In addition, advances in computing systems and mobile devices have fueled demand for higher capacity memory chips. To meet these demands, IC manufacturers and designers are constantly challenged to improve the overall performance of their ICs by designing and manufacturing ICs with more embedded applications to create greater functionality while lowering cost per transistor. As a result, both logic and memory manufacturers have migrated to more and more advanced manufacturing nodes, capable of integrating more devices with higher performance, higher density, and lower power. As this trend continues, companies will continually be challenged to improve process capabilities to optimally produce ICs with minimal random and systematic yield loss, which is driven by the lack of compatibility between the design and its respective manufacturing process. We believe that as new advanced nodes continue to be introduced and industry dynamics drive the introduction of derivative nodes, the difficulties of integrating IC designs with their respective processes will create a greater need for products and services that address yield loss across the IC product life cycle.

Customer Contracts

Although a substantial portion of our total revenues are concentrated in a small number of customers, the total revenues for each of these customers in any period is the result of Design-to-silicon-yield solutions and Gainshare performance incentives revenues recognized in the period under multiple, separate contracts, with no interdependent performance obligations. These contracts were all entered into in the ordinary course of our business and contain general terms and conditions that are standard across most of our yield improvement solutions customers, including providing services typically targeted to one manufacturing process node, for example the 28 or 20 nanometer node. Fluctuations in future results may occur if any of these customers renegotiate pre-existing contractual commitments due to adverse changes in their own business. See the additional discussion in Part I, Item 1, “Customers,” on page 9 of our Annual Report on Form 10-K for the year ended December 31, 2017, and in Item 1A, “Risk Factors,” on pages 13 through 19 of our Annual Report on Form 10-K for the year ended December 31, 2017, for related information on the risks associated with customer concentration and Gainshare performance incentives revenue.

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Financial Highlights

Financial highlights for the three months ended March 31, 2018, were as follows:

- Total revenues were $24.7 million, which was an increase of $0.5 million, or 2%, compared to the three months ended March 31, 2017. Design-to-silicon-yield solutions revenues were $18.2 million, which was a decrease of $1.5 million, or 8%, compared to the three months ended March 31, 2017. The decrease in design-to-silicon-yield solutions revenue was primarily related to lower hours worked across multiple contracts and customers, which was partially offset by increases in Exensio big data solution revenues. Gainshare performance incentives revenue was $6.5 million, an increase of $2.0 million, or 43%, compared to the three months ended March 31, 2017. The increase was primarily the result of higher 14nm Gainshare from one customer as well as new Gainshare from the engagements that reached the performance incentive target in the period, partially offset by lower Gainshare from 28nm and older nodes. Gross margin for the three months ended March 31, 2018 was 54%, compared to 53% for the three months ended March 31, 2017.

- Net loss was $0.4 million, compared to net income of $0.5 million for the three months ended March 31, 2017. The decrease in net income was primarily attributable to a $0.8 million decrease in income tax benefit primarily due to lower excess tax benefits related to employee stock compensation and impacts of the recently enacted U.S. Tax Cuts and Jobs Act ("Tax Act"), such as, a decrease in the maximum federal tax rate from 35% to 21%, global intangible low-taxed income (“GILTI”), and foreign derived intangible income (“FDII”).

- Net loss per basic and diluted share was $(0.01) for the three months ended March 31, 2018, compared to net income per basic and diluted share of $0.02, for the three months ended March 31, 2017, a decrease of $0.03 per basic and diluted share.

- Cash, cash equivalents and investments decreased $2.7 million to $98.5 million at March 31, 2018, from $101.3 million at December 31, 2017, primarily due to cash used in investing activities related to the development of our DFI solution, and cash used in financing activities primarily due to repurchases of our common stock, offset by cash generated from operating activities during the quarter.

Critical Accounting Policies

See Note 1 of “Notes to Condensed Consolidated Financial Statements (Unaudited)” of this Quarterly Report on Form 10-Q for a description of recent accounting pronouncements and accounting changes, including the expected dates of adoption and estimated effects, if any, on our consolidated financial statements, and to Management’s Discussion and Analysis of Financial Condition and Results of Operations contained in Part II, Item 7 of our Annual Report on Form 10-K for the year ended December 31, 2017.

