UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, DC 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, 2019

OR

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

COMMISSION FILE NUMBER: 1-12691

ION GEOPHYSICAL CORPORATION

(EXACT NAME OF REGISTRANT AS SPECIFIED IN ITS CHARTER)

DELAWARE	**22-2286646**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**
2105 CityWest Blvd. Suite 100 Houston, Texas	**77042-2839**
(Address of principal executive offices)	**(Zip Code)**

REGISTRANT'S TELEPHONE NUMBER, INCLUDING AREA CODE: (281) 933-3339

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

Title of each class	Trading symbol(s)	Name of each exchange on which registered
Common Stock, $0.01 par value	**IO**	**New York Stock Exchange**

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

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

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

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

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

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

At October 28, 2019, there were 14,201,650 shares of common stock, par value $0.01 per share, outstanding.

ION GEOPHYSICAL CORPORATION AND SUBSIDIARIES
TABLE OF CONTENTS FOR FORM 10-Q
FOR THE QUARTER ENDED SEPTEMBER 30, 2019

PART I. FINANCIAL INFORMATION
Item 1. *Financial Statements*

ION GEOPHYSICAL CORPORATION AND SUBSIDIARIES
CONDENSED CONSOLIDATED BALANCE SHEETS
(UNAUDITED)

	September 30, 2019	December 31, 2018
	(In thousands, except share data)	
ASSETS		
Current assets:		
Cash and cash equivalents	$ 27,894	$ 33,551
Accounts receivable, net	23,832	26,128
Unbilled receivables	30,990	44,032
Inventories, net	12,934	14,130
Prepaid expenses and other current assets	6,626	7,782
Total current assets	102,276	125,623
Deferred income tax asset, net	8,435	7,191
Property, plant and equipment, net	12,903	13,041
Multi-client data library, net	69,723	73,544
Goodwill	22,276	22,915
Right-of-use assets	37,155	47,803
Other assets	2,222	2,435
Total assets	$ 254,990	$ 292,552
LIABILITIES AND (DEFICIT) EQUITY		
Current liabilities:		
Current maturities of long-term debt	$ 1,110	$ 2,228
Accounts payable	43,565	34,913
Accrued expenses	42,807	31,411
Accrued multi-client data library royalties	17,514	29,256
Deferred revenue	5,310	7,710
Current maturities of operating lease liabilities	11,648	12,214
Total current liabilities	121,954	117,732
Long-term debt, net of current maturities	119,402	119,513
Operating lease liabilities, net of current maturities	35,214	45,592
Other long-term liabilities	1,526	1,891
Total liabilities	278,096	284,728
(Deficit) Equity:		
Common stock, $0.01 par value; authorized 26,666,667 shares; outstanding 14,201,650 and 14,015,615 shares at September 30, 2019 and December 31, 2018, respectively.	142	140
Additional paid-in capital	955,705	952,626
Accumulated deficit	(959,797)	(926,092)
Accumulated other comprehensive loss	(21,440)	(20,442)
Total stockholders' (deficit) equity	(25,390)	6,232
Noncontrolling interest	2,284	1,592
Total (deficit) equity	(23,106)	7,824
Total liabilities and (deficit) equity	$ 254,990	$ 292,552

See accompanying Footnotes to Condensed Consolidated Financial Statements.

ION GEOPHYSICAL CORPORATION AND SUBSIDIARIES
CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS
(UNAUDITED)

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
	(In thousands, except per share data)			
Service revenues	$ 41,990	$ 37,105	$ 100,525	$ 77,943
Product revenues	11,249	10,095	31,445	27,508
Total net revenues	53,239	47,200	131,970	105,451
Cost of services	22,690	25,924	61,931	70,286
Cost of products	5,261	4,801	15,256	13,354
Gross profit	25,288	16,475	54,783	21,811
Operating expenses:				
Research, development and engineering	4,878	5,030	15,421	13,544
Marketing and sales	5,591	5,209	17,444	16,314
General, administrative and other operating expenses	10,961	8,688	36,550	29,564
Total operating expenses	21,430	18,927	69,415	59,422
Income (loss) from operations	3,858	(2,452)	(14,632)	(37,611)
Interest expense, net	(3,155)	(3,022)	(9,378)	(9,769)
Other income (expense), net	(242)	91	(938)	(616)
Income (loss) before income taxes	461	(5,383)	(24,948)	(47,996)
Income tax expense	3,790	2,079	7,916	3,305
Net loss	(3,329)	(7,462)	(32,864)	(51,301)
Less: Net income attributable to noncontrolling interest	(394)	(74)	(841)	(527)
Net loss attributable to ION	$ (3,723)	$ (7,536)	$ (33,705)	$ (51,828)
Net loss per share:				
Basic	$ (0.26)	$ (0.54)	$ (2.39)	$ (3.81)
Diluted	$ (0.26)	$ (0.54)	$ (2.39)	$ (3.81)
Weighted average number of common shares outstanding:				
Basic	14,181	14,003	14,104	13,586
Diluted	14,181	14,003	14,104	13,586

See accompanying Footnotes to Condensed Consolidated Financial Statements.

ION GEOPHYSICAL CORPORATION AND SUBSIDIARIES
CONDENSED CONSOLIDATED STATEMENTS OF COMPREHENSIVE LOSS
(UNAUDITED)

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
	(In thousands)			
Net loss	$ (3,329)	$ (7,462)	$ (32,864)	$ (51,301)
Other comprehensive loss, net of taxes, as appropriate:				
Foreign currency translation adjustments	(1,028)	43	(998)	(712)
Comprehensive net loss	(4,357)	(7,419)	(33,862)	(52,013)
Comprehensive income attributable to noncontrolling interest	(394)	(74)	(841)	(527)
Comprehensive net loss attributable to ION	$ (4,751)	$ (7,493)	$ (34,703)	$ (52,540)

See accompanying Footnotes to Condensed Consolidated Financial Statements.

ION GEOPHYSICAL CORPORATION AND SUBSIDIARIES
CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS
(UNAUDITED)

	Nine Months Ended September 30,	
	2019	2018
	(In thousands)	
Cash flows from operating activities:		
Net loss	$ (32,864)	$ (51,301)
Adjustments to reconcile net loss to cash provided by (used in) operating activities:		
Depreciation and amortization (other than multi-client data library)	2,903	6,902
Amortization of multi-client data library	29,787	32,544
Stock-based compensation expense	3,736	2,508
Deferred income taxes	(1,248)	(2,310)
Changes in operating assets and liabilities:		
Accounts receivable	2,115	(4,383)
Unbilled receivables	12,772	13,156
Inventories	729	(646)
Accounts payable, accrued expenses and accrued royalties	1,528	(9,567)
Deferred revenue	(2,398)	1,479
Other assets and liabilities	2,244	4,294
Net cash provided by (used in) operating activities	19,304	(7,324)
Cash flows from investing activities:		
Investment in multi-client data library	(21,225)	(19,911)
Purchase of property, plant and equipment	(1,272)	(313)
Net cash used in investing activities	(22,497)	(20,224)
Cash flows from financing activities:		
Payments under revolving line of credit	(15,000)	(10,000)
Borrowings under revolving line of credit	15,000	—
Payments on notes payable and long-term debt	(1,960)	(30,071)
Net proceeds from issuance of stock	—	46,999
Dividend payment to noncontrolling interest	—	(200)
Other financing activities	(655)	(1,489)
Net cash (used in) provided by financing activities	(2,615)	5,239
Effect of change in foreign currency exchange rates on cash, cash equivalents and restricted cash	151	296
Net decrease in cash, cash equivalents and restricted cash	(5,657)	(22,013)
Cash, cash equivalents and restricted cash at beginning of period	33,854	52,419
Cash, cash equivalents and restricted cash at end of period	$ 28,197	$ 30,406

