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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 September 30, 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**

(State or Other Jurisdiction of Incorporation or Organization)

**25-1701361**

(I.R.S. Employer Identification No.)

**2858 De La Cruz Blvd.,  
Santa Clara, California**

(Address of Principal Executive Offices)

**95050**

(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 every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit 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, a smaller reporting company, or emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer

Non-accelerated filer

Emerging growth company

Accelerated filer

Smaller reporting 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 32,274,543 shares of the Registrant's Common Stock outstanding as of November 5, 2018.

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TABLE OF CONTENTS

	<b><u>Page</u></b>
<b><u>PART I FINANCIAL INFORMATION</u></b>	
<b><u>Item 1. Financial Statements (Unaudited)</u></b>	
<u>Condensed Consolidated Balance Sheets</u>	3
<u>Condensed Consolidated Statements of Operations and Comprehensive Income (Loss)</u>	4
<u>Condensed Consolidated Statements of Cash Flows</u>	5
<u>Notes to Condensed Consolidated Financial Statements</u>	6
<b><u>Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations</u></b>	24
<b><u>Item 3. Quantitative and Qualitative Disclosures About Market Risk</u></b>	32
<b><u>Item 4. Controls and Procedures</u></b>	32
<b><u>PART II OTHER INFORMATION</u></b>	
<b><u>Item 1. Legal Proceedings</u></b>	33
<b><u>Item 1A. Risk Factors</u></b>	33
<b><u>Item 2. Unregistered Sales of Equity Securities and Use of Proceeds</u></b>	34
<b><u>Item 3. Defaults Upon Senior Securities</u></b>	34
<b><u>Item 4. Mine Safety Disclosures</u></b>	34
<b><u>Item 5. Other Information</u></b>	34
<b><u>Item 6. Exhibits</u></b>	34
<b><u>SIGNATURES</u></b>	35

## PART I — FINANCIAL INFORMATION

## Item 1. Financial Statements

**PDF SOLUTIONS, INC.**  
**CONDENSED CONSOLIDATED BALANCE SHEETS**  
**(Unaudited)**  
**(in thousands, except par value)**

	September 30, 2018	December 31, 2017
<b>ASSETS</b>		
Current assets:		
Cash and cash equivalents	\$ 96,788	\$ 101,267
Accounts receivable, net of allowance of \$333 and \$374, respectively	52,744	57,564
Prepaid expenses and other current assets	10,890	5,069
<b>Total current assets</b>	<b>160,422</b>	<b>163,900</b>
Property and equipment, net	34,120	25,386
Goodwill	1,923	1,923
Intangible assets, net	5,317	6,074
Deferred tax assets	17,714	16,348
Other non-current assets	8,163	10,545
<b>Total assets</b>	<b>\$ 227,659</b>	<b>\$ 224,176</b>
<b>LIABILITIES AND STOCKHOLDERS' EQUITY</b>		
Current liabilities:		
Accounts payable	\$ 3,286	\$ 2,536
Accrued compensation and related benefits	4,969	6,493
Accrued and other current liabilities	4,386	2,627
Deferred revenues – current portion	7,360	7,981
Billings in excess of recognized revenues	669	-
<b>Total current liabilities</b>	<b>20,670</b>	<b>19,637</b>
Long-term income taxes payable	4,140	3,902
Other non-current liabilities	1,954	2,269
<b>Total liabilities</b>	<b>26,764</b>	<b>25,808</b>
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 40,509 and 39,799, respectively; shares outstanding 32,257 and 32,112, respectively	5	5
Additional paid-in-capital	308,098	297,950
Treasury stock at cost, 8,252 and 7,688 shares, respectively	(78,752)	(71,793)
Accumulated deficit	(27,337)	(27,089)
Accumulated other comprehensive loss	(1,119)	(705)
<b>Total stockholders' equity</b>	<b>200,895</b>	<b>198,368</b>
<b>Total liabilities and stockholders' equity</b>	<b>\$ 227,659</b>	<b>\$ 224,176</b>

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

**PDF SOLUTIONS, INC.**  
**CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE INCOME (LOSS)**  
**(Unaudited)**  
**(in thousands, except per share amounts)**

	Three Months Ended September		Nine Months Ended September	
	30,		30,	
	2018	2017	2018	2017
<b>Revenues:</b>				
Design-to-silicon-yield solutions	\$ 13,976	\$ 19,229	\$ 47,431	\$ 55,426
Gainshare performance incentives	6,237	7,288	18,638	19,668
Total revenues	<u>20,213</u>	<u>26,517</u>	<u>66,069</u>	<u>75,094</u>
<b>Costs of Design-to-silicon-yield solutions:</b>				
Direct costs of Design-to-silicon-yield solutions	10,539	12,295	32,651	34,913
Amortization of acquired technology	144	136	431	327
Total cost of Design-to-silicon-yield solutions	<u>10,683</u>	<u>12,431</u>	<u>33,082</u>	<u>35,240</u>
<b>Gross profit</b>	9,530	14,086	32,987	39,854
<b>Operating expenses:</b>				
Research and development	6,755	7,875	21,100	22,432
Selling, general and administrative	5,507	5,680	17,801	17,775
Amortization of other acquired intangible assets	108	107	326	291
Total operating expenses	<u>12,370</u>	<u>13,662</u>	<u>39,227</u>	<u>40,498</u>
<b>Income (loss) from operations</b>	(2,840)	424	(6,240)	(644)
Interest and other income (expense), net	223	(104)	283	(305)
<b>Income (loss) before income taxes</b>	(2,617)	320	(5,957)	(949)
Income tax benefit	(535)	(270)	(1,355)	(2,246)
<b>Net income (loss)</b>	<u>\$ (2,082)</u>	<u>\$ 590</u>	<u>\$ (4,602)</u>	<u>\$ 1,297</u>
Net income (loss) per share:				
Basic	\$ (0.06)	\$ 0.02	\$ (0.14)	\$ 0.04
Diluted	\$ (0.06)	\$ 0.02	\$ (0.14)	\$ 0.04
Weighted average common shares:				
Basic	32,184	32,078	32,105	32,060
Diluted	<u>32,184</u>	<u>32,969</u>	<u>32,105</u>	<u>33,317</u>
Net income (loss)	\$ (2,082)	\$ 590	\$ (4,602)	\$ 1,297
Other comprehensive income (loss):				
Foreign currency translation adjustments, net of tax	(168)	409	(414)	1,117
Comprehensive income (loss)	<u>\$ (2,250)</u>	<u>\$ 999</u>	<u>\$ (5,016)</u>	<u>\$ 2,414</u>

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

**PDF SOLUTIONS, INC.**  
**CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS**  
**(Unaudited)**  
**(in thousands)**

	<b>Nine Months Ended September 30,</b>	
	<b>2018</b>	<b>2017</b>
<b>Cash flows from operating activities:</b>		
Net income (loss)	\$ (4,602)	\$ 1,297
Adjustments to reconcile net income (loss) to net cash provided by operating activities:		
Depreciation and amortization	3,689	3,549
Stock-based compensation expense	7,825	8,737
Amortization of acquired intangible assets	757	618
Deferred taxes	(2,298)	(3,514)
Loss on disposal of property and equipment	4	5
Provision for (reversal of) allowance for doubtful accounts	(41)	124
Unrealized loss (gain) on foreign currency forward contract	59	(6)
Changes in operating assets and liabilities:		
Accounts receivable	5,653	(4,921)
Prepaid expenses and other current assets	(3,444)	(1,142)
Accounts payable	(598)	1,611
Accrued compensation and related benefits	(1,377)	(721)
Accrued and other liabilities	(252)	(225)
Deferred revenues	632	(682)
Billings in excess of recognized revenues	669	200
Other non-current assets	2,367	1,331
Net cash provided by operating activities	<u>9,043</u>	<u>6,261</u>
<b>Cash flows from investing activities:</b>		
Purchases of property and equipment	(8,747)	(6,942)
Payments of business acquisitions, net of cash acquired	-	(3,841)
Net cash used in investing activities	<u>(8,747)</u>	<u>(10,783)</u>
<b>Cash flows from financing activities:</b>		
Proceeds from exercise of stock options	469	2,304
Repurchases of common stock	(5,248)	(13,418)
Proceeds from employee stock purchase plan	1,832	1,866
Payments for taxes related to net share settlement of equity awards	(1,711)	(2,439)
Net cash used in financing activities	<u>(4,658)</u>	<u>(11,687)</u>
Effect of exchange rate changes on cash and cash equivalents	(117)	172
Net decrease in cash and cash equivalents	(4,479)	(16,037)
Cash and cash equivalents, beginning of period	101,267	116,787
Cash and cash equivalents, end of period	<u>\$ 96,788</u>	<u>\$ 100,750</u>
<b>Supplemental disclosure of cash flow information:</b>		
Cash paid during the period for:		
Taxes	\$ 1,616	\$ 1,876
Property and equipment received and accrued in accounts payable and accrued and other liabilities	\$ 3,398	\$ 1,533
Tenant allowance paid by landlord for leasehold improvements	\$ 1,536	\$ -

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

**PDF SOLUTIONS, INC.**  
**NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS (UNAUDITED)**

## **1. 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.

### ***Recently Adopted Accounting Pronouncements***

In May 2014, the Financial Accounting Standards Board (“FASB”) issued Accounting Standards Update (“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.

## Table of Contents

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 its 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 its financial statements and footnote disclosures.

### ***Recent Accounting Standards or Updates 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 ("TCJA") 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 ASUNo. 2018-05, Income Taxes (Topic 740): Amendments to SEC Paragraphs Pursuant to SEC Staff Accounting Bulletin No. 118. The staff of the SEC recognized the complexity of reflecting the impacts of the 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 the 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 on January 1, 2018 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.
- For fiscal 2018, revenue generated under Topic 606 is expected to be slightly higher 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 as 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 both the three and nine months ended September 30, 2018 was approximately \$0.5 million.