With the exception of the changes made to our revenue recognition policy as a result of the adoption of ASC 606, there have been no material changes during the three months ended March 31, 2018 to the items that we disclosed as our critical accounting policies and estimates in Management's Discussion and Analysis of Financial Condition and Results of Operations in our Annual Report on Form 10-K for the fiscal year ended December 31, 2017.

The following is a brief discussion of the more significant accounting policies and methods that we use.

General

Our discussion and analysis of our financial conditions, results of operations and cash flows are based on our consolidated financial statements, which have been prepared in conformity with accounting principles generally accepted in the United States of America. Our preparation of these consolidated financial statements requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the dates of the financial statements and the reported amounts of revenues and expenses during the reporting periods. We based our estimates on historical experience and on various other assumptions that we believe to be reasonable under the circumstances. The most significant estimates and assumptions relate to revenue recognition, stock-based compensation and the realization of deferred tax assets. Actual amounts may differ from such estimates under different assumptions or conditions.

Revenue Recognition

We derive revenues from two sources: Design-to-silicon-yield Solutions and Gainshare performance incentives.

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Design-to-silicon-yield solutions — We recognize revenue for each element of Design-to-silicon-yield solutions as follows:

We generate a significant portion of its Design-to-silicon-yield solutions revenue from fixed-price solution implementation service contracts delivered over a specific period of time. Revenue under project–based contracts for solution implementation services is recognized as services are performed using a percentage of completion method based on costs or labor-hours inputs, whichever is the most appropriate measure of the progress towards completion of the contract. Due to the nature of the work performed in these arrangements, the estimation of costs or hours at completion is complex, subject to many variables and requires significant judgment. Key factors reviewed by us to estimate costs to complete each contract are future labor and product costs and expected productivity efficiencies. If circumstances arise that change the original estimates of revenues, costs, or extent of progress toward completion, revisions to the estimates are made. These revisions may result in increases or decreases in estimated revenues or costs. Losses on fixed-price solution implementation contracts are recognized in the period when they become probable. Revisions in profit estimates are reflected in the period in which the conditions that require the revisions become known and can be estimated (cumulative catch-up method).

On occasion, we include our products as a component of its fixed-price service contracts. In such instances, we determine whether the services performed and products included, are distinct. In most cases, the arrangement is a single performance obligation and therefore follows the pattern of transfer as the service is provided. We apply a measure of progress (typically hours-to-hours or cost-to-cost) to any fixed consideration. As a result, revenue is generally recognized over the period the services are performed using percentage of completion method. This results in revenue recognition that corresponds with the value to the client of the services transferred to date relative to the remaining services promised.

We also license our Design-for-Inspection (DFI) system as a separate component of fixed-price service contracts. We allocate revenue to all deliverables based on their standalone selling prices, or SSP. In such instances, we apply judgment to estimate the range of SSPs for each performance obligation.

We license some of our software products separately from solution implementations, primarily its Exensio big data platform and related products. The majority of these products are delivered as on-premise software licenses, while others can be delivered entirely or partially through Software-as-a-Service (SaaS) or cloud delivery models. Revenue from perpetual (one-time charge) license software is recognized at a point in time at the inception of the arrangement when control transfers to the client, if the software license is distinct from the services offered by us. Revenue from post-contract support subscription is recognized over the contract term on a straight-line basis, because we are providing a service of standing ready to provide support, when-and-if needed, and is providing unspecified software upgrades on a when-and-if available basis over the contract term. Revenue from time-based license software is allocated to each performance obligation and is recognized either at a point in time or over time. The license component is recognized at a point in time, at the delivery of the software license, with the post-contract support subscription component being recognized ratably over for the committed term of the contract. Revenue from software hosting or SaaS arrangements that allow for the use of a hosted software product or service over a contractually

determined period of time without taking possession of software are accounted for as subscriptions and recognized as revenue ratably, on a straight-line basis, over the coverage period beginning on the date the service is made available to customers.