The following table is a reconciliation of cash, cash equivalents, and restricted cash to the condensed consolidated balance sheets:

	September 30,	
	2019	2018
	(In thousands)	
Cash and cash equivalents	$ 27,894	$ 30,043
Restricted cash included in prepaid expenses and other current assets	303	60
Restricted cash included in other long-term assets	—	303
Total cash, cash equivalents, and restricted cash shown in statements of cash flows	$ 28,197	$ 30,406

See accompanying Footnotes to Condensed Consolidated Financial Statements.

ION GEOPHYSICAL CORPORATION AND SUBSIDIARIES
CONDENSED CONSOLIDATED STATEMENTS OF STOCKHOLDERS' (DEFICIT) EQUITY
(UNAUDITED)

Three Months Ended September 30, 2019

(In thousands, except shares)	Common Stock Shares	Common Stock Amount	Additional Paid-In Capital	Accumulated Deficit	Accumulated Other Comprehensive Loss	Noncontrolling Interests	Total Equity (Deficit)
Balance at July 1, 2019	14,171,561	$ 142	$ 954,904	$ (956,074)	$ (20,412)	$ 2,059	$ (19,381)
Comprehensive income (loss):							
Net (loss) income	—	—	—	(3,723)		394	(3,329)
Translation adjustments	—	—	—		(1,028)	(169)	(1,197)
Stock-based compensation expense	—	—	905	—	—	—	905
Exercise of stock options	58,400	—	26	—	—	—	26
Vesting of restricted stock units/awards	1,066	—	—	—	—	—	—
Vested restricted stock cancelled for employee minimum income taxes	(29,377)	—	(130)	—	—	—	(130)
Balance at September 30, 2019	14,201,650	$ 142	$ 955,705	$ (959,797)	$ (21,440)	$ 2,284	$ (23,106)

Nine Months Ended September 30, 2019

(In thousands, except shares)	Common Stock Shares	Common Stock Amount	Additional Paid-In Capital	Accumulated Deficit	Accumulated Other Comprehensive Loss	Noncontrolling Interests	Total Equity (Deficit)
Balance at January 1, 2019	14,015,615	$ 140	$ 952,626	$ (926,092)	$ (20,442)	$ 1,592	$ 7,824
Comprehensive income (loss):							
Net (loss) income	—	—	—	(33,705)	—	841	(32,864)
Translation adjustments	—	—	—	—	(998)	(149)	(1,147)
Stock-based compensation expense	—	—	3,736	—	—	—	3,736
Exercise of stock options	82,900	1	102	—	—	—	103
Vesting of restricted stock units/awards	202,697	2	(2)	—	—	—	—
Vested restricted stock cancelled for employee minimum income taxes	(99,562)	(1)	(757)	—	—	—	(758)
Balance at September 30, 2019	14,201,650	$ 142	$ 955,705	$ (959,797)	$ (21,440)	$ 2,284	$ (23,106)

Three Months Ended September 30, 2018

(In thousands, except shares)	Common Stock Shares	Common Stock Amount	Additional Paid-In Capital	Accumulated Deficit	Accumulated Other Comprehensive Loss	Noncontrolling Interests	Total Equity
Balance at July 1, 2018	14,002,999	$ 140	$ 951,349	$ (899,213)	$ (19,634)	$ 1,279	$ 33,921
Comprehensive income (loss):							
Net (loss) income	—	—	—	(7,536)	—	74	(7,462)
Translation adjustment	—	—	—	—	43	(50)	(7)
Stock-based compensation expense	—	—	465	—	—	—	465
Exercise of stock options	—	—	(3)	—	—	—	(3)
Balance at September 30, 2018	14,002,999	$ 140	$ 951,811	$ (906,749)	$ (19,591)	$ 1,303	$ 26,914

(In thousands, except shares)	Common Stock Shares	Common Stock Amount	Additional Paid-In Capital	Accumulated Deficit	Accumulated Other Comprehensive Loss	Noncontrolling Interests	Total Equity
	Nine Months Ended September 30, 2018						
Balance at January 1, 2018	12,019,701	$ 120	$ 903,247	$ (854,921)	$ (18,879)	$ 1,239	$ 30,806
Comprehensive income (loss):							
Net (loss) income	—	—	—	(51,828)	—	527	(51,301)
Translation adjustment	—	—	—	—	(712)	(263)	(975)
Dividend payment to noncontrolling interest	—	—	—	—	—	(200)	(200)
Stock-based compensation expense	—	—	2,508	—	—	—	2,508
Exercise of stock options	70,086	—	214	—	—	—	214
Vesting of restricted stock units/awards	137,844	2	(2)	—	—	—	—
Vested restricted stock cancelled for employee minimum income taxes	(22,176)	—	(527)	—	—	—	(527)
Public equity offering	1,820,000	18	46,981	—	—	—	46,999
Employee purchases of unregistered shares of common stock	(22,456)	—	(610)	—	—	—	(610)
Balance at September 30, 2018	14,002,999	$ 140	$ 951,811	$ (906,749)	$ (19,591)	$ 1,303	$ 26,914

See accompanying Footnotes to Condensed Consolidated Financial Statements.

(1) Summary of Significant Accounting Policies

Basis of Presentation

The condensed consolidated balance sheet of ION Geophysical Corporation and its subsidiaries (collectively referred to as the “Company” or “ION,” unless the context otherwise requires) at December 31, 2018, has been derived from the Company’s audited consolidated financial statements at that date.The condensed consolidated balance sheet at September 30, 2019, and the condensed consolidated statements of operations, comprehensive loss and condensed consolidated statements of stockholders' (deficit) equity for the three and nine months ended September 30, 2019 and 2018 and the condensed consolidated statements of cash flows for the nine months ended September 30, 2019 and 2018, are unaudited. In the opinion of management, all adjustments of a normal recurring nature that are necessary for a fair presentation of the results of the interim period have been included. Interim results are not necessarily indicative of the operating results for a full year or of future operations. Intercompany transactions and balances have been eliminated.

The Company’s condensed consolidated financial statements reflect a non-redeemable noncontrolling interest in a majority-owned affiliate which is reported as a separate component of equity in “Noncontrolling interest” in the condensed consolidated balance sheets. Net income attributable to noncontrolling interest is stated separately in the condensed consolidated statements of operations. The activity for this noncontrolling interest relates to proprietary processing projects in Brazil.