The adoption of Topic 606 impacted the Company’s accounting for certain commercial software multi-element arrangements 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 (“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 software that is licensed under a 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, which was 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 the 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 September 30, 2018:

(In thousands)	As reported under Topic 606	Adjustments	Balances under Topic 605
Accounts receivable, net of allowance	\$ 52,744	\$ 125	\$ 52,869
Prepaid expenses and other current assets	10,890	(3,490)	7,400
Deferred tax assets	17,714	435	18,149
Other non-current assets	8,163	(28)	8,135
Deferred revenues – current portion	7,360	2,150	9,510
Long-term income taxes payable	4,140	(1,046)	3,094
Other non-current liabilities	1,954	616	2,570
Accumulated deficit	\$ (27,337)	\$ (4,679)	\$ (32,016)

## [Table of Contents](#)

The Company's net cash provided by operating activities for the three and nine months ended September 30, 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 nine months ended September 30, 2018:

<b>(In thousands)</b>	<b>As reported under Topic 606</b>	<b>Adjustments</b>	<b>Balances under Topic 605</b>
Net income (loss)	\$ (4,602)	\$ (325)	\$ (4,927)
Adjustments to reconcile net income (loss) to net cash provided by operating activities:			
Deferred taxes	(2,298)	(137)	(2,435)
Changes in operating assets and liabilities:			
Accounts receivable, net of allowance	5,654	(917)	4,737
Prepaid expenses and other current assets	(3,444)	1,100	(2,344)
Other non-current assets	2,367	28	2,395
Other accrued and long-term liabilities	(252)	3	(249)
Deferred revenue	\$ 632	\$ 248	\$ 880

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. 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 the 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 (the cumulative catch-up method).

## Table of Contents

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 licenses 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 software 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 the time of 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 (i) a service of standing ready to provide support, when-and-if needed, and (ii) 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 the time of 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 records Gainshare revenue as a usage-based royalty based on customers' usage of intellectual property and records it in the same period in which the usage occurs.

The following table summarizes the effects of adopting Topic 606 on the financial statement line items of the Company's condensed consolidated statements of operations for the three months ended September 30, 2018:

<b>(In thousands)</b>	<b>As reported under Topic 606</b>	<b>Adjustments</b>	<b>Balances under Topic 605</b>
Design-to-silicon-yield solutions	\$ 13,976	\$ (522)	\$ 13,454
Total revenue	20,213	(522)	19,691
Gross margin	9,530	(522)	9,008
Selling, general and administrative	5,507	(49)	5,458
Total operating expenses	12,370	(49)	12,321
Income (loss) from operations	(2,840)	(473)	(3,313)
Income (loss) before taxes	(2,617)	(473)	(3,090)
Income tax benefit	(535)	(92)	(627)
Net loss	\$ (2,082)	\$ (381)	\$ (2,463)

## [Table of Contents](#)

The following table summarizes the effects of adopting Topic 606 on the financial statement line items of the Company's condensed consolidated statements of operations for the nine months ended September 30, 2018:

<b>(In thousands)</b>	<b>As reported under Topic 606</b>	<b>Adjustments</b>	<b>Balances under Topic 605</b>
Design-to-silicon-yield solutions	\$ 47,431	\$ (539)	\$ 46,892
Total revenue	66,069	(539)	65,530
Gross margin	32,987	(539)	32,448
Selling, general and administrative	17,801	(122)	17,679
Total operating expenses	39,227	(122)	39,105
Income (loss) from operations	(6,240)	(417)	(6,657)
Income (loss) before taxes	(5,957)	(417)	(6,374)
Income tax benefit	(1,355)	(92)	(1,447)
Net loss	\$ (4,602)	\$ (325)	\$ (4,927)

### **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.

The following table shows the revenues from contracts with customers by the nature of transactions for the three and nine months ended September 30, 2018:

	<b>Three Months Ended September 30, 2018</b>	<b>Nine Months Ended September 30, 2018</b>
Product and licenses	\$ 7,729	\$ 22,044
Support and services	11,905	43,095
Other	579	930
Total	<u>\$ 20,213</u>	<u>\$ 66,069</u>

Product and licenses include a portion of time-based software which is recognized in the period, perpetual software, and Gainshare performance incentives. The remaining portions of revenue from these contracts correspond to services or other types of performance obligations 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 59% and 41% for the three months ended September 30, 2018, respectively. Revenue from performance obligations, satisfied over time and at a point-in-time, accounted for approximately 66% and 34% for the nine months ended September 30, 2018, respectively. International revenues accounted for approximately 59% and 58% of total revenues for the three and nine months ended September 30, 2018, respectively, compared to 63% and 58% for the three and nine months ended September 30, 2017, respectively. 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 the 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 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 are 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.

### **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 are included in prepaid expenses and other current assets in the condensed consolidated balance sheets. At September 30, 2018 and January 1, 2018, contract assets of \$3.1 million and \$1.9 million, respectively, were included in prepaid expenses and other current assets in the condensed consolidated balance sheets. The change in the contract assets balance during the period relates to the recording of revenues for which the right to consideration is subject to milestone completion or client acceptance and movement of previously recorded contract assets to receivables as the right to consideration becomes unconditional. 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. The non-current portion of deferred revenue was \$0.3 million and \$0.9 million, respectively, as of September 30, 2018 and January 1, 2018.

During the three and nine months ended September 30, 2018, the Company recognized \$4.4 million and \$12.0 million, respectively, of revenue that was included in the deferred revenue balance, as adjusted for Topic 606, at the beginning of 2018.

At September 30, 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 \$38.7 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 to change due to future revaluations of variable consideration, terminations, other contract modifications, or currency adjustments. The estimated timing of the recognition of remaining unsatisfied performance obligations is subject to change and is 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 and nine months ended September 30, 2018 from significant performance obligations satisfied (or partially satisfied) in previous periods was \$1.3 million and \$1.6 million, respectively. This amount primarily represents changes of estimated percentage-of-completion based contracts and changes in estimated Gainshare performance incentives for those customers that reported actual Gainshare revenue with some time lag.

#### **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 September 30, 2018, were \$0.4 million and the amortization of these assets were \$0.1 million and \$0.3 million during the three and nine months ended September 30, 2018, respectively. 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 are 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. The deferred costs balance was \$0.4 million and \$0.6 million as of September 30, 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 a 12-month period. Unbilled accounts receivable, included in accounts receivable, totaled \$22.7 million and \$22.2 million as of September 30, 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 \$6.4 million and \$8.6 million as of September 30, 2018 and December 31, 2017, respectively.

## Table of Contents

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

<b>(Dollars in thousands)</b>	<b>September 30, 2018</b>	<b>December 31, 2017</b>
Computer equipment	\$ 10,446	\$ 10,729
Software	4,121	3,348
Furniture, fixtures and equipment	4,420	3,676
Leasehold improvements	5,573	1,980
Test equipment	14,694	13,796
Construction-in-progress	17,928	12,527
	<u>57,182</u>	<u>46,056</u>
Less: accumulated depreciation and amortization	(23,062)	(20,670)
<b>Total</b>	<b>\$ 34,120</b>	<b>\$ 25,386</b>

Test equipment includes some DFI assets at customer sites that are contributing to DFI solution revenues. The construction-in-progress balance as of September 30, 2018 and December 31, 2017 was primarily related to construction of DFI assets. Leasehold improvements increased to \$5.6 million due to a recent move of the Company's headquarters to a new office location. Depreciation and amortization expense was \$1.2 million and \$1.3 million for the three months ended September 30, 2018 and 2017, respectively. Depreciation and amortization expense was \$3.7 million and \$3.5 million for the nine months ended September 30, 2018 and 2017, respectively.

As of both September 30, 2018, and December 31, 2017, the carrying amount of goodwill was \$1.9 million.

Intangible assets balance was \$5.3 million and \$6.1 million as of September 30, 2018, and December 31, 2017, respectively. Intangible assets as of September 30, 2018 and December 31, 2017 consist of the following (in thousands):

<b>(Dollars in thousands)</b>	<b>Amortization Period (Years)</b>	<b>September 30, 2018</b>			<b>December 31, 2017</b>		
		<b>Gross Carrying Amount</b>	<b>Accumulated Amortization</b>	<b>Net Carrying Amount</b>	<b>Gross Carrying Amount</b>	<b>Accumulated Amortization</b>	<b>Net Carrying Amount</b>
Customer relationships	1 - 9	\$ 6,740	\$ (4,421)	\$ 2,319	\$ 6,740	\$ (4,145)	\$ 2,595
Developed technology	4 - 6	15,820	(13,261)	2,559	15,820	(12,829)	2,991
Tradenname	2 - 4	790	(641)	149	790	(622)	168
Patent	7 - 10	1800	(1,510)	290	1,800	(1,480)	320
<b>Total</b>		<b>\$ 25,150</b>	<b>\$ (19,833)</b>	<b>\$ 5,317</b>	<b>\$ 25,150</b>	<b>\$ (19,076)</b>	<b>\$ 6,074</b>

The weighted average remaining amortization period for acquired identifiable intangible assets was 6.1 years as of September 30, 2018. For the three and nine months ended September 30, 2018, total intangible asset amortization expense was \$0.3 million and \$0.8 million, respectively. For the three and nine months ended September 30, 2017, total intangible asset amortization expense was \$0.2 million and \$0.6 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 three months)	\$ 253
2019	1,009
2020	1,009
2021	833
2022	626
2023 and thereafter	1,587
Total future amortization expense	<u>\$ 5,317</u>

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 and nine months ended September 30, 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		Nine Months Ended	
	September 30,		September 30,	
	2018	2017	2018	2017
Costs of Design-to-silicon-yield solutions	\$ 787	\$ 1,184	\$ 2,768	\$ 3,445
Research and development	725	877	2,449	2,558
Selling, general and administrative	756	888	2,608	2,734
Stock-based compensation expenses	<u>\$ 2,268</u>	<u>\$ 2,949</u>	<u>\$ 7,825</u>	<u>\$ 8,737</u>

On September 30, 2018, the Company had the following stock-based compensation plans:

*Stock Plans* — On November 16, 2011, the Company's stockholders approved the 2011 Stock Incentive Plan, which was amended and restated four times thereafter, most recently on May 31, 2017, when the Company's stockholders approved the Fourth Amended and Restated 2011 Stock Incentive Plan (as amended, the "2011 Stock Plan"). Under the 2011 Stock 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 Stock Plan that are forfeited or repurchased by the Company or shares subject to awards previously issued. In the 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.