Gainshare Performance Incentives — When we enter into a contract to provide yield improvement services, the contract usually includes two components: (1) a fixed fee for performance by the Company of services delivered over a specific period of time; and (2) a Gainshare performance incentive component where the customer pays a variable fee, usually after the fixed fee period has ended, related to the usage of the Company's intellectual property. Revenue derived from Gainshare performance incentives is contingent upon our customers reaching certain defined production yield levels. Gainshare performance incentive periods are usually subsequent to the delivery of all contractual services and performance obligations. We recorded Gainshare revenue as a usage-based royalty based on customers' usage of intellectual property and recorded in the same period in which the usage occurs.

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Income Taxes

We are required to assess the likelihood that our deferred tax assets will be recovered from future taxable income and if we believe that they are not likely to be realizable before the expiration dates applicable to such assets then, to the extent we believe that recovery is not likely, establish a valuation allowance. Changes in the net deferred tax assets, less offsetting valuation allowance, in a period are recorded through the income tax provision in the condensed consolidated statements of operations. The valuation allowance was approximately $9.0 million and $9.1 million as of March 31, 2018 and December 31, 2017, respectively, which was related to California R&D tax credits and California net operating losses related to acquisition that we currently do not believe to be more likely than not to be ultimately realized. If we conclude at a future financial reporting period that there has been a change in our ability to realize our California R&D credit and net operating loss carry forward deferred tax assets, and it is at such time no longer "more–likely-than-not" that we will realize the tax credits before applicable expiration dates, our tax provision will increase in the period in which we make such determination.

Our income tax calculations are based on application of the respective U.S. federal, state or foreign tax law. Our tax filings, however, are subject to audit by the respective tax authorities. Accordingly, we recognize tax liabilities based upon our estimate of whether, and the extent to which, additional taxes will be due when such estimates are more-likely-than-not to be sustained. An uncertain income tax position will not be recognized if it has less than a 50% likelihood of being sustained. To the extent the final tax liabilities are different than the amounts originally accrued, the increases or decreases are recorded as income tax expense or benefit in the consolidated statements of operations. At March 31, 2018, no deferred taxes have been provided on undistributed earnings of approximately $3.4 million from the Company's international subsidiaries since these earnings have been, and under current plans will continue to be, permanently reinvested outside the United States. It is not practicable to determine the amount of the unrecognized tax liability at this time.

Recent Accounting Pronouncements and Accounting Changes

See Note 2 of "Notes to Condensed Consolidated Financial Statements (Unaudited)" of this Quarterly Report on Form 10-Q for a description of recent accounting pronouncements and accounting changes, including the expected dates of adoption and estimated effects, if any, on our consolidated financial statements.

Results of Operations

The following table sets forth, for the periods indicated, the percentage of total revenues represented by the line items reflected in our condensed consolidated statements of operations:

	Three Months Ended	
	March 31,	
	2018	**2017**
Revenues:		
Design-to-silicon-yield solutions	74 %	81 %
Gainshare performance incentives	26 %	19
Total revenues	100%	100 %
Costs of design-to-silicon-yield solutions	45	47
Amortization of acquired technology	1	1
Total costs of Design-to-silicon-yield solutions	46	48
Gross profit	54	52
Operating expenses:		
Research and development	29	30
Selling, general and administrative	26	24
Amortization of other acquired intangible assets	1	1
Total operating expenses	56	55
Income (loss) from operations	(2)	(2)
Interest and other income (expense), net	(1)	(1)
Income (loss) before taxes	(3)	(3)
Income tax provision (benefit)	(1)	(5)
Net income (loss)	(2)%	2 %

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Comparison of the Three Months Ended March 31, 2018 and 2017

Revenues (in thousands, except for percentages)	Three Months Ended March 31, 2018	2017	$ Change	% Change
Design-to-silicon-yield solutions	$18,190	$19,698	$(1,508)	(8 %)
Gainshare performance incentives	6,547	4,591	1,956	43 %
Total revenues	$24,737	$24,289	$448	2 %