These condensed consolidated financial statements have been prepared using accounting principles generally accepted in the United States (“GAAP”) for interim financial information and the instructions to Form 10-Q and applicable rules of Regulation S-X of the Securities and Exchange Commission (the “SEC”). Certain information and footnote disclosures normally included in annual financial statements presented in accordance with GAAP have been omitted. The accompanying condensed consolidated financial statements should be read in conjunction with the Company’s Annual Report on Form 10-K for the year ended December 31, 2018.

Certain prior period amounts have been reclassified to conform to the current period presentation, including the change in reportable segments presentation which had no impact on the condensed consolidated financial statements and the recognition of right-of-use (“ROU”) assets and operating lease liabilities on the condensed consolidated balance sheets as a result of the adoption of the new lease standard. See Note 2 “*Recent Accounting Pronouncements.*”

Significant Accounting Policies

The Company’s significant accounting policies are disclosed in Note 1 *“Summary of Significant Accounting Policies.”* of the Annual Report on Form 10-K for the year ended December 31, 2018. There have been no changes in such policies or the application of such policies during thenine months ended September 30, 2019 except as discussed in Note 2 “*Recent Accounting Pronouncements.*” and Note 11 “*Lease Obligations.*”

Use of Estimates

The preparation of condensed consolidated financial statements in conformity with GAAP requires the use of estimates and assumptions by management that affects the reported amounts in the condensed consolidated financial statements and accompanying notes. Areas involving significant estimates include, but not limited to, accounts and unbilled receivables, inventory valuation, sales forecast related to multi-client data libraries, impairment of property, plant and equipment and goodwill and deferred taxes. Actual results could materially differ from those estimates.

(2) Recent Accounting Pronouncements

Accounting Pronouncements Recently Adopted

On January 1, 2019, the Company adopted Accounting Standards Update (“ASU”) 2016-2, *“Leases (Topic 842)”* using the modified retrospective method. This ASU requires the recognition of lease assets and lease liabilities by lessees for those leases classified as operating leases under the previous guidance. The Company used January 1, 2018, the beginning of the earliest comparative period presented in its condensed consolidated financial statements, as the date of initial application. The Company elected the practical expedients upon transition which will retain the lease classification for leases and any unamortized initial direct costs that existed prior to the adoption of the standard.

The adoption of the standard resulted in ROU assets of$59.5 million and operating lease liabilities of $70.6 million on the condensed consolidated balance sheets as of January 1, 2018. The difference between the ROU assets and operating lease liabilities is due to the derecognition of $11.1 million in deferred rent recorded within other long-term liabilities. There was no impact on the condensed consolidated statements of operations and cash flows. The adoption of the standard had no impact on the debt covenant compliance under existing agreements. The Company elected the practical expedient related to short-term leases, which are leases with a duration of twelve months or less, as such, they have not been recorded in the condensed consolidated balance sheets. See Note 11 "*Lease Obligations.*" for further discussion.

Accounting Pronouncements Not Yet Adopted

In June 2016, the Financial Accounting Standards Board issued ASU No. 2016-13,*"Financial Instruments - Credit Losses: Measurement of Credit Losses on Financial Instruments."* The guidance will replace the incurred loss impairment methodology under current GAAP with a methodology that reflects expected credit losses and requires consideration of a broader range of reasonable and supportable information to inform credit loss estimates. The guidance is effective for public companies for interim and annual periods beginning after December 15, 2019, with early adoption permitted for interim and annual periods beginning after December 15, 2018. The Company is in the initial stages of evaluating the impact of this standard on the condensed consolidated financial statements. The Company does not currently expect the adoption of this standard to have a material impact on the condensed consolidated financial statements.

(3) Segment Information

During the first quarter of 2019, the Company consolidated its operating segments fromthree into two, eliminating the separate presentation of its Ocean Bottom Integrated Technologies segment. This consolidation aligns with the Company's asset light business model and evolved strategy to commercialize components of the Company's next generation ocean bottom nodal system, 4Sea™, instead of operating a crew. The Company is offering 4Sea components more broadly to the growing number of Ocean Bottom Seismic ("OBS") service providers under recurring revenue commercial strategies. The Company may also license the right to manufacture and use the 4Sea nodal technology to a service provider on a value-based pricing model, such as a royalty stream. Revenues from 4Sea are being recognized through the relevant segments, either E&P Technology & Services or Operations Optimization.

Accordingly, as of first quarter 2019, the Company evaluates and reviews its results of operations based ontwo reporting segments: E&P Technology & Services and Operations Optimization. Refer to Item 2. "*Management's Discussion and Analysis of Financial Condition and Results of Operations"* for information about each business segment's business, products and services.

The segments represent components of the Company for which separate financial information is available that is utilized on a regular basis by the Chief Operating Decision Maker in determining how to allocate resources and evaluate performance. The Company measures segment operating results based on income (loss) from operations.

Previously reported segment information has been retrospectively revised throughout the condensed consolidated financial statements, as applicable, for all periods presented to reflect the changes in the Company's reporting segments. These changes did not have an impact on the Company's condensed consolidated financial statements. These changes did not affect the Company's reporting units used for allocating and testing goodwill for impairment.

The following table is a summary of segment information (in thousands):

	Three Months Ended September 30, 2019	Three Months Ended September 30, 2018		Nine Months Ended September 30, 2019	Nine Months Ended September 30, 2018	
Net revenues:						
E&P Technology & Services:						
New Venture	$ 5,905	$ 18,218		$ 24,394	$ 40,069	
Data Library	27,288	13,956		55,030	21,629	
Total multi-client revenues	33,193	32,174		79,424	61,698	
Imaging Services	7,048	4,147		16,443	14,379	
Total	40,241	36,321		95,867	76,077	
Operations Optimization:						
Devices	6,103	5,356		18,455	14,275	
Optimization Software & Services	6,895	5,523		17,648	15,099	
Total	12,998	10,879		36,103	29,374	
Total net revenues	$ 53,239	$ 47,200		$ 131,970	$ 105,451	
Gross profit (loss):						
E&P Technology & Services	$ 18,316	$ 12,139		$ 36,113	$ 11,626	
Operations Optimization	6,972	5,736		18,670	14,980	
Segment gross profit	25,288	17,875		54,783	26,606	
Other	—	(1,400)	(a)	—	(4,795)	(a)
Total gross profit	$ 25,288	$ 16,475		$ 54,783	$ 21,811	
Gross margin:						
E&P Technology & Services	46%	33 %		38%	15 %	
Operations Optimization	54%	53 %		52%	51 %	
Segment gross margin	47%	38 %		42%	25 %	
Other	—%	(3)%		—%	(5)%	
Total gross margin	47%	35 %		42%	21 %	
Income (loss) from operations:						
E&P Technology & Services	$ 11,878	$ 6,578		$ 15,500	$ (4,422)	
Operations Optimization	2,994	1,963		5,808	3,992	
Support and other	(11,014) (b)	(10,993)	(b)	(35,940) (c)	(37,181)	(c)
Income (loss) from operations	3,858	(2,452)		(14,632)	(37,611)	
Interest expense, net	(3,155)	(3,022)		(9,378)	(9,769)	
Other income (expense), net	(242)	91		(938)	(616)	
Income (loss) before income taxes	$ 461	$ (5,383)		$ (24,948)	$ (47,996)	

[a] Relates to gross loss primarily related to depreciation expense of previously reported Ocean Bottom Integrated Technologies segment.
[b] Includes loss from operations of previously reported Ocean Bottom Integrated Technologies segment of $0.7 million and $2.8 million for the three months ended September 30, 2019 and 2018, respectively, which consists of item (a) above and operating expenses of $0.7 million and $1.4 million for the three months ended September 30, 2019 and 2018, respectively.
[c] Includes loss from operations of previously reported Ocean Bottom Integrated Technologies segment of $2.3 million and $8.6 million for the nine months ended September 30, 2019 and 2018, respectively, which consists of item (a) above and operating expenses of $2.3 million and $3.8 million for the nine months ended September 30, 2019 and 2018, respectively.