As of September 30, 2018, the Company has reserved 9,600,000 shares of common stock to cover stock-based awards under the 2011 Stock Plan, of which approximately 4.0 million shares were available for future grant. The number of shares reserved and available under the 2011 Stock Plan includes 0.5 million shares that were subject to awards previously made under the 2001 Stock Plan which were forfeited, expired or repurchased by the Company after adoption of the 2011 Stock Plan through September 30, 2018. As of September 30, 2018, there were no outstanding awards that had been granted outside of the 2011 Stock Plan, the 2001 Stock Plan or the 2001 Stock Option/Stock Issuance Plan assumed in connection with the acquisition of IDS Systems Inc. (collectively, the "Stock Plans").

## [Table of Contents](#)

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 September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Expected life (in years)	4.43	4.41	4.43	4.41
Volatility	44.01%	41.49%	43.82%	41.53%
Risk-free interest rate	2.73%	1.65%	2.71%	1.69%
Expected dividend	-	-	-	-
Weighted average fair value per share of options granted during the period	\$ 4.21	\$ 5.78	\$ 4.22	\$ 6.14

The Company granted 87,000 shares of options to purchase shares of common stock during the three months ended September 30, 2018.

Stock option activity under the Company's Stock Plans during the nine months ended September 30, 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 \$4.22 per share)	98	\$ 10.71		
Exercised	(68)	\$ 6.88		
Canceled or expired	(30)	\$ 13.84		
Outstanding, September 30, 2018	1,045	\$ 9.81	4.64	\$ 1,422
Vested and expected to vest, September 30, 2018	1,039	\$ 9.77	4.59	\$ 1,422
Exercisable, September 30, 2018	806	\$ 8.60	3.31	\$ 1,422

The aggregate intrinsic value in the table above represents the total intrinsic value based on the Company's closing stock price of \$9.03 per share as of September 30, 2018. The total intrinsic value of options exercised during the nine months ended September 30, 2018 was \$0.3 million.

As of September 30, 2018, there was \$1.1 million of total unrecognized compensation cost related to unvested stock options. That cost is expected to be recognized over a weighted average period of 3.0 years. The total fair value of shares vested was \$0.3 million during the nine months ended September 30, 2018.

Restricted stock unit activity during the nine months ended September 30, 2018 was as follows:

	Shares (in thousands)	Weighted Average Grant Date Fair Value Per Share
Outstanding, January 1, 2018	1,617	\$ 15.66
Granted	113	\$ 10.70
Vested	(440)	\$ 15.73
Forfeited	(116)	\$ 15.21
Outstanding, September 30, 2018	1,174	\$ 15.21

## [Table of Contents](#)

As of September 30, 2018, there was \$14 million of total unrecognized compensation cost related to outstanding restricted stock units. That cost is expected to be recognized over a weighted average period of 2.2 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 “ESPP”) under which eligible employees can contribute up to 10% of their compensation, as defined in the ESPP, towards the purchase of shares of PDF Solutions 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 ESPP consists of twenty-four-month offering periods with four six-month purchase periods in each offering period which commence every six months. Under the ESPP, on January 1 of each year, 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 ESPP to extend it through May 17, 2020.

The Company estimated the fair value of purchase rights granted under the ESPP 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:

	Nine Months Ended September 30,	
	2018	2017
Expected life (in years)	1.25	1.25
Volatility	42.85%	40.63%
Risk-free interest rate	2.48%	1.25%
Expected dividend	—	—
Weighted average fair value per share of options granted during the period	\$ 3.62	\$ 5.22

During the three months ended September 30, 2018 and 2017, a total of 92,345 and 99,550 shares, respectively, were issued at a weighted-average purchase price of \$8.925 and \$9.53 per share. During the nine months ended September 30, 2018 and 2017, a total of 200,704 and 199,827 shares, respectively, were issued at a weighted-average purchase price of \$9.12 and \$9.33 per share, respectively. As of September 30, 2018, there was \$1.7 million of unrecognized compensation cost related to the ESPP. That cost is expected to be recognized over a weighted average period of 1.83 years. As of September 30, 2018, 4.7 million shares were available for future issuance under the ESPP.

*Stock Repurchase Program* - On May 29, 2018, the Board of Directors terminated the previous 2016 stock repurchase program, and adopted a new 2018 program to repurchase up to \$25.0 million of the Company’s common stock both on the open market and in privately negotiated transactions, from time to time, over the next two years. During the three and nine months ended September 30, 2018, the Company repurchased zero and 437,007 shares, respectively, under the 2016 and 2018 programs. As of September 30, 2018, 1,279,189 shares had been repurchased at an average price of \$14.59 per share under the 2016 program, for a total purchase of \$18.7 million. Under the 2018 program, as of September 30, 2018, \$25.0 million of the Company’s common stock remained available for future repurchases.

## 5. INCOME TAXES

Income tax benefit decreased by \$0.9 million for the nine months ended September 30, 2018 to \$1.3 million compared to \$2.2 million for the nine months ended September 30, 2017. The Company’s effective tax rate was 2.27% and 236.7% for the nine months ended September 30, 2018 and 2017, respectively. The Company’s effective tax rate decreased in the nine months ended September 30, 2018, as compared to the same period in 2017, primarily due to lower excess tax benefits related to employee stock compensation and the impact of the recently enacted TCJA, such as a decrease in the maximum federal tax rate from 35% to 21%.

The Company’s total amount of unrecognized tax benefits, excluding interest and penalties, as of September 30, 2018, was \$12.9 million, of which \$7.6 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 September 30, 2018, the Company has recorded unrecognized tax benefits of \$2.9 million, including interest and penalties, as long-term taxes payable in its condensed consolidated balance sheet. The remaining \$10.7 million has been recorded net of our deferred tax assets, of which \$5.3 million is subject to a full valuation allowance.

## [Table of Contents](#)

The valuation allowance was approximately \$9.4 million and \$9.1 million as of September 30, 2018, and December 31, 2017, respectively, which was related to California R&D tax credits and California net operating losses related to the Company's acquisition of Syntricity, Inc. that it currently does not believe they are more likely than not to be ultimately realized.

The Company is required to assess whether it is more-likely-than-not that deferred tax assets will be recovered from future taxable income and if the Company believes that they are not likely to be realizable before the expiration dates applicable to such assets then, to the extent the Company believes that recovery is not likely, establish a valuation allowance. Changes in the net deferred tax assets, less offsetting valuation allowance, in a financial reporting period are recorded through the income tax provision and could have a material impact to the condensed consolidated statements of operations.

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 TCJA enactment date. Since the TCJA 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 TCJA.

Effective January 1, 2018, the TCJA created 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. including federal and various states, 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.

## 6. NET INCOME PER SHARE

Basic net income per share is computed by dividing net income by the 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 that 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		Nine Months	
	Ended September 30,		Ended September 30,	
	2018	2017	2018	2017
<b>Numerator:</b>				
Net income (loss)	\$ (2,082)	\$ 590	\$ (4,602)	\$ 1,297
<b>Denominator:</b>				
Basic weighted-average common shares outstanding	32,184	32,078	32,105	32,060
Effect of dilutive options and restricted stock	-	891	-	1,257
Diluted weighted average shares outstanding	32,184	32,969	32,105	33,317
Net income (loss) per share - Basic	\$ (0.06)	\$ 0.02	\$ (0.14)	\$ 0.04
Net income (loss) per share - Diluted	\$ (0.06)	\$ 0.02	\$ (0.14)	\$ 0.04

## [Table of Contents](#)

For the three and nine months ended September 30, 2018, there are no potential dilutive common shares included in the computation of diluted net income (loss) per share because there was a net loss for both periods.