Design-to-silicon-yield solutions. Design-to-silicon-yield solutions revenue is derived from services (including solution implementations, software support and maintenance, consulting, and training) and software licenses, provided during our customer yield improvement engagements as well as during solution product sales. Design-to-silicon-yield solutions revenue decreased $1.5 million for the three months ended March 31, 2018, compared to the three months ended March 31, 2017. The decrease in Design-to-silicon-yield solutions was primarily due to the decrease in the revenue from our yield ramp solutions due to lower hours worked across multiple contracts and customers, which was partially offset by increases in Exensio big data solution revenues that were driven by strong business activities. Our Design-to-silicon-yield solutions revenue may fluctuate in the future and is dependent on a number of factors, including the semiconductor industry's continued acceptance of our solutions, the timing of purchases by existing and new customers, and our ability to attract new customers and penetrate new markets, and further penetration of our current customer base. Fluctuations in future results may also occur if any of our significant customers renegotiate pre-existing contractual commitments due to adverse changes in their own business or, in the case of a time and materials contract, may take advantage of contractual provisions that permit the suspension of contracted work for a period if their business experiences a financial hardship.

Gainshare Performance Incentives. Gainshare performance incentives revenues represent royalties and performance incentives earned contingent upon our customers reaching certain defined operational levels. Revenue derived from Gainshare performance incentives increased $2.0 million for the three months ended March 31, 2018, compared to the three months ended March 31, 2017. The increase was primarily the result of higher 14nm Gainshare from one customer as well as new Gainshare from the engagements that reached the performance incentive target in the period, partially offset by lower Gainshare from 28nm and older nodes. Our Gainshare performance incentives revenue may continue to fluctuate from period to period. Gainshare performance incentives revenue is dependent on many factors that are outside our control, including among others, continued production of ICs by our customers at facilities at which we generate Gainshare, sustained yield improvements by our customers, and our ability to enter into new Design-to-silicon-yield solutions contracts containing Gainshare performance incentives.

	Three Months Ended	$	%

Costs of Design-to-silicon-yield solutions (in thousands, except for percentages)	March 31, 2018	2017	Change	Change
Direct costs of Design-to-silicon-yield solutions	$11,338	$11,335	$ 3	— %
Amortization of acquired technology	144	96	48	50 %
Total costs of Design-to-silicon-yield solutions	$11,482	$11,431	$ 51	— %

Costs of Design-to-silicon-yield solutions. Costs of Design-to-silicon-yield solutions consist of costs incurred to provide and support our services, costs recognized in connection with licensing our software, and amortization of acquired technology. Direct costs of Design-to-silicon-yield solutions consist of service and software licenses costs. Service costs consist of material, employee compensation and related benefits, overhead costs, travel and facilities-related costs. Software license costs consist of costs associated with licensing third-party software used by the Company in providing services to our customers in solution engagements, or sold in conjunction with our software products. Direct costs of Design-to-silicon-yield solutions were flat for the three months ended March 31, 2018, compared to the three months ended March 31, 2017. The change in direct cost of Design-to-silicon-yield solutions primarily due to a $0.3 million decrease in personnel-related cost driven by lower headcount, offset by a $0.3 million increase in hardware and equipment expense due to the timing of hardware shipment to the customers. Amortization of acquired technology for the three months ended March 31, 2018, slightly increased due to the amortization of acquired technology from our acquisition of certain assets from Kinesys.

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Research and Development (in thousands, except for percentages)	Three Months Ended March 31 2018	2017	$ Change	% Change
Research and development	$7,245	$7,282	$ (37)	(1%)

Research and Development. Research and development expenses consist primarily of personnel-related costs to support product development activities, including compensation and benefits, outside development services, travel, facilities cost allocations, and stock-based compensation charges. Research and development expenses were relatively flat for the three months ended March 31, 2018, compared to the three months ended March 31, 2017. The change in the research and development expenses was primarily due to a $0.2 million decrease in personnel-related expense due to lower headcount, offset by a $0.2 million increase in facilities expense due to the increase in depreciation expense for lab equipment. We anticipate our expenses in research and development will fluctuate in absolute dollars from period to period as a result of cost control initiatives and the timing of product development projects and revenue generating activity requirements.