(4) Revenue From Contracts With Customers

The Company derives revenue from the (i) sale or license of multi-client and proprietary data, imaging services and E&P Advisors consulting services within its E&P Technologies & Services segment; (ii) sale, license and repair of seismic data acquisition systems and other equipment; and (iii) sale or license of seismic command and control software systems and software solutions for operations management within its Operations Optimization segment. All E&P Technology & Services' revenues and the services component of Optimization Software & Services' revenues under Operations Optimization segment are classified as service revenues. All other revenues are classified as product revenues.

The Company uses a five-step model to determine proper revenue recognition from customer contracts in accordance with Accounting Standards Codification Topic 606 ("ASC 606"). Revenue is recognized when (i) a contract is approved by all parties; (ii) the goods or services promised in the contract are identified; (iii) the consideration we expect to receive in exchange for the goods or services promised is determined; (iv) the consideration is allocated to the goods and services in the contract; and (v) control of the promised goods or services is transferred to the customer. The Company applies the practical expedient in ASC 606 and does not disclose information about remaining contractual future performance obligations with an original term of one year or less within the footnotes. The Company does not have any contractual future performance obligations with an original term of over one year.

Revenue by Geographic Area

The following table is a summary of net revenues by geographic area (in thousands):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Latin America	$ 22,720	$ 19,910	$ 50,572	$ 37,356
North America	12,182	13,095	32,984	25,452
Europe	8,335	8,202	24,850	19,811
Asia Pacific	2,744	3,718	8,287	11,581
Africa	2,874	1,121	7,541	8,362
Middle East	3,899	717	6,364	1,907
Commonwealth of Independent States	485	437	1,372	982
Total	$ 53,239	$ 47,200	$ 131,970	$ 105,451

See Note 3 *"Segment Information"* for revenue by segment for the three and nine months ended September 30, 2019 and 2018.

Unbilled Receivables

Unbilled receivables relate to revenues recognized on multi-client surveys, imaging services and devices equipment repairs on a proportionate basis, and on licensing of multi-client data libraries for which invoices have not yet been presented to the customer. The following table is a summary of unbilled receivables (in thousands):

	September 30, 2019	December 31, 2018
New Venture	$ 22,373	$ 38,430
Imaging Services	7,016	5,075
Devices	1,601	527
Total	$ 30,990	$ 44,032

The changes in unbilled receivables are as follows (in thousands):

Unbilled receivables at December 31, 2018	$ 44,032
Recognition of unbilled receivables	125,586
Revenues billed to customers	(138,628)
Unbilled receivables at September 30, 2019	$ 30,990

Deferred Revenue

Billing practices are governed by the terms of each contract based upon achievement of milestones or pre-agreed schedules. Billing does not necessarily correlate with revenue recognized on a proportionate basis as work is performed and control is transferred to the customer. Deferred revenue represents cash received in excess of revenue recognized as of the reporting period, but will be recognized in future periods. The following table is a summary of deferred revenues (in thousands):

	September 30, 2019	December 31, 2018
New Venture	$ 1,973	$ 5,797
Imaging Services	1,219	307
Devices	1,018	626
Optimization Software & Services	1,100	980
Total	$ 5,310	$ 7,710

The changes in deferred revenues are as follows (in thousands):

Deferred revenue at December 31, 2018	$ 7,710
Cash collected in excess of revenue recognized	3,984
Recognition of deferred revenue [a]	(6,384)
Deferred revenue at September 30, 2019	$ 5,310

[a] The majority of deferred revenue recognized relates to Company's Ventures group.

The Company expects to recognize all deferred revenue within the next 12 months.

Credit Risks

For the nine months ended September 30, 2019 and 2018, the Company had one customer with sales that exceeded 10% of the Company's consolidated net revenues. Revenues related to each of these customers are included within the E&P Technology & Services segment.

At September 30, 2019, the Company had two customers with balances that, combined, accounted for 40% of the Company's total combined accounts receivable and unbilled receivable balances. At September 30, 2018, the Company had one customer with a balance that accounted for 29% of the Company's total combined accounts receivable and unbilled receivable balances.

(5) Long-term Debt

The following table is a summary of long-term debt (in thousands):

	September 30, 2019	December 31, 2018
Senior secured second-priority lien notes *(maturing December 15, 2021)*	$ 120,569	$ 120,569
Revolving credit facility *(maturing August 16, 2023)* [a]	—	—
Equipment finance leases (Note 11)	2,138	2,938
Other debt	—	1,159
Costs associated with issuances of debt	(2,195)	(2,925)
Total	120,512	121,741
Current maturities of long-term debt	(1,110)	(2,228)
Long-term debt, net of current maturities	$ 119,402	$ 119,513

[a] The maturity of the Credit Facility will accelerate to October 31, 2021 if the Company is unable to repay or extend the maturity of the Second Lien Notes.

Revolving Credit Facility

On August 16, 2018, ION Geophysical Corporation and its material U.S. subsidiaries — GX Technology Corporation, ION Exploration Products (U.S.A), Inc. and I/O Marine Systems Inc. (the "Material U.S. Subsidiaries") — along with GX Geoscience Corporation, S. de R.L. de C.V., a limited liability company (Sociedad de Responsibilidad Limitada de Capital Variable) organized under the laws of Mexico, and a subsidiary of the Company (the "Mexican Subsidiary") (the Material U.S. Subsidiaries and the

Mexican Subsidiary are collectively, the “Subsidiary Borrowers”, together with ION Geophysical Corporation are the “Borrowers”) — the financial institutions party thereto, as lenders, and PNC Bank, National Association (“PNC”), as agent for the lenders, entered into that certain Third Amendment and Joinder to Revolving Credit and Security Agreement (the “Third Amendment”), amending the Revolving Credit and Security Agreement, dated as of August 22, 2014 (as previously amended by the First Amendment to Revolving Credit and Security Agreement, dated as of August 4, 2015 and the Second Amendment to Revolving Credit and Security Agreement, dated as of April 28, 2016, the “Credit Agreement”). The Credit Agreement, as amended by the First Amendment, the Second Amendment and the Third Amendment is herein called the “Credit Facility”).