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):

	<b>Three Months</b>		<b>Nine Months</b>	
	<b>Ended September 30,</b>		<b>Ended September 30,</b>	
	<b>2018</b>	<b>2017</b>	<b>2018</b>	<b>2017</b>
Outstanding stock options	-	211	-	109
Nonvested restricted stock units	-	15	-	12
Employee Stock Purchase Plan	-	68	-	42
Total	-	294	-	163

## 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:

<b>Customer</b>	<b>Three Months</b>		<b>Nine Months</b>	
	<b>Ended September 30,</b>		<b>Ended September 30,</b>	
	<b>2018</b>	<b>2017</b>	<b>2018</b>	<b>2017</b>
A	38%	38%	39%	41%

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

<b>Customer</b>	<b>September 30,</b>	<b>December 31,</b>
	<b>2018</b>	<b>2017</b>
A	41%	41%
B	19%	15%

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

	<b>Three Months Ended September 30,</b>			
	<b>2018</b>		<b>2017</b>	
	<b>Revenues</b>	<b>Percentage of Revenues</b>	<b>Revenues</b>	<b>Percentage of Revenues</b>
United States	\$ 8,366	41%	\$ 9,750	37%
China	4,644	23%	6,452	24%
Taiwan	936	5%	2,414	9%
Rest of the world	6,267	31%	7,901	30%
<b>Total revenue</b>	<b>\$ 20,213</b>	<b>100%</b>	<b>\$ 26,517</b>	<b>100%</b>

	<b>Nine Months Ended September 30,</b>			
	<b>2018</b>		<b>2017</b>	
	<b>Revenues</b>	<b>Percentage of Revenues</b>	<b>Revenues</b>	<b>Percentage of Revenues</b>
United States	\$ 27,430	42%	\$ 30,610	41%
China	14,186	21%	12,891	17%
Taiwan	4,109	6%	9,894	13%
Rest of the world	20,344	31%	21,699	29%
<b>Total revenue</b>	<b>\$ 66,069</b>	<b>100%</b>	<b>\$ 75,094</b>	<b>100%</b>

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

	<b>September 30, 2018</b>	<b>December 31, 2017</b>
United States	\$ 33,690	\$ 24,883
Rest of the world	430	503
<b>Total long-lived assets, net</b>	<b>\$ 34,120</b>	<b>\$ 25,386</b>

## 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.

## [Table of Contents](#)

The following table represents the Company's assets measured at fair value on a recurring basis as of September 30, 2018, and the basis for that measurement (in thousands):

Assets	As of September 30, 2018			
	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	\$ 26,934	\$ 26,934	\$ —	\$ —

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	As of December 31, 2017			
	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 September 30, 2018 and 2017, the Company recognized a realized loss of \$0.1 million and a realized gain \$0.2 million on the contracts, respectively, which was recorded in other income (expense), net in the Company's Statements of Operations and Comprehensive Income (Loss). For the nine months ended September 30, 2018 and 2017, the Company recognized a realized loss of \$0.5 million and a realized gain \$0.7 million on the contracts, respectively, which was recorded in other income (expense), net in the Company's Statements of Operations and Comprehensive Income (Loss).

The Company carries these derivatives financial instruments on its Condensed 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 September 30, 2018, the Company had one outstanding forward contract with a notional amount of \$8.1 million and recorded \$47,000 in 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 2028. Rent expense was \$0.6 million for both the three months ended September 30, 2018 and 2017, respectively. Rent expense was \$1.9 million and \$1.6 million for the nine months ended September 30, 2018 and 2017, respectively.

Future minimum lease payments under noncancelable operating leases at September 30, 2018 are as follows (in thousands):

<b>Year ending December 31,</b>	<b>Amount</b>
2018 (remaining three months)	\$ 357
2019	1,659
2020	1,813
2021	1,654
2022	1,483
2023 and thereafter	4,799
<b>Total future minimum lease payments</b>	<b>\$ 11,765</b>

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 ten years commencing on September 1, 2018. Total lease obligation over the new lease term is approximately \$7.3 million, less a lease abatement allowance of approximately \$0.4 million. The terms of the new lease include a tenant improvement allowance of \$1.5 million. Future minimum lease payments under the lease are included in the above table.

*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 September 30, 2018, total outstanding purchase obligations were \$10.0 million, which are primarily due within the next 15 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 September 30, 2018, the Company was not party to any material legal proceedings, and thus no loss was probable and no amount was accrued.

## 10. SUBSEQUENT EVENT

### *Restructuring*

On September 27, 2018, the Board of Directors of the Company approved a reduction in its workforce to reduce expenses and align its operations with evolving business needs. Notifications to the affected employees began on October 24, 2018. The Company expects to incur total pre-tax cash restructuring charges, primarily relating to severance and transition assistance, of approximately \$1.2 million to \$2.3 million. The charges are expected to be expensed in the fourth quarter of 2018 and first quarter of 2019. The Company expects cash payments to be made in the fourth quarter of 2018 and into 2019.

## 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,” “believe,” “estimate,” “predict,” “potential,” “target” or “continue,” the negative effect of terms like these or other similar expressions. Any 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.

### Overview

We analyze our customers’ integrated circuit (“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 with 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

The logic foundry market at the leading edge nodes, such as 10nm and 7nm, is undergoing significant change. The leading foundry has increased market share as other foundries either suspended 7nm development or forecast a later start of mass production. This trend will likely negatively impact our future business on these nodes unless we are able to engage on our Integrated Yield Ramp with that leading foundry. For many foundries, utilization rates for 28nm fabs remain suppressed. We expect most logic foundries to invest in derivatives of older process nodes, such as 28nm and 20nm, 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 continuing to invest in leading edge nodes are expected to continue to invest in new technologies such as 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 semiconductors to continue for the next few years. In order for these trends to provide opportunities for us to increase our business in process control and electrical characterization, Chinese semiconductor manufacturers will need to increase their production volumes on advanced technology nodes.

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 power and cost per transistor. 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 these difficulties 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. In general, our customer contracts are noncancelable. 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 14 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.

During the third quarter of 2018, we were notified by a major customer that it was discontinuing the development and production of its 7nm technology node. This customer's decision will negatively impact our solutions and Gainshare performance incentives revenues for the 7nm technology node. We cannot assess the ultimate resolution of this noncancelable contract at the current time pending further discussion with the customer. We expect Gainshare performance incentives revenues related to this contract will not be recognized in the long-term as Gainshare performance incentives revenues are based on future production of the customer.

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.

## Financial Highlights

Financial highlights for the three months ended September 30, 2018 were summarized as follows:

- Total revenues were \$20.2 million, which was a decrease of \$6.3 million, or 24%, compared to the three months ended September 30, 2017. Design-to-silicon-yield solutions revenues were \$14.0 million, which was a decrease of \$5.3 million, or 27%, compared to the three months ended September 30, 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 software revenues. Gainshare performance incentives revenue was \$6.2 million, a decrease of \$1.1 million, or 14%, compared to the three months ended September 30, 2017. 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 performance incentives, sustained yield improvements by our customers, and our ability to enter into new Design-to-silicon-yield solutions contracts containing Gainshare performance incentives.
- Net loss was \$2.1 million for the three months ended September 30, 2018, compared to net income of \$0.6 million for the three months ended September 30, 2017. The decrease in net income was primarily attributable to 24% lower total revenue for the three months ended September 30, 2018 compared to the year-ago period.
- Net loss per basic and diluted share was \$(0.06) for the three months ended September 30, 2018, compared to net income per basic and diluted share of \$0.02, for the three months ended September 30, 2017, a decrease of \$0.08 per basic and diluted share.

Financial highlights for the nine months ended September 30, 2018, were as follows:

- Total revenues were \$66.1 million, which was a decrease of \$9.0 million, or 12%, compared to the nine months ended September 30, 2017. Design-to-silicon-yield solutions revenues were \$47.4 million, which was a decrease of \$8.0 million, or 14%, compared to the year-ago period. 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 software revenues. Gainshare performance incentives revenue was \$18.6 million, a decrease of \$1.0 million, or 6%, compared to the nine months ended September 30, 2017. The decrease in Gainshare performance incentives revenue was primarily due to lower incentives revenue from the 28nm nodes, partially offset by higher incentives revenue from the 14nm nodes.

- Gross margin for the nine months ended September 30, 2018, was 50%, compared to 53% for the nine months ended September 30, 2017.
- Net loss was \$4.6 million for the nine months ended September 30, 2018, compared to net income of \$1.3 million for the nine months ended September 30, 2017. The decrease in net income was primarily attributable to lower total revenue for the nine months ended September 30, 2018, compared to the year-ago period and a \$0.9 million decrease in income tax benefit primarily due to lower excess tax benefits related to employee stock compensation and the impact of the recently enacted U.S. Tax Cuts and Jobs Act, such as, a decrease in the maximum federal tax rate from 35% to 21%.
- Net loss per basic and diluted share was \$(0.14) for the nine months ended September 30, 2018, compared to net income per basic and diluted share of \$0.04, for the nine months ended September 30, 2017, a decrease of \$0.18 per basic and diluted share.

Cash, cash equivalents and investments decreased by \$4.5 million to \$96.8 million at September 30, 2018, from \$101.3 million at December 31, 2017, due primarily to cash used in investing activities related to the development of our Design-for-Inspection (“DFI”) solution and property and equipment purchased for the new office headquarters and cash used in financing activities primarily due to repurchases of our common stock, partially offset by cash generated from operating activities during the nine months period ended September 30, 2018.

### **Critical Accounting Estimates**

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 nine months ended September 30, 2018, to the items that we disclosed as our critical accounting estimates in our Critical Accounting Policies 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 condensed consolidated financial statements, which have been prepared in conformity with accounting principles generally accepted in the United States of America. Our preparation of these condensed 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.

**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 our 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).

## [Table of Contents](#)

On occasion, we include our products as a component of our 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 the 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 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 our Exensio software 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 the time of 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 (i) a service of standing ready to provide support, when-and-if needed, and (ii) 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 the time of 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 are 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 in accordance with customers' usage of intellectual property and recorded in the same period in which the usage occurs.

### **Income Taxes**

We are required to assess whether it is more-likely-than-not 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 financial reporting period are recorded through the income tax provision and could have a material impact on the condensed consolidated statements of operations. The valuation allowance was approximately \$9.4 million and \$9.1 million as of September 30, 2018 and December 31, 2017, respectively, which was related to California R&D tax credits and California net operating losses related to an 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 “more-likely-than-not” that we will realize the tax credits before applicable expiration dates, our tax provision will decrease 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 an income tax expense or benefit in the consolidated statements of operations. The Company intends to reinvest the earnings of its non-U.S. subsidiaries in those operations indefinitely. As such, the Company has not provided for any taxes on the earnings of foreign subsidiaries as of September 30, 2018. It is not practicable to determine the amount of the unrecognized tax liability at this time.