Selling, General and Administrative (in thousands, except for percentages)	Three Months Ended March 31, 2018	2017	$ Change	% Change
Selling, general and administrative	$6,375	$5,899	$ 476	8%

Selling, General and Administrative. Selling, general and administrative expenses consist primarily of compensation and benefits for sales, marketing and general and administrative personnel, legal and accounting services, marketing communications, travel and facilities cost allocations, and stock-based compensation charges. Selling, general and administrative expenses increased $0.5 million for the three months ended March 31, 2018, compared to the three months ended March 31, 2017, primarily due to a $0.3 million increase in accounting and legal expense, largely due to the adoption of the new revenue recognition standard, a $0.1 million increase in personnel-related expenses and a $0.1 million increase in subcontractor expenses. We anticipate our selling, general and administrative expenses will fluctuate in absolute dollars from period to period as a result of cost control initiatives and to support increased selling efforts in the future.

Amortization of Other Acquired Intangible Assets (In thousands, except for percentages)	Three Months Ended March 31, 2018	2017	$ Change	% Change
Amortization of other acquired intangible assets	$109	$92	$ 17	18%

Amortization of Other Acquired Intangible Assets. Amortization of other acquired intangible assets consists of amortization of intangibles acquired as a result of certain business combinations. The increase in amortization of other acquired intangible assets for the three months ended March 31, 2018 compared to the three months ended March 31, 2017 was primarily related to amortization of other acquired intangible assets related to acquisition of certain assets from Kinesys.

Interest and Other Income (Expense), Net (in thousands, except for percentages)	**Three Months Ended March 31,**		**$ Change**	**% Change**
	2018	**2017**		
Interest and other income (expense), net	$(331)	$(230)	$ (101)	44 %

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Interest and Other Income (expense), net. Interest and other income (expense), net changed $0.1 million for the three months ended March 31, 2018, compared to the three months ended March 31, 2017. The change was primarily due to foreign exchange rate movements.

Income Tax Provision (Benefits) (in thousands, except for percentages)	Three Months Ended March 31, 2018	2017	$ Change	% Change
Income tax provision (benefits)	$(381)	$(1,162)	$ 781	(67 %)

Income Tax Provision (benefits). Income tax benefit decreased $0.8 million for the three months ended March 31, 2018, compared to three months ended March 31, 2017, primarily due to lower excess tax benefits related to employee stock compensation and impacts of recently enacted U.S. tax reform, such as, a decrease in the maximum federal tax rate from 35% to 21%, global intangible low-taxed income (GILTI), and foreign derived intangible income (FDII).

Liquidity and Capital Resources

As of March 31, 2018, our working capital, defined as total current assets less total current liabilities, was $148.1 million, compared to $144.3 million as of December 31, 2017. Cash and cash equivalents were $98.5 million as of March 31, 2018, compared to $101.3 million as of December 31, 2017. As of March 31, 2018, and December 31, 2017, cash and cash equivalents held by our foreign subsidiaries were $3.4 million and $3.1 million, respectively. We believe that our existing cash resources and anticipated funds from operations will satisfy our cash requirements to fund our operating activities, capital expenditures and other obligations for the next twelve months. During three months ended March 31, 2018, cash provided by operating activities of $3.3 million was a result of $0.4 million of net loss, non-cash adjustments to net income of $4.5 million, and an increase in the net change in operating assets and liabilities of $0.9 million. Non-cash charges consisted primarily of stock-based compensation of $2.9 million, depreciation and amortization of $1.3 million, and amortization of acquired intangible assets of $0.3 million. Cash provided by operating activities resulting from the net change in operating assets and liabilities primarily consisted of a $1.9 million increase in deferred revenue, a $0.8 million decrease in other non-current assets, and a $0.5 million increase in accounts payable, partially offset by a $2.2 million increase in prepaid expenses and other assets, mainly due to an $1.8 million increase in contract assets, a $1.3 million decrease in accrued compensation and related benefit, and a $0.5 million decrease in accrued and other liabilities. Cash flows used in investing activities of $2.5 million, consisted of payments for capital expenditures, primarily test equipment. Cash flows used in financing activities of $3.6 million, consisted of $4.1 million repurchases of common stock, $0.6 million of cash payments for taxes related to net share settlement of equity awards, partially offset by $1.0 million of proceeds from our Employee Stock Purchase Plan.