The Credit Facility is available to provide for the Borrowers’ general corporate needs, including working capital requirements, capital expenditures, surety deposits and acquisition financing.

The Third Amendment amended the Credit Agreement to, among other things:

- extend the maturity date of the Credit Facility by approximately four years (from August 22, 2019 to August 16, 2023), subject to the Company’s retirement or extension of the maturity date of its Second Lien Notes, as defined below, which mature on December 15, 2021;
- increase the maximum revolver amount by $10.0 million (from $40.0 million to $50.0 million);
- increase the borrowing base percentage of the net orderly liquidation value as it relates to the multi-client data library (not to exceed $28.5 million, up from the previous maximum of $15.0 million for the multi-client data library component);
- include the eligible billed receivables of the Mexican Subsidiary up to a maximum of $5.0 million in the borrowing base calculation and joins the Mexican Subsidiary as a borrower thereunder (with a maximum exposure of $5.0 million) and require the equity and assets of the Mexican Subsidiary to be pledged to secure obligations under the facility;
- modify the interest rate such that the maximum interest rate remains consistent with the fixed interest rate prior to the Third Amendment (that is 3.00% per annum for domestic rate loans and 4.00% per annum for LIBOR rate loans), but now lowers the range down to a minimum interest rate of 2.00% for domestic rate loans and 3.00% for LIBOR rate loans based on a leverage ratio for the preceding four-quarter period;
- decrease the minimum excess borrowing availability threshold which (if the Borrowers have minimum excess borrowing availability below any such threshold) triggers the agent’s right to exercise dominion over cash and deposit accounts; and
- modify the trigger required to test for compliance with the fixed charges coverage ratio, which is further described below.

The maximum amount under the Credit Facility is the lesser of $50.0 million or a monthly borrowing base. The borrowing base under the Credit Facility will increase or decrease monthly using a formula based on certain eligible receivables, eligible inventory and other amounts, including a percentage of the net orderly liquidation value of the Borrowers’ multi-client library. As of September 30, 2019, the undrawn borrowing base availability under the Credit Facility was $37.6 million, and there was no outstanding indebtedness under the Credit Facility.

The obligations of Borrowers under the Credit Facility are secured by a first-priority security interest in 100% of the stock of the Subsidiary Borrowers and 65% of the equity interest in ION International Holdings L.P., and by substantially all other assets of the Borrowers. However, the first-priority security interest in the other assets of the Mexican Subsidiary is capped to a maximum exposure of $5.0 million.

The Credit Facility contains covenants that, among other things, limit or prohibit the Borrowers, subject to certain exceptions and qualifications, from incurring additional indebtedness in excess of permitted indebtedness (including finance lease obligations), repurchasing equity, paying dividends or distributions, granting or incurring additional liens on the Borrowers’ properties, pledging shares of the Borrowers’ subsidiaries, entering into certain merger transactions, entering into transactions with the Company’s affiliates, making certain sales or other dispositions of the Borrowers’ assets, making certain investments, acquiring other businesses and entering into sale-leaseback transactions with respect to the Borrowers’ property.

The Credit Facility requires that the Borrowers maintain a minimum fixed charge coverage ratio of 1.1 to 1.0 as of the end of each fiscal quarter during the existence of a covenant testing trigger event. The fixed charge coverage ratio is defined as the ratio of (i) ION Geophysical Corporation’s earnings before interest, taxes, depreciation and amortization (“EBITDA”), minus unfunded capital expenditures made during the relevant period, minus distributions (including tax distributions) and dividends made during the relevant period, minus cash taxes paid during the relevant period, to (ii) certain debt payments made during the relevant period. A covenant testing trigger event occurs upon (a) the occurrence and continuance of an event of default under the Credit Facility or (b) by a two-step process based on (i) a minimum excess borrowing availability threshold (excess borrowing availability less than $6.25 million for five consecutive days or $5.0 million on any given day), and (ii) the Borrowers’ unencumbered cash maintained in a PNC deposit account is less than the Borrowers’ then outstanding obligations.

At September 30, 2019, the Company was in compliance with all of the covenants under the Credit Facility.

The Credit Facility contains customary event of default provisions (including a “change of control” event affecting ION Geophysical Corporation), the occurrence of which could lead to an acceleration of ION Geophysical Corporation’s obligations under the Credit Facility.

Senior Secured Notes

ION Geophysical Corporation's 9.125% Senior Secured Second Priority Notes due December 2021 (the "Second Lien Notes") are senior secured second-priority obligations guaranteed by the Material U.S. Subsidiaries and the Mexican Subsidiary (each as defined above and herein below, with the reference to the Second Lien Notes, the "Guarantors"). Interest on the Second Lien Notes is payable semiannually in arrears on June 15 and December 15 of each year during their term, except that the interest payment otherwise payable on June 15, 2021 will be payable on December 15, 2021.

The April 2016 indenture governing the Second Lien Notes contains certain covenants that, among other things, limits or prohibits ION Geophysical Corporation's ability and the ability of its restricted subsidiaries to take certain actions or permit certain conditions to exist during the term of the Second Lien Notes, including among other things, incurring additional indebtedness in excess of permitted indebtedness, creating liens, paying dividends and making other distributions in respect of ION Geophysical Corporation's capital stock, redeeming ION Geophysical Corporation's capital stock, making investments or certain other restricted payments, selling certain kinds of assets, entering into transactions with affiliates, and effecting mergers or consolidations. These and other restrictive covenants contained in the Second Lien Notes Indenture are subject to certain exceptions and qualifications. All of ION Geophysical Corporation's subsidiaries are currently restricted subsidiaries.

At September 30, 2019, the Company was in compliance with all of the covenants under the Second Lien Notes.

On or after December 15, 2019, the Company may, on one or more occasions, redeem all or a part of the Second Lien Notes at the redemption prices set forth below, plus accrued and unpaid interest and special interest, if any, on the Second Lien Notes redeemed during the twelve-month period beginning on December 15th of the years indicated below:

Date	Percentage
2019	105.50%
2020	103.50%
2021 and thereafter	100.00%

(6) Net Loss Per Share

Basic net loss per share is computed by dividing net loss applicable to common shares by the weighted average number of common shares outstanding during the period. Diluted net loss per common share is determined based on the assumption that dilutive restricted stock and restricted stock unit awards have vested and outstanding dilutive stock options have been exercised and the aggregate proceeds were used to reacquire common stock using the average price of such common stock for the period. The total number of shares issuable pursuant to outstanding stock options at September 30, 2019 and 2018 of 700,759 and 804,936, respectively, were excluded as their inclusion would have an anti-dilutive effect. The total number of shares issuable pursuant to restricted stock units awards outstanding at September 30, 2019 and 2018 of 926,917 and 128,131, respectively, were excluded as their inclusion would have an anti-dilutive effect.

(7) Income Taxes

The Company maintains a valuation allowance for substantially all of its deferred tax assets. A valuation allowance is established or maintained when it is "more likely than not" that all or a portion of deferred tax assets will not be realized. The Company will continue to record a valuation allowance for the substantial majority of its deferred tax assets until there is sufficient evidence to warrant reversal.