### **Recent Accounting Pronouncements and Accounting Changes**

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 statement.

**Results of Operations**
**Discussion of Financial Data for the Three and Nine Months Ended September 30, 2018 and 2017**
**Revenues**

(Dollars in thousands)	Three Months Ended September 30,			Nine Months Ended September 30,		
	2018	2017	Percent Change	2018	2017	Percent Change
Design-to-silicon-yield solutions	\$ 13,976	\$ 19,229	(27%)	\$ 47,431	\$ 55,426	(14%)
Gainshare performance incentives	6,237	7,288	(14%)	18,638	19,668	(5%)
Total revenues	<u>\$ 20,213</u>	<u>\$ 26,517</u>	(24%)	<u>\$ 66,069</u>	<u>\$ 75,094</u>	(12%)
<i>Design-to-silicon-yield solutions as a percentage of total revenues</i>	69%	73%		72%	74%	
<i>Gainshare performance incentives as a percentage of total revenues</i>	31%	27%		28%	26%	

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 for the three and nine months ended September 30, 2018, compared to the year-ago periods due primarily to the decrease in revenue from our yield ramp solutions due to lower hours worked across multiple contracts and customers, which was partially offset by increases in Exensio software 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, cancellations by existing 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 if any of our significant customers, who have entered into a time and materials contract, take advantage of certain contractual provisions that permit the suspension of contracted work for a period if their business experiences a financial hardship.

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 decreased \$1.1 million and \$1.0 million for the three months and nine months ended September 30, 2018, respectively, compared to the year-ago periods due primarily to lower gainshare performance incentives revenue from the 28nm nodes, partially offset by higher incentives revenue from the 14nm 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.

**Costs of Design-to-silicon-yield solutions**

(Dollars in thousands)	Three Months Ended September 30,			Nine Months Ended September 30,		
	2018	2017	Percent Change	2018	2017	Percent Change
Direct costs of Design-to-silicon-yield solutions	\$ 10,539	\$ 12,295	(14%)	\$ 32,651	\$ 34,913	(6%)
Amortization of acquired technology	144	136	6%	431	327	32%
Total costs of Design-to-silicon-yield solutions	<u>\$ 10,683</u>	<u>\$ 12,431</u>	(14%)	<u>\$ 33,082</u>	<u>\$ 35,240</u>	(6%)
<i>As a percentage of total revenues</i>	53%	47%		50%	47%	

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 decreased for the three months ended September 30, 2018, compared to the year-ago period primarily due to a \$1.7 million decrease in personnel-related cost driven by lower headcount and project costs. Amortization of acquired technology for the three months ended September 30, 2018, increased slightly due to the amortization of acquired technology from our acquisition of certain assets from Realtime Performance Europe B.V. (dba “Kinesys Software”). Direct costs of Design-to-silicon-yield solutions decreased for the nine months ended September 30, 2018, compared to the year-ago period due primarily to a \$2.1 million decrease in personnel-related cost driven by lower headcount. Amortization of acquired technology for the nine months ended September 30, 2018, slightly increased due to the amortization of acquired technology from our acquisition of certain assets from Kinesys Software.

**Research and Development**

(Dollars in thousands)	Three Months Ended September 30,			Nine Months Ended September 30,		
	2018	2017	Percent Change	2018	2017	Percent Change
Research and development	\$ 6,755	\$ 7,875	(14%)	\$ 21,100	\$ 22,432	(6%)
<i>As a percentage of total revenues</i>	33%	30%		32%	30%	

Research and development expenses consist primarily of personnel-related costs to support product development activities, including compensation and benefits, third-party development services, travel, facilities cost allocations, and stock-based compensation charges. Research and development expenses decreased for the three months ended September 30, 2018, compared to the year-ago period due primarily to a \$1.1 million decrease in personnel-related expense as a result of lower headcount. Research and development expenses decreased for the nine months ended September 30, 2018, compared to the year-ago period due primarily to a \$1.5 million decrease in personnel-related expense, partially offset by a \$0.3 million 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**

(Dollars in thousands)	Three Months Ended September 30,			Nine Months Ended September 30,		
	2018	2017	Percent Change	2018	2017	Percent Change
Selling, general and administrative	\$ 5,507	\$ 5,680	(3%)	\$ 17,801	\$ 17,775	0%
<i>As a percentage of total revenues</i>	27%	21%		27%	24%	

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 decreased for the three months ended September 30, 2018, compared to the year-ago period, primarily due to a \$0.2 million decrease in professional fees. Selling, general and administrative expenses were flat for the nine months ended September 30, 2018, compared to the year-ago period, primarily due to a \$0.1 million increase in personnel-related expense, partially offset by a \$0.1 million decrease in professional fees. 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**

(Dollars in thousands)	Three Months Ended September 30,			Nine Months Ended September 30,		
	2018	2017	Percent Change	2018	2017	Percent Change
Amortization of other acquired intangible assets	\$ 108	\$ 107	1%	\$ 326	\$ 291	12%

Amortization of other acquired intangible assets consists of amortization of intangibles acquired from business combinations. The increase in amortization of other acquired intangible assets for the nine months ended September 30, 2018, compared to the year-ago period, was primarily related to the amortization of other acquired intangible assets, which resulted from the acquisition of certain assets from Kinesys Software.

#### **Interest and Other Income (Expense), Net**

<b>(Dollars in thousands)</b>	<b>Three Months Ended September 30,</b>			<b>Nine Months Ended September 30,</b>		
	<b>2018</b>	<b>2017</b>	<b>Percent Change</b>	<b>2018</b>	<b>2017</b>	<b>Percent Change</b>
Interest and other income (expense), net	\$ 223	\$ (104)	314%	\$ 283	\$ (305)	193%

Interest and other income (expense), net increased for the three and nine months ended September 30, 2018, compared to the year-ago periods, primarily due to foreign exchange rate movements and an increase in interest income due to higher interest rates.

#### **Income Tax Provision (Benefit)**

<b>(Dollars in thousands)</b>	<b>Three Months Ended September 30,</b>			<b>Nine Months Ended September 30,</b>		
	<b>2018</b>	<b>2017</b>	<b>Percent Change</b>	<b>2018</b>	<b>2017</b>	<b>Percent Change</b>
Income tax benefit	\$ (535)	\$ (270)	98%	\$ (1,355)	\$ (2,246)	(40%)

Income tax benefit increased by \$0.3 million for the three months ended September 30, 2018, compared to the year-ago period, primarily due to higher pre-tax operating loss. Income tax benefit decreased by \$0.9 million for the nine months ended September 30, 2018, compared to the year-ago period, primarily due to lower excess tax benefits related to employee stock compensation and the impact of recently enacted U.S. tax reform, such as, a decrease in the maximum federal tax rate from 35% to 21% and GILTI.

#### **Liquidity and Capital Resources**

As of September 30, 2018, our working capital, defined as total current assets less total current liabilities, was \$139.8 million, compared to \$144.3 million as of December 31, 2017. Cash and cash equivalents were \$96.8 million as of September 30, 2018, compared to \$101.3 million as of December 31, 2017. As of September 30, 2018 and December 31, 2017, cash and cash equivalents held by our foreign subsidiaries were \$3.8 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.

<b>(In thousands)</b>	<b>Nine Months Ended September 30,</b>	
	<b>2018</b>	<b>2017</b>
Net cash flows provided by (used in):		
Operating activities	\$ 9,043	\$ 6,261
Investing activities	(8,747)	(10,783)
Financing activities	(4,658)	(11,687)
Effect of exchange rate changes on cash and cash equivalents	(117)	172
Net decrease in cash and cash equivalents	\$ (4,479)	\$ (16,037)

Our primary cash inflows and outflows for the nine months ended September 30, 2018, as compared to the nine months ended September 30, 2017, were as follows:

- During the nine months ended September 30, 2018, net cash provided by operating activities was \$9.0 million compared to \$6.3 million during the nine months ended September 30, 2017. The \$2.7 million increase in net cash from operating activities was driven primarily by \$8.2 million increase in the net change from operating assets and liabilities, which was partially offset by a \$5.9 million increase in net loss. The major contributors to the net change in operating assets and liabilities in the nine months ended September 30, 2018, were as follows:
  - Accounts receivable decreased by \$5.7 million due primarily to significant collections from one large customer.
  - Other noncurrent assets decreased by \$2.4 million due to billings to customers for unbilled receivables that had reached billing milestones.
  - Accrued compensation and related benefits decreased by \$1.4 million primarily due to bonus payout, vacation taken and ESPP purchases during the period.
  - Prepaid expenses and other current assets increased by \$3.4 million due to contract assets resulting from the effect of adopting Topic 606.

During the nine months ended September 30, 2018, net cash used in investing activities was \$8.7 million compared to \$10.8 million during the nine months ended September 30, 2017. For the nine months ended September 30, 2018, cash flows used in investing activities consisted of payments for capital expenditures which included purchases of test equipment, furniture and fixture and leasehold improvements for the new office headquarters. For the nine months ended September 30, 2017, cash flows used in investing activities primarily consisted of payments for capital expenditures, primarily test equipment and cash paid for acquisition of business.