During three months ended March 31, 2017, cash used in operating activities of $0.4 million was a result of $0.5 million of net income, non-cash adjustments to net income of $3.7 million and an increase in the net change in operating assets and liabilities of $4.6 million. Non-cash charges consisted primarily of stock-based compensation of $2.9 million, depreciation and amortization of $1.1 million, and amortization of acquired intangible assets of $0.2 million, partially offset by deferred taxes of $0.6 million. Cash flow decreases resulting from the net change in operating assets and liabilities primarily consisted of a $1.9 million increase in accounts receivable, mainly due to the timing of customer payments, a $1.4 million increase in prepaid expense and other current assets, a $1.0 million decrease in accrued compensation and related benefits, a $0.6 million of decrease in accrued and other liabilities, and a $2.0 million increase in other non-current assets, partially offset by a $0.5 million increase in accounts payable, a $1.7 million increase in deferred revenue, and a $0.1 million increase in billing in excess of recognized revenue. Cash flows used in investing activities of $2.3 million for the three months ended March 31, 2017, consisted of payments for capital expenditures, primarily test equipment. Cash flows provided by financing activities of $0.8 million for the three months ended March 31, 2017, consisted of $0.7 million of proceeds from the exercise of stock options and $0.9 million of proceeds from our Employee Stock Purchase Plan, offset by $0.8 million of cash payments for taxes related to net share settlement of equity awards.

Off-Balance Sheet Agreements

We do not have any off-balance sheet arrangements, investments in special purpose entities or undisclosed borrowings or debt.

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Contractual Obligations

The following table summarizes our known contractual obligations (in thousands) as of March 31, 2018:

Contractual Obligations	Payments Due by Period 2018 (remaining nine months)	2019	2020	2021	2022	2023 and thereafter	Total
Operating lease obligations(1)	$1,363	$800	$726	$645	$389	$ 51	$3,974
Purchase obligations(2)	11,542	2,414	300	230	222	0	14,708
Total(3)	$12,309	$3,214	$1,026	$875	$611	$ 51	$18,086

(1) As of March 31, 2018, we lease approximately 28,600 square feet for principal executive offices located in San Jose, California. The lease terminates September 2018. In April 2018, we entered into a new approximately 20,757 square foot lease, located in Santa Clara, California. The term of the new lease is approximately ten years and is expected to commence on or around July 1, 2018. Total lease obligation over the new lease term is approximately $7.0 million, less a lease abatement allowance of approximately $0.4 million. The terms of the new lease include a tenant improvement allowance of approximately $1.3 million.

(2) Purchase obligations consist of agreements to purchase goods and services entered in the ordinary course of business.

(3) The contractual obligation table above excludes liabilities for uncertain tax positions of $3.0 million, which are not practicable to assign to any particular years, due to the inherent uncertainty of the tax positions. See Note 5. of "Notes to Condensed Consolidated Financial Statements" for further discussion.

Item 3. Quantitative and Qualitative Disclosures about Market Risk

The following discusses our exposure to market risk related to changes in interest rates and foreign currency exchange rates. We do not currently own any equity investments, nor do we expect to own any in the foreseeable future. This discussion contains forward-looking statements that are subject to risks and uncertainties. Actual results could vary materially as a result of a number of factors.

Interest Rate Risk. As of March 31, 2018, we had cash and cash equivalents of $98.6 million. Cash and cash equivalents consisted of cash and highly liquid money market instruments. We would not expect our operating results or cash flows to be affected to any significant degree by the effect of a sudden change in market interest on our

portfolio. A hypothetical increase in market interest rates of 100 basis points from the market rates in effect at March 31, 2018, would cause the fair value of these investments to decrease by an immaterial amount which would not have significantly impacted our financial position or results of operations. Declines in interest rates over time will result in lower interest income and interest expense.