The tax provision for the nine months ended September 30, 2019 has been calculated using the Company's overall estimated annual effective tax rate based on projected 2019 full year results. The Company's effective tax rates for the three months ended September 30, 2019 and 2018 were 822.1% and (38.6)%, respectively. The Company's effective tax rates for the nine months ended September 30, 2019 and 2018 were (31.7)% and (6.9)%, respectively. The Company's effective tax rates for the three and nine months ended September 30, 2019 and 2018 were negatively impacted by the change in valuation allowance related to U.S. operating losses for which the Company cannot currently recognize a tax benefit. The Company's income tax expense for the nine months ended September 30, 2019 of $7.9 million primarily relates to results from the Company's non-U.S. businesses.

As of September 30, 2019, the Company has approximately $0.4 million of unrecognized tax benefits and does not expect to recognize significant increases in unrecognized tax benefits during the next twelve-month period. Interest and penalties, if any, related to unrecognized tax benefits are recorded in income tax expense.

As of September 30, 2019, the Company's U.S. federal tax returns for 2016 and subsequent years remain subject to examination by tax authorities. In the Company's foreign tax jurisdictions, tax returns for 2012 and subsequent years generally remain open to examination.

(8) Litigation

WesternGeco

In June 2009, WesternGeco L.L.C. ("WesternGeco") filed a lawsuit against the Company in the United States District Court for the Southern District of Texas (the "District Court"). In the lawsuit, styled *WesternGeco L.L.C. v. ION Geophysical Corporation*, WesternGeco alleged that the Company had infringed four of their patents concerning marine seismic surveys.

Trial began in July 2012, and the jury returned a verdict in August 2012. The jury found that the Company infringed the six "claims" contained in four of WesternGeco's patents by supplying the Company's DigiFIN® lateral streamer control units from the United States. (In patent law, a "claim" is a technical legal term; an infringer infringes on one or more "claims" of a given patent.)

In May 2014, the District Court entered a Final Judgment against the Company in the amount of $123.8 million. The Final Judgment also enjoined the Company from supplying DigiFINs or any parts unique to DigiFINs in or from the United States. The Company has conducted its business in compliance with the District Court's orders, and has reorganized its operations such that it no longer supplies DigiFINs or any parts unique to DigiFINs in or from the United States.

As of 2018, the Company has paid WesternGeco the $25.8 million of the Final Judgment (the portion of the judgment representing reasonable royalty damages and enhanced damages, plus interest).

However, as further described below, the balance of the judgment against the Company ($98.0 million, representing lost profits from surveys performed by the Company's customers outside of the United State, plus interest) has been vacated, and a new trial ordered, to determine what lost profit damages, if any, WesternGeco is entitled to.

The Final Judgment was vacated after it was appealed to the United States Court of Appeals for the Federal Circuit in Washington, D.C. (the "Court of Appeals"), then to the Supreme Court of the United States, which remanded the case, again, to the Court of Appeals.

On January 11, 2019, the Court of Appeals refused to disturb the award of reasonable royalties to WesternGeco (which the Company paid in 2016), but did not reinstate the lost profits award; rather, the Court of Appeals remanded the case back to the District Court to determine whether to hold a new trial as to lost profits.

On August 30, 2019, the District Court refused WesternGeco's request to reinstate the lost profits awards against the Company, and instead ordered a new trial to determine what lost profits, if any, WesternGeco is entitled to from surveys performed by the Company's customers outside of the United States.

The District Court's basis for granting the new trial as to lost profits was that, subsequent to the jury verdict that awarded lost profits, the Patent Trial and Appeal Board ("PTAB") of the Patent and Trademark Office, in an administrative proceeding, invalidated four of the five patent claims that formed the basis for the lost profits judgment against the Company (that is, the PTAB held that those four patent claims should never have been granted), and the Court of Appeals and the Supreme Court both subsequently refused to overturn that finding. A trial date for the new trial has not yet been set.

The Company may not ultimately prevail in the litigation and it could be required to pay lost profits if and when a new judgment issues in the new trial. The Company's assessment that it does not have a loss contingency may change in the future due to developments at the District Court, and other events, such as changes in applicable law, and such reassessment could lead to the determination that a significant loss contingency is probable, which could have a material effect on the Company's business, financial condition and results of operations. The Company's assessments disclosed in this Quarterly Report on Form 10-Q or elsewhere are based on currently available information and involve elements of judgment and significant uncertainties.

Other Litigation

The Company has been named in various other lawsuits or threatened actions that are incidental to its ordinary business. Litigation is inherently unpredictable. Any claims against the Company, whether meritorious or not, could be time-consuming, cause the Company to incur costs and expenses, require significant amounts of management time and result in the diversion of significant operational resources. The results of these lawsuits and actions cannot be predicted with certainty. The Company currently believes that the ultimate resolution of these matters will not have a material adverse effect on its financial condition or results of operations.

(9) Details of Selected Balance Sheet Accounts

Inventories

A summary of inventories follows (in thousands):

	September 30, 2019	December 31, 2018
Raw materials and subassemblies	$ 18,269	$ 20,011
Work-in-process	2,460	1,032
Finished goods	5,166	8,111
Reserve for excess and obsolete inventories	(12,961)	(15,024)
Inventories, net	$ 12,934	$ 14,130

Property, Plant and Equipment

A summary of property, plant and equipment follows (in thousands):

	September 30, 2019	December 31, 2018
Buildings	$ 15,714	$ 15,707
Machinery and equipment	133,257	132,135
Seismic rental equipment	1,572	1,423
Furniture and fixtures	3,867	3,859
Other	30,560	30,104
Total	184,970	183,228
Less accumulated depreciation	(135,514)	(133,634)
Less impairment of long-lived assets	(36,553)	(36,553)
Property, plant and equipment, net	$ 12,903	$ 13,041

Total depreciation expense, including amortization of assets recorded under equipment finance leases, for the nine months ended September 30, 2019 and 2018 was $2.4 million and $6.0 million, respectively.

Multi-Client Data Library

The change in multi-client data library are as follows (in thousands):

	September 30, 2019	December 31, 2018
Gross costs of multi-client data creation	$ 998,275	$ 972,309
Less accumulated amortization	(806,647)	(776,860)
Less impairments to multi-client data library	(121,905)	(121,905)
Multi-client data library, net	$ 69,723	$ 73,544

Total amortization expense for the nine months ended September 30, 2019 and 2018 was $29.8 million and $32.5 million, respectively.

(10) Stockholder's Equity and Stock-Based Compensation Expense

Public Equity Offering

On February 21, 2018, the Company completed a public equity offering (“Offering”) of its 1,820,000 shares of common stock at a public offering price of $27.50 per share, and warrants to purchase an additional 1,820,000 shares of the Company’s common stock pursuant to the Registration Statement on Form S-3 (No. 33-213769) filed with the Securities and Exchange Commission under the Securities Act of 1933 and declared effective on December 2, 2016. The net proceeds from this offering were $47.0 million, including transaction expenses. A portion of the net proceeds were used to retire the Company’s $28.5 million Third Lien Notes in March 2018. The warrants have an exercise price of $33.60 per share, are immediately exercisable and were to expire on March 21, 2019. On February 4, 2019, the Company extended expiration of the warrants to March 21, 2020.