During the nine months ended September 30, 2018, net cash used in financing activities was \$4.7 million compared to \$11.7 million during the nine months ended September 30, 2017. For the nine months ended September 30, 2018, cash flows used in financing activities consisted of \$5.2 million of cash used to repurchase shares of our common stock and \$1.7 million of cash payments for taxes related to net share settlement of equity awards, partially offset by \$2.3 million of proceeds from our Employee Stock Purchase Plan and the exercise of stock options. For the nine months ended September 30, 2017, cash flows used in financing activities consisted of \$13.4 million of cash used to repurchase shares of our common stock and \$2.4 million of cash payments for taxes related to net share settlement of equity awards, partially offset by \$4.2 million of proceeds from the exercise of stock options and from our Employee Stock Purchase Plan.

#### Off-Balance Sheet Agreements

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

#### Contractual Obligations

The following table summarizes our known contractual obligations (in thousands) as of September 30, 2018:

Contractual Obligations	Payments Due by Period						Total
	2018 (remaining three months)	2019	2020	2021	2022	2023 and thereafter	
Operating lease obligations (1)	\$ 357	\$ 1,659	\$ 1,813	\$ 1,654	\$ 1,483	\$ 4,799	\$ 11,765
Purchase obligations (2)	3,893	5,691	243	155	5	-	9,987
Total (3)	\$ 4,250	\$ 7,350	\$ 2,056	\$ 1,809	\$ 1,488	\$ 4,799	\$ 21,752

- (1) In April 2018, we entered into a new approximately 20,800 square foot lease, located in Santa Clara, California. The term of the new lease is ten years commencing on September 1, 2018. The total lease obligation over the new lease term is approximately \$7.3 million, less a lease abatement allowance of approximately \$0.4 million. The terms of the new lease include a tenant improvement allowance of \$1.5 million. Future minimum lease payments under the lease are included in the above table.
- (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 \$2.9 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**

We are exposed to three primary types of market risks: credit risk and counterparty risk, foreign currency exchange rate risk and interest rate 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 September 30, 2018, we had cash and cash equivalents of \$96.8 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 September 30, 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 Exchange Rate Risk.* Certain of our payables for our international offices are denominated in the local currency, including the Euro, Yen and Renminbi. 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 September 30, 2018, we had one outstanding forward contract with a notional amount of \$8.1 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**

#### **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 Securities and Exchange Act of 1934, as amended (the "Exchange Act") Rules 13a-15(e) and 15d-15(e) as of September 30, 2018, in connection with the filing of this Quarterly Report on Form 10-Q. Based on that evaluation as of September 30, 2018, our principal executive officer and principal financial and accounting officer concluded that our disclosure controls and procedures were effective to ensure that the 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.

#### **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 September 30, 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 September 30, 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, except as set forth below.

***We generate most of our revenues from a limited number of customers, and a large percentage of our revenues from a single customer, so decreased business with, or the loss of, any one of these customers, or pricing pressure, or customer consolidation could significantly reduce our revenue or margins, negatively impacting results of operations, and require us to accept lower margin business on future nodes.***

Historically, we have had a small number of large customers for our core Design-to-silicon-yield solutions and that contribute significant Gainshare performance incentives revenue. In the year ended December 31, 2017, one customer, GlobalFoundries, accounted for 40% of our revenues. We could lose a customer due to its decision not to engage us on future process nodes, its decision to reduce the scope of our services or technology used, which is permitted in certain of our contracts if the customer company’s business materially adversely changes, its decision not to develop its own future process node, or as a result of industry factors, including but not limited to consolidation. During the third quarter of 2018, we were notified by a major customer that it was discontinuing the development and production of its 7nm technology node. This customer’s decision will negatively impact our solutions and Gainshare performance incentives revenues on the 7nm technology node. We cannot assess the ultimate resolution of this noncancelable contract at the current time pending further discussion with the customer. We expect Gainshare performance incentives revenues related to this contract will not be recognized in the long-term as Gainshare performance incentives revenues are based on future production of the customer. Further, new business may be delayed if a key customer uses its leverage to push for terms that are worse for us and we nonetheless continue to negotiate for better terms, in which case Solutions revenue in any particular quarter or year may fail to meet expectations. Also, the loss of any of these customers or the failure to secure new contracts with these customers could further increase our reliance on our remaining customers. For example, in the first quarter of 2015, we recognized significant one-time revenue associated with closing two contracts with one of our then-largest customers that we were unable to close on the expected schedule. Further, if any of our key customers default, declare bankruptcy or otherwise delay or fail to pay amounts owed, or we otherwise have a dispute with any of these customers, our results of operations would be negatively affected in the short term and possibly the long term. These customers may seek to renegotiate pre-existing contractual commitments due to adverse changes in their own businesses or, in some cases, take advantage of contractual provisions that permit the suspension of contracted work for some period if their business experiences a financial hardship, which would harm our operating results. In particular, these events could cause significant fluctuations in results of operations because our expenses are fixed in the short term and it takes us a long time to replace customers or reassign resources.

**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 September 30, 2018 (in thousands except per share amounts):

**ISSUER PURCHASES OF EQUITY SECURITIES**

Period	Total Number of Shares Purchased (in thousands) (1)	Average Price Paid Per Share	Total Number of Shares Purchased as Part of Publicly Announced Programs (in thousands) (1)	Approximate Dollar Value of Shares that May Yet Be Purchased Under Programs (in thousands) (1)
July 1, 2018 - July 31, 2018	-	\$ -	-	
August 1, 2018 - August 31, 2018	-	\$ -	-	
September 1, 2018 - September 30, 2018	-	\$ -	-	\$ 25,000
Total	-	\$ -	-	\$ 25,000

(1) On May 29, 2018, the Board of Directors adopted a new 2018 program to repurchase up to \$25.0 million of common stock both on the open market and in privately negotiated transactions, from time to time, over the next two years. Under the 2018 program, \$25.0 million of common stock remained available for future repurchases.

**Item 3. Defaults Upon Senior Securities**

None.

**Item 4. Mine Safety Disclosures**

None.

**Item 5. Other Information**

None.

**Item 6. Exhibits**

Exhibit Number	Description
10.01	<a href="#">Employment offer to Christine A. Russell, dated July 31, 2018.</a>
31.01	<a href="#">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.</a>
31.02	<a href="#">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.</a>
32.01	<a href="#">Certification pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.</a>
32.02	<a href="#">Certification pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.</a>
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.

**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: November 8, 2018

By: /s/ JOHN K. KIBARIAN  
John K. Kibarian  
President and Chief Executive Officer  
(Principal executive officer)

Date: November 8, 2018

By: /s/ CHRISTINE A. RUSSELL  
Christine A. Russell  
Chief Financial Officer  
(Principal financial and accounting officer)



PDF Solutions, Inc.

333 West San Carlos Street, Suite 1000  
San Jose, California 95110 USA

June 27, 2018

Christine Russell

VIA EMAIL: Christine.Russell@comcast.net

**Re: Employment Offer**

Dear Christine,

On behalf of PDF Solutions, Inc. (the "**Company**"), I am pleased to extend to you this offer of full-time employment. Your initial position will be that of **Vice President, Finance**, reporting to me. Subject to appointment by PDF's Board of Directors at a date thereafter to be decided in the Company's discretion, it is the Company's intention that your position will also be that of **Chief Financial Officer**. You will be based in our San Jose area office, currently at 333 W. San Carlos Street, Suite 1000, San Jose, CA 95110. This offer of employment with PDF is conditioned upon your acceptance, in writing, of the terms and conditions as enumerated below.

1. **Compensation.** Commencing on your Start Date (as defined below), you shall be paid a base salary of **THREE HUNDRED THIRTY THOUSAND** U.S. dollars (**\$330,000**) per annum, paid to you semi-monthly at the rate of **\$13,750** per payroll period. Your salary shall be paid in accordance with the Company's standard payroll policies (subject to applicable withholding taxes as required by law). Your salary will be reviewed by the Compensation Committee each year and adjusted in their discretion, if at all.
  2. **Pay for Performance Compensation Program ("PPCP").** Named Executive Officer ("NEOs") are eligible to participate in our Company-sponsored Pay for Performance Compensation Program of which the structure of such plans and the amount of any bonus awarded under such plans is defined and governed by the Compensation Committee of the Board of Directors (and subject to change based on Compensation Committee approval). The pay-for-performance component of our executive compensation program as it applies to the calendar year period as the performance period under the PPCP, will be based on specific goals set by the Compensation Committee, which currently include revenue and non-GAAP profitability. Currently as outlined in the program, 50% of each eligible participant's total annual cash incentive bonus opportunity and 50% of each eligible participant's total annual equity opportunity will be subject to achievement of the goals under the PPCP (the remaining percentage of total annual cash incentive bonus opportunity is provided via the Company's Annual Discretionary Incentive Bonuses program described in Section 3 and the remaining percentage of total annual equity opportunity is provided via the Company-sponsored Annual Discretionary Long-Term Equity Incentive Awards program described in Section 4). All cash incentive bonus payouts are conditioned on you being an employee at the time of such payment and are subject to applicable withholding taxes as required by law.
  3. **Annual Discretionary Incentive Bonuses.** NEO's are eligible to participate in our Company-sponsored Annual Discretionary Incentive Bonuses program. The percentage of each eligible participant's total annual cash incentive bonus opportunity that is not subject to the PPCP (the "Discretionary Bonus") will be based on achieving performance objectives as determined by the Compensation Committee. All Annual Discretionary Incentive Bonuses program payouts are conditioned on you being an employee at the time of such payment and are subject to applicable withholding taxes as required by law.
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However, in any case, your guaranteed minimum cash bonus for the 2018 calendar year is **EIGHTY TWO THOUSAND FIVE HUNDRED U.S. dollars (\$82,500) prorated**, which will be paid in 2019 when other NEOs' 2018 bonuses are paid and, in any event, no later than March 15, 2019.