Foreign Currency and Exchange Risk. Certain of our payables for our international offices are denominated in the local currency, including the Euro, Yen and RMB. Therefore, a portion of our operating expenditures is subject to foreign currency risks. We enter into foreign currency forward contracts to reduce the exposure to foreign currency exchange rate fluctuations on certain foreign currency denominated monetary assets and liabilities. We do not use foreign currency forward contracts for speculative or trading purposes. We record these forward contracts at fair value. The counterparty to these foreign currency forward contracts is a large global financial institution that we believe is creditworthy, and therefore, we believe the credit risk of counterparty non-performance is not significant. The change in fair value of these contracts is recorded into earnings as a component of other income (expense), net and offsets the change in fair value of foreign currency denominated monetary assets and liabilities, which is also recorded in other income (expense), net. As of March 31, 2018, we had one outstanding forward contract with a notional amount of $8.6 million. The foreign currency exchange rate movement of plus-or-minus 10% will result in the change in fair value of this contract of plus-or-minus $0.8 million.

Item 4. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our principal executive officer and principal financial and accounting officer, evaluated the effectiveness of our "disclosure controls and procedures" as defined in Exchange Act Rules 13a-15(e) and 15d-15(e) as of March 31, 2018, in connection with the filing of this Quarterly Report on Form 10-Q. Based on that evaluation as of March 31, 2018, our principal executive officer and principal financial and accounting officer concluded that our disclosure controls and procedures were effective to ensure that information we are required to disclose in reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in rules and forms of the SEC and accumulated and communicated to our management as appropriate to allow timely decisions regarding required disclosure.

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Changes in Internal Control over Financial Reporting

There were no changes in the Company's internal control over financial reporting during the three months ended March 31, 2018, that have materially affected, or are reasonably likely to materially affect, the Company's internal control over financial reporting.

PART II — OTHER INFORMATION

Item 1. Legal Proceedings

From time to time, we are subject to various claims and legal proceedings that arise in the ordinary course of business. We accrue for losses related to litigation when a potential loss is probable and the loss can be reasonably estimated in accordance with FASB requirements. During the reported period, we were not a party to any material legal proceedings, thus no loss was probable and no amount was accrued at March 31, 2018.

Item 1A. Risk Factors

Item 1A, “Risk Factors,” on pages 13 through 19 of the Company’s Annual Report on Form 10-K for the year ended December 31, 2017, provides information on the significant risks associated with our business. There have been no subsequent material changes to these risks.

Item 2. Unregistered Sales of Equity Securities and Use of Proceeds

The table below sets forth the information with respect to purchases made by or on behalf of the Company or any “affiliated purchaser” (as the term is defined in Rule 10b-18(a)(3) under the Exchange Act) of our common stock during the three months ended March 31, 2018 (in thousands except per share amounts):

ISSUER PURCHASES OF EQUITY SECURITIES

Period	Total Number of Shares Purchased (1)	Average Price Paid Per Share	Total Number of Shares Purchased as Part of Publicly Announced Programs (1)	Approximate Dollar Value of Shares that May Yet Be Purchased Under Programs(1)
Month #1 (January 1, 2018 through January 31, 2018)	—	$ —	—	$ 11,582
Month #2 (February 1, 2018 through February 28, 2018)	—	$ —	—	$ 11,582
Month #3 (March 1, 2018 through March 31, 2018)	338	$ 12.19	338	$ 7,459
Total	338	$ 12.19	338	

(1) On October 25, 2016, the Board of Directors adopted a program, effective immediately, to repurchase up to $25.0 million of the Company's common stock both on the open market and in privately negotiated transactions over the next two years.

Item 3. Defaults Upon Senior Securities

None.

Item 4. Mine Safety Disclosures

None.

Item 5. Other Information

None.

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Item 6. Exhibits

Exhibit Number	Description
31.01	Certification of the principal executive officer pursuant to Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.02	Certification of the principal financial and accounting officer pursuant to Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.01	Certification pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
32.02	Certification 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.DEF	XBRL Taxonomy Extension Definition Linkbase Document.
101.LAB	XBRL Taxonomy Extension Label Linkbase Document.
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document.

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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 the undersigned thereunto duly authorized.

PDF SOLUTIONS, INC.

Date: May 10, 2018 By: /s/ JOHN K. KIBARIAN
John K. Kibarian
President and Chief Executive Officer
(principal executive officer)

Date: May 10, 2018 By: /s/ GREGORY C. WALKER
Gregory C. Walker
Vice President, Finance and Chief Financial Officer
(principal financial and accounting officer)