Stock-Based Compensation

The total number of shares issued or reserved for future issuance under outstanding stock options at September 30, 2019 and 2018 was 700,759 and 804,936, respectively, and the total number of shares of restricted stock and shares reserved for restricted stock units outstanding at September 30, 2019 and 2018 was 926,917 and 128,131, respectively. The total number of stock appreciation rights ("SARs") awards outstanding at September 30, 2019 and 2018 was 963,013 and 530,865, respectively. The following table presents a summary of the activity related to stock options, restricted stock, restricted stock unit awards and SARs awards for the nine months ended September 30, 2019:

	Stock Options	Restricted Stock and Unit Awards	Stock Appreciation Rights
	Number of Shares		
Outstanding at December 31, 2018	785,890	1,044,125	1,481,541
Granted	10,000	152,155	—
Stock options and SARs exercised/restricted stock and unit awards vested	(82,900)	(202,697)	(150,000)
Cancelled/forfeited	(12,231)	(66,666)	(368,528)
Outstanding at September 30, 2019	700,759	926,917	963,013

Cancelled/forfeited SARs relates to the 2015 issuance of 176,528 awards that expired during the current period and also 192,000 forfeited awards of the former Chief Executive Officer. On September 1, 2019, the Company granted 130,000 shares of restricted stock to the new Chief Executive Officer. The vesting of the 65,000 shares is achieved through a time based condition and the vesting of the remaining 65,000 shares is achieved through both a time based condition and performance based condition.

Stock-based compensation expense recognized for the nine months ended September 30, 2019 and 2018, totaled $3.7 million and $2.5 million, respectively. SARs expense recognized for the nine months ended September 30, 2019 and 2018, totaled $2.7 million and $2.8 million, respectively.

SARs awards are considered liability awards as they are ultimately settled in cash. As such, these amounts are incrementally accrued in the liability section of the condensed consolidated balance sheets over the service period. All of the Company's currently outstanding SARs awards achieve vesting through both a market condition and a service condition. SARs awards that are fully vested under both conditions are measured at intrinsic value (i.e. the difference between the market price on the last day of the quarter and the strike price of the awards times the number of awards vested and outstanding) and marked to market each quarter until settled. SARs awards that are not fully vested are incrementally accrued over the service period and adjusted to their fair value each quarter until settled based on a valuation model. The Company calculated the fair value of each award as of September 30, 2019 and December 31, 2018 using a Monte Carlo simulation model. The following assumptions were used:

	September 30, 2019	**December 31, 2018**
Risk-free interest rates	1.97%	3.0%
Expected lives (in years)	5.31	5.31
Expected dividend yield	—%	—%
Expected volatility	86.1%	82.9%

(11) Lease Obligations

The Company determines if an arrangement is a lease at inception by considering whether (1) explicitly or implicitly identified assets have been deployed in the agreement and (2) the Company obtains substantially all of the economic benefits from the use of that underlying asset and directs how and for what purpose the asset is used during the term of the agreement. Amounts related to operating leases are included in "Right-of-use assets", "Current maturities of operating lease liabilities" and "Operating lease liabilities, net of current maturities" in the condensed consolidated balance sheets. Amounts related to finance leases are included in "Property, plant and equipment, net", "Current maturities of long-term debt", and "Long-term debt, net of current maturities" in the condensed consolidated balance sheets.

ROU assets represent the Company's right to use an underlying asset for the lease term and operating lease liabilities represent the Company's obligation to make lease payments arising from the lease. ROU assets are recognized at the commencement date and consist of the present value of remaining lease payments over the lease term, initial direct costs, prepaid lease payments less any lease incentives. Operating lease liabilities are recognized at commencement date based on the present value of remaining lease payments over the lease term. The Company uses the implicit rate, when readily determinable or the incremental borrowing rate based on the information available at commencement date to determine the present value of lease payments. The lease terms may include options to extend or terminate the lease which are recorded in the financial statements if it is reasonably certain that the Company will exercise such options. Lease expense for lease payments is recognized on a straight-line basis over the lease term. Lease agreements with lease and non-lease components are accounted for separately. The Company does not recognize leases with terms of less than twelve months in the condensed consolidated balance sheets and will recognize those lease payments in the condensed consolidated statements of operations on a straight-line basis over the lease term.

The Company leases offices, processing centers, warehouse spaces and, to a lesser extent, certain equipment. These leases have remaining terms of1 year to 7 years, some of which have options to extend for up to10 years and/or options to terminate within1 year. The options to renew are not recognized as part of the Company's ROU assets and operating lease liabilities as the Company is not reasonably certain that it will exercise these options.

Total operating lease expense, including short-term lease expense was$8.9 million and $12.3 million for the nine months ended September 30, 2019 and 2018, respectively.

Future maturities of lease obligations follows (in thousands):

For the year ending September 30,	Operating Leases	Finance Leases	Total
2020	$ 13,193	$ 1,254	$ 14,447
2021	11,975	1,070	13,045
2022	11,404	—	11,404
2023	11,389	—	11,389
2024	5,257	—	5,257
Thereafter	5,242	—	5,242
Total lease payments	58,460	2,324	60,784
Less imputed interest	(11,598)	(186)	(11,784)
Total	$ 46,862	$ 2,138	$ 49,000

The weighted average remaining lease term as of September 30, 2019 and December 31, 2018 was 5.00 years and 5.26 years, respectively. The weighted average discount rate used to determine the operating lease liability as of September 30, 2019 and December 31, 2018 was 6.53% and 6.25%, respectively.

Equipment Finance Leases

The Company has entered into equipment finance leases that are due in installments for the purpose of financing the purchase of computer equipment through August 2021. Interest accrues under these leases at rates from 4.3% to 8.7% per annum, and the leases are collateralized by liens on the computer equipment. The assets are amortized over the lesser of their related lease terms or their estimated useful lives and such charges are reflected within depreciation expense.

(12) Supplemental Cash Flow Information and Non-cash Activity

Supplemental disclosure of cash flow information are as follows (in thousands):

	Nine Months Ended September 30,	
	2019	2018
Cash paid during the period for:		
Interest	$ 6,085	$ 6,733
Income taxes	7,607	2,257
Non-cash items from investing and financing activities:		
Purchases of computer equipment financed through capital leases	—	3,298
Investment in multi-client data library in accounts payable and accrued expenses	4,741	6,657

(13) Fair Value of Financial Instruments

Authoritative guidance on fair value measurements defines fair value, establishes a framework for measuring fair value and stipulates the related disclosure requirements. The Company follows a three-level hierarchy, under which the fair value hierarchy prioritizes the inputs used to measure fair value into three broad levels, moving from quoted prices in active markets in (Level 1) to unobservable inputs in (Level 3).