4. **Annual Discretionary Long-Term Equity Incentive Awards.** NEOs are eligible to participate in our Company-sponsored Annual Discretionary Long-Term Equity Incentive Awards program. The percentage of each eligible participant's total annual equity opportunity that is not subject to the PPCP (the "Discretionary Equity Award") will be based on achieving performance objectives as determined by the Compensation Committee of the Board of Directors and granted with the Company-wide merit/refresh awards in the Compensation Committee's discretion, which is typically around May – June each year.
  5. **Stock Options.** As soon as practicable following the commencement of your employment, and subject to approval of the Compensation Committee of the grant, you will be awarded an option to purchase **80,000 shares** (the "**Total Option Shares**") of the Company's Common Stock with an exercise price equal to the fair market value of the Common Stock on the effective date of grant (the effective date of grant and Vesting Start dates are generally the first day of the month following approval). Such option shall vest over a four year period commencing on the Vesting Start date, according to the following vesting schedule: 1/4th of the Total Option Shares shall vest and become exercisable on the one (1) year anniversary of the Vesting Start Date and thereafter 1/48th of Total Option Shares shall vest and become exercisable on the same day of the month as the Vesting Start Date of each month thereafter until fully vested, subject to your continued service through each applicable vesting date. The options will be non-qualified options and will be subject to the terms of the Company's 2011 Stock Plan (as amended and restated) and execution of an applicable Stock Option Agreement to be entered into between you and the Company.
  6. **Restricted Stock Units.** As soon as practicable following the commencement of your employment, and subject to approval of the Compensation Committee of the grant, you will be awarded a restricted stock unit ("RSU") for **80,000 shares** (the "**Total RSUs**") of the Company's Common Stock. This award is subject to the terms of the Company's 2011 Stock Plan (as amended and restated). Such RSUs are generally granted and start vesting (the "RSU Vesting Start Date") on the first day of the month following the month the award is approved according to the following vesting schedule: 25% of Total RSUs shall vest (and shares will be issued) on the one (1) year anniversary of the RSU Vesting Start Date and thereafter 12.5% of the Total RSUs shall vest (and shares will be issued) every six (6) months thereafter until fully vested, subject to your continued service through each applicable vesting date.
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7. **Start Date.** This offer is contingent upon the satisfactory completion of reference/background checks. Subject to fulfillment of any conditions imposed by this letter agreement, you will commence your new position with the Company on a date to be determined and agreed upon with the Company. Your "Anticipated Start Date" is currently expected by the Company to be **July 16, 2018**. The date you actually start working at the Company is referred to as your "**Start Date**."
  8. **General Duties.** During the term of your employment, you agree that at all times and to the best of your ability you will loyally and conscientiously perform all of the duties and obligations required of you in your job and by the Company. You further agree that you will not render commercial or professional services of any nature to any person or organization, whether or not for compensation, without the prior written consent of the Company, and that you will not directly or indirectly engage in or participate in any business that is competitive in any manner with the business of the Company. You also agree to comply with any and all policies of the Company as in effect from time to time.
  9. **Proof of Right to Work.** In compliance with federal immigration laws, you will be required to provide to the Company documentary evidence of your identity and eligibility for employment in the United States. Such documentation must be provided within three (3) business days of your Start Date. Your failure to meet this condition could result in termination of your employment with the Company.
  10. **Benefits.** Effective on the first day of the month following your Start Date, the Company will make available to you the regular health insurance program and other benefits as established by the Company for its employees from time to time.
  11. **Change of Control.** In the event that the Company undergoes a Change in Control (as defined below) after the first (1<sup>st</sup>) anniversary of your Start Date and, at any time over the next twelve (12) months after consummation of such Change of Control, your employment is terminated without Cause or as a result of your Disability (as such terms are defined below), then following your Separation and upon meeting the Separation Conditions (as such terms are defined below) you will be entitled to all of the following:
    - (i) vesting acceleration of your then outstanding and unvested stock options and RSUs as if you provided continuous service to the Company for an additional twelve (12) months after your Separation Date, effective as of the Release Deadline Date;
    - (ii) severance equal to twelve (12) months of your then-current annual base salary, paid in accordance with the Company's standard payroll procedures over a twelve-month period, with the first payment commencing on the Company's first regular payroll date following the Release Deadline Date (as defined below) (subject to applicable withholding taxes required by law); provided that the first payment shall be equal to the number of business days between the Separation Date and the date of the first payment multiplied by your daily base salary rate;
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- (iii) severance equal to one hundred percent (100%) of the PPCP annual cash incentive bonus and Annual Discretionary Incentive Bonus paid to you for the immediately preceding performance period, which will be paid in a single lump sum payment on the Company's first regular payroll date following the Release Deadline Date (subject to applicable withholding taxes required by law); and,
- (iv) the Company's portion of the health insurance premium paid just prior to termination to supplement your COBRA coverage from the last date on which you receive health care coverage as a Company employee until the earlier of: (1) the date the Company has paid for twelve (12) months of COBRA premiums; or (2) the date you become eligible to be covered under another employer's health coverage plan, with the first of such premium payments made when due immediately following the date on which you have made your COBRA election, which you will elect within sixty (60) days following your Separation Date; provided that the Company shall treat any payment of COBRA premiums as taxable to the extent required to avoid adverse consequences to you or the Company under either Section 105(h) of the Internal Revenue Code of 1986, as amended (the "Code") or the Patient Protection and Affordable Care Act of 2010.

In the event the Change of Control referenced above occurs *before* the first (1<sup>st</sup>) anniversary of your Start Date and, at any time over the next twelve (12) months after consummation of such Change of Control, your employment is terminated without Cause or as a result of your Disability, then following your Separation and upon meeting the Separation Conditions (defined below) you will be entitled to:

- (v) vesting acceleration with respect to fifty percent (50%) of your then outstanding and unvested Total Option Shares and Total RSUs, effective as of the Release Deadline Date.

12. **Termination without Cause or Disability.** In the event of the Company terminates your employment at any time without Cause or as a result of your Disability and a Separation occurs, then subject to the Separation Conditions, you will be entitled to all of the following:

- (i) vesting acceleration of your then outstanding and unvested stock options and RSUs as if you provided continuous service to the Company for an additional six (6) months after your Separation Date, effective as of the Release Deadline Date;
  - (ii) severance equal to six (6) months of your then-current annual base salary, paid in accordance with the Company's standard payroll procedures over a six-month period, with the first payment commencing on the Company's first regular payroll date following the Release Deadline Date (subject to applicable withholding taxes required by law); provided that the first payment shall be equal to the number of business days between the Separation Date and the date of the first payment multiplied by your daily base salary rate;
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- (iii) severance equal to fifty percent (50%) of the PPCP annual cash incentive bonus and Annual Discretionary Incentive Bonus paid to you for the immediately preceding performance period, which will be paid in a single lump sum payment on the Company's first regular payroll date following the Release Deadline Date (subject to applicable withholding taxes required by law) ; and,
- (iv) the Company's portion of the health insurance premium paid just prior to termination to supplement your COBRA coverage from the last date on which you receive health care coverage as a Company employee until the earlier of: (1) the date the Company has paid for six (6) months of COBRA premiums; or (2) the date you become eligible to be covered under another employer's health coverage plan, with the first of such premium payments made when due immediately following the date on which you have made your COBRA election, which you will elect within sixty (60) days following your Separation Date; provided that the Company shall treat any payment of COBRA premiums as taxable to the extent required to avoid adverse consequences to you or the Company under either Code Section 105(h) or the Patient Protection and Affordable Care Act of 2010.

13. **Definitions.** As used in this letter:

- (a) "Cause" means (i) your unauthorized use or disclosure of the Company's confidential information or trade secrets; (b) your material breach of any agreement between you and the Company, which remains uncured by you more than five (5) days from the date of your receipt of written notice of such material breach from the Company; (c) your repeated or material failure to comply with the Company's written policies or rules, including without limitation the Company's Code of Ethics, and including actions or omissions for which the Company undergoes more than one formal investigation for potential violations; (d) your conviction of, or your plea of "guilty" or "no contest" to, a felony under the laws of the United States or any State; (e) your gross negligence or willful misconduct; (f) your continuing failure to perform or initiating performance of assigned duties for which there is no reasonable basis for you disputing and/or failing to so perform for ten (10) days after receiving written notification of the failure from the Board of Directors; or, (g) your failure to cooperate in good faith with a governmental or internal investigation of the Company or its directors, officers or employees, if the Company has requested your cooperation.
  - (b) "Change of Control" means a change in ownership or control of the Company effected through a merger, consolidation or acquisition by any person or related group of persons (other than an acquisition by the Company or by a Company-sponsored employee benefit plan or by a person or persons that directly or indirectly controls, is controlled by, or is under common control with, the Company) of beneficial ownership (within the meaning of Rule 13d-3 of the Securities Exchange Act of 1934) of securities possessing more than fifty percent (50%) of the total combined voting power of the outstanding securities of the Company.
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- (c) "Disability" means your inability to perform the essential functions of your position, with reasonable accommodation, for a period of one hundred and twenty (120) consecutive days because of your physical or mental impairment, provided your disability also qualifies as a "disability" as defined in the regulations under Section 409A (as defined below).
  - (d) "Release" means the Company's standard general release of all claims that you may have against the Company or persons affiliated with the Company, subject to good-faith negotiation between you and the Company.
  - (e) "Separation" means a "separation from service," as defined in the regulations under Section 409A.
  - (f) "Separation Conditions" means you have (i) returned all Company property in your possession promptly after your Separation Date and, in any event, no later than ten (10) days after your Separation Date; and, (ii) executed the Release, and not revoked it through any deadline applicable to such revocation, such that the Release is effective within sixty (60) days after your Separation Date (the "Release Deadline Date"). The foregoing condition in subsection (ii) is contingent on the Company delivering the form of release to you within two (2) days after your Separation Date.
  - (g) "Separation Date" means the date that the termination or resignation of your employment becomes an effective Separation.
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14. **Tax Considerations.** For purposes of Code Section 409A, the regulations and other guidance there under and any state law of similar effect (collectively "Section 409A"), each payment that is paid, and benefit that is provided, pursuant to this agreement is hereby designated as a separate payment. The parties intend that all payments made or to be made, and benefits provided or to be provided, under this agreement comply with, or are exempt from, the requirements of Section 409A so that none of the payments or benefits will be subject to the adverse tax penalties imposed under Section 409A, and any ambiguities herein will be interpreted to so comply or be so exempt. Specifically, any severance payments or benefits made in connection with your Separation under this agreement and paid or provided on or before the fifteenth (15<sup>th</sup>) day of the third (3<sup>rd</sup>) month following the end of your first (1<sup>st</sup>) tax year in which your Separation occurs or, if later, the fifteenth (15<sup>th</sup>) day of the third (3<sup>rd</sup>) month following the end of the Company's first (1<sup>st</sup>) tax year in which your Separation occurs, shall be exempt from Section 409A to the maximum extent permitted pursuant to Treasury Regulation Section 1.409A-1(b)(4) and any additional severance payments and benefits provided in connection with any Separation are intended to be exempt from Section 409A pursuant to Treasury Regulation Section 1.409A-1(b)(9)(iii). Notwithstanding anything set forth herein, to the extent that the severance payments and/or benefits provided in this letter do not qualify for any reason to be exempt from Section 409A pursuant to Treasury Regulation Section 1.409A-1(b)(4), Treasury Regulation Section 1.409A-1(b)(9)(iii), or any other applicable exemption, as described herein, and as reasonably determined by the Company, and the Company determines that you are a "specified employee" under Section 409A(a)(2)(B)(i) of the Code at the time of the Separation, then, to the extent required by Section 409A, all payments and benefits that otherwise would have been paid or provided during the first six (6) months after the effective date of the Separation will be paid in a lump sum or provided on the first (1<sup>st</sup>) day of the seventh (7<sup>th</sup>) month after the Separation.

You are encouraged to obtain your own tax advice regarding your compensation from the Company. You agree that the Company does not have a duty to design its compensation policies in a manner that minimizes your tax liabilities, and you will not make any claim against the Company or its Board of Directors related to tax liabilities arising from your compensation or any severance paid hereunder.

15. **Confidential Information and Invention Assignment Agreement.** Your acceptance of this offer and commencement of employment with the Company is contingent upon your execution of the Company's Confidential Information and Invention Assignment Agreement (the "**Confidentiality Agreement**"), a copy of which is enclosed for your review. An executed copy of the Confidentiality Agreement must be delivered to the PDF Human Resources Department on or before your Start Date. The Confidentiality Agreement relates to confidential information received in regards to the Company's business, technology, and intellectual property, as well as information about the Company's customers. The Confidentiality Agreement also addresses the Company's ownership of intellectual property generated during your employment at the Company. You are required, to the best of your ability, to hold such information as confidential even after an event terminating your employment with the Company.
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16. **Arbitration.** Any dispute, claim or controversy between you as Employee and PDF Solutions as Employer arising out of or relating to (i) our employment relationship or any of the events or circumstances leading up to your employment with PDF Solutions including, without limitation, your interview process and all negotiations relating to your employment with PDF Solutions and the execution of this agreement; and/or (ii) this agreement or any of its provisions, or the breach, termination, enforcement, interpretation or validity thereof, shall be subject to and resolved exclusively by arbitration before a single arbitrator in accordance with the National Rules for the Resolution of Employment Disputes, also called the "Employment Arbitration Rules and Mediation Procedures"(the "Rules") of the American Arbitration Association (the "AAA"), a copy of which can be found as of the date of this letter at the following internet website: <https://www.adr.org/sites/default/files/Commercial%20Rules.pdf> Such Rules of the AAA in effect at the time of your accepting this offer of employment and entering this agreement by that acceptance are to be used, provided that they remain applicable and do not contravene applicable law at the time of any actual arbitration. The single arbitrator will be selected by the AAA pursuant to its Rules. The decision of the arbitrator and any arbitration award shall be final, binding, non-appealable and conclusive on and as to the parties thereto. No recourse may be made to any court except solely to enforce a final award in a court of competent jurisdiction. California law, without regard to conflict of law principles or the choice of law provisions of other states, applies to this agreement to arbitrate, as well as exclusively to all other matters regarding your employment or arising respecting it at any time, except to the extent that the Federal Arbitration Act (FAA) and federal law regarding arbitration is applicable, in which case as to those issues, federal law governs. In this regard, it is acknowledged that the employee's employment is specifically understood to "involve commerce" and that the FAA governs and applies in those circumstances. The provisions of this offer letter, specifically including the agreement to arbitrate, are the product of arm's length negotiations with you and they are agreed to and are entered after due consideration and voluntarily with the intention to be bound by them, including the agreement to arbitrate, and it is agreed and acknowledged that this is an individually negotiated agreement and plan, not an employer-promulgated plan, and that you have been given the opportunity to have this agreement, including the provision for arbitration, reviewed prior to our signing by counsel of your own choice and at your sole expense.
17. **At-Will Employment and Other Conditions.** Your employment will be at-will, meaning that you or PDF may terminate the employment relationship at any time, with or without cause, with or without notice ("At-Will"). This offer is contingent upon: (i) receiving satisfactory references from former employers, (ii) Satisfactory completion of a background investigation, (iii) Verification of your right to work in the United States, as demonstrated by your completion of the I-9 form upon hire and your submission of acceptable documentation (as noted on the I-9 form) verifying your identity and work authorization within three days of starting employment. (iv) Your execution of PDF's Agreements and Policies as enclosed, that need to be executed prior to commencing work and (v) PDF's receiving verification that you hold the following qualification(s) as listed in your resume. Your failure to meet these conditions individually or collectively could result in termination of your employment with the Company.
18. **Severability; Electronic Signature.** If any provision of this offer is determined to be invalid or unenforceable, the remainder shall be unaffected and shall be enforceable. This offer may be executed by one or both parties electronically, and in counterparts, each of which shall be deemed an original and all of which together shall be deemed one and the same original agreement.
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We are all delighted to be able to extend you this offer and look forward to working with you. Should you have any additional questions, please reach out to Pamela Fong at 408-938-4462 or by email at the address listed below. To indicate your acceptance of this offer, please sign and date this letter in the space provided below and return a scanned copy to Pamela by email to [pamela.fong@pdf.com](mailto:pamela.fong@pdf.com).

**THIS OFFER EXPIRES ON July 9, 2018 at 5:00 PM.**

Sincerely,

PDF SOLUTIONS, INC.

/s/ John K. Kibarian

John K. Kibarian  
Chief Executive Officer and President

**ACKNOWLEDGMENTS & ACCEPTANCE**

I accept this employment offer with the understanding that it is not a contract for a fixed term or specified period of time. I understand that my employment is voluntary, (“**At Will**”), and can be terminated either by me or by the company at any time, with or without notice and with or without cause. The provisions stated above supersede all prior representations or agreements, whether written or oral. This offer letter may not be modified or amended except by a written agreement, signed by the Company and me.

***THE FOREGOING TERMS AND CONDITIONS ARE HEREBY AGREED TO AND ACCEPTED:***

Signed: /s/ Christine Russell

Name: Christine Russell Date: Jul 6, 2018

## CERTIFICATIONS

I, John K. Kibarian, certify that:

1. I have reviewed this quarterly report on Form 10-Q of PDF Solutions, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

(d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of registrant's board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

By: /s/ JOHN K. KIBARIAN

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John K. Kibarian  
*President and Chief Executive Officer*  
*(principal executive officer)*

Date: November 8, 2018

## CERTIFICATIONS

I, Christine A. Russell, certify that:

1. I have reviewed this quarterly report on Form 10-Q of PDF Solutions, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

(d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of registrant's board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

By: /s/ CHRISTINE A. RUSSELL

Christine A. Russell

Chief Financial Officer

(principal financial and accounting officer)

Date: November 8, 2018

**CERTIFICATION PURSUANT TO  
18 U.S.C. SECTION 1350,  
AS ADOPTED PURSUANT TO  
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the Quarterly Report of PDF Solutions, Inc. (the "Company") on Form 10-Q for the quarter ended September 30, 2018, as filed with the Securities and Exchange Commission on November 8, 2018 (the "Report"), I, John K. Kibarian, President and Chief Executive Officer of the Company, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to my knowledge:

- (1) The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2) The information contained in the Report fairly presents, in all material respects, the financial condition and result of operations of the Company.

By: /s/ JOHN K. KIBARIAN  
John K. Kibarian  
*President and Chief Executive Officer*  
*(principal executive officer)*

Date: November 8, 2018

**CERTIFICATION PURSUANT TO  
18 U.S.C. SECTION 1350,  
AS ADOPTED PURSUANT TO  
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the Quarterly Report of PDF Solutions, Inc. (the "Company") on Form 10-Q for the quarter ended September 30, 2018 as filed with the Securities and Exchange Commission on November 8, 2018 (the "Report"), I, Christine A. Russell, Chief Financial Officer, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to my knowledge:

- (1) The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2) The information contained in the Report fairly presents, in all material respects, the financial condition and result of operations of the Company.

By: /s/ CHRISTINE A. RUSSELL  
Christine A. Russell  
*Chief Financial Officer*  
*(principal financial and accounting officer)*

Date: November 8, 2018