Due to their highly liquid nature, the amount of the Company's other financial instruments, including cash and cash equivalents, restricted cash, accounts and unbilled receivables, short term investments, accounts payable and accrued multi-client data library royalties, represent their approximate fair value.

The carrying amounts of the Company's long-term debt as ofSeptember 30, 2019 and December 31, 2018 were $122.7 million and $124.7 million, respectively, compared to its fair values of $118.8 million and $120.7 million as of September 30, 2019 and December 31, 2018, respectively. The fair value of the Second Lien Notes was calculated using Level 1 inputs, including an active market price.

Fair value measurements are applied with respect to non-financial assets and liabilities on a non-recurring basis, which would consist primarily of goodwill, multi-client data library and property, plant and equipment.

(14) Condensed Consolidating Financial Information

The Second Lien Notes were issued by ION Geophysical Corporation and are guaranteed by Guarantors, all of which are wholly-owned subsidiaries. The Guarantors have fully and unconditionally guaranteed the payment obligations of ION Geophysical Corporation with respect to the Second Lien Notes. The following condensed consolidating financial information presents the results of operations, financial position and cash flows for:

- ION Geophysical Corporation and the Guarantors (in each case, reflecting investments in subsidiaries utilizing the equity method of accounting).
- All other subsidiaries of ION Geophysical Corporation that are not Guarantors.
- The consolidating adjustments necessary to present ION Geophysical Corporation's results on a consolidated basis.

This condensed consolidating financial information should be read in conjunction with the accompanying condensed consolidated financial statements and footnotes. For additional information pertaining to the Second Lien Notes, See Item 2. "*Management's Discussion and Analysis of Financial Condition and Results of Operations*" in Part II of this Form 10-Q.

Balance Sheet	ION Geophysical Corporation	The Guarantors	All Other Subsidiaries	Consolidating Adjustments	Total Consolidated
	September 30, 2019				
	(In thousands)				
ASSETS					
Current assets:					
Cash and cash equivalents	$ 7,153	$ 45	$ 20,696	$ —	$ 27,894
Accounts receivable, net	8	11,338	12,486	—	23,832
Unbilled receivables	—	10,758	20,232	—	30,990
Inventories, net	—	7,192	5,742	—	12,934
Prepaid expenses and other current assets	3,160	986	2,480	—	6,626
Total current assets	10,321	30,319	61,636	—	102,276
Deferred income tax asset	805	7,510	120	—	8,435
Property, plant and equipment, net	754	7,931	4,218	—	12,903
Multi-client data library, net	—	65,790	3,933	—	69,723
Investment in subsidiaries	847,183	268,398	—	(1,115,581)	—
Goodwill	—	—	22,276	—	22,276
Intercompany receivables	—	91,534	80,264	(171,798)	—
Right-of-use assets	15,206	16,897	5,052	—	37,155
Other assets	1,223	945	54	—	2,222
Total assets	$ 875,492	$ 489,324	$ 177,553	$ (1,287,379)	$ 254,990
LIABILITIES AND (DEFICIT) EQUITY					
Current liabilities:					
Current maturities of long-term debt	$ —	$ 1,110	$ —	$ —	$ 1,110
Accounts payable	2,460	37,508	3,597	—	43,565
Accrued expenses	15,338	15,840	11,629	—	42,807
Accrued multi-client data library royalties	—	17,299	215	—	17,514
Deferred revenue	—	3,802	1,508	—	5,310
Current maturities of operating lease liabilities	5,026	5,422	1,200	—	11,648
Total current liabilities	22,824	80,981	18,149	—	121,954
Long-term debt, net of current maturities	118,375	1,027	—	—	119,402
Operating lease liabilities, net of current maturities	14,090	16,647	4,477	—	35,214
Intercompany payables	744,102	—	—	(744,102)	—
Other long-term liabilities	1,491	35	—	—	1,526
Total liabilities	900,882	98,690	22,626	(744,102)	278,096
(Deficit) Equity:					
Common stock	142	290,460	47,776	(338,236)	142
Additional paid-in capital	955,705	180,700	203,909	(384,609)	955,705
Accumulated earnings (deficit)	(959,797)	401,351	10,981	(412,332)	(959,797)
Accumulated other comprehensive income (loss)	(21,440)	4,281	(23,877)	19,596	(21,440)
Due from ION Geophysical Corporation	—	(486,158)	(86,146)	572,304	—
Total stockholders' (deficit) equity	(25,390)	390,634	152,643	(543,277)	(25,390)
Noncontrolling interest	—	—	2,284	—	2,284
Total (deficit) equity	(25,390)	390,634	154,927	(543,277)	(23,106)
Total liabilities and (deficit) equity	$ 875,492	$ 489,324	$ 177,553	$ (1,287,379)	$ 254,990

Balance Sheet	December 31, 2018				
	ION Geophysical Corporation	The Guarantors	All Other Subsidiaries	Consolidating Adjustments	Total Consolidated
			(In thousands)		
ASSETS					
Current assets:					
Cash and cash equivalents	$ 13,782	$ 47	$ 19,722	$ —	$ 33,551
Accounts receivable, net	8	17,349	8,771	—	26,128
Unbilled receivables	—	12,697	31,335	—	44,032
Inventories, net	—	8,721	5,409	—	14,130
Prepaid expenses and other current assets	3,891	1,325	2,566	—	7,782
Total current assets	17,681	40,139	67,803	—	125,623
Deferred income tax asset	805	6,261	125	—	7,191
Property, plant and equipment, net	489	8,922	3,630	—	13,041
Multi-client data library, net	—	70,380	3,164	—	73,544
Investment in subsidiaries	836,002	247,359	—	(1,083,361)	—
Goodwill	—	—	22,915	—	22,915
Intercompany receivables	—	305,623	60,255	(365,878)	—
Right-of-use assets	18,513	21,350	7,940	—	47,803
Other assets	1,723	643	69	—	2,435
Total assets	$ 875,213	$ 700,677	$ 165,901	$ (1,449,239)	$ 292,552
LIABILITIES AND (DEFICIT) EQUITY					
Current liabilities:					
Current maturities of long-term debt	$ 1,159	$ 1,069	$ —	$ —	$ 2,228
Accounts payable	2,407	29,602	2,904	—	34,913
Accrued expenses	7,011	10,036	14,364	—	31,411
Accrued multi-client data library royalties	—	29,040	216	—	29,256
Deferred revenue	—	6,515	1,195	—	7,710
Current maturities of operating lease liabilities	5,155	5,633	1,426	—	12,214
Total current liabilities	15,732	81,895	20,105	—	117,732
Long-term debt, net of current maturities	117,644	1,869	—	—	119,513
Operating lease liabilities, net of current maturities	17,841	21,237	6,514	—	45,592
Intercompany payables	716,051	—		(716,051)	—
Other long-term liabilities	1,713	178	—	—	1,891
Total liabilities	868,981	105,179	26,619	(716,051)	284,728
Equity:					
Common stock	140	290,460	47,776	(338,236)	140
Additional paid-in capital	952,626	180,700	203,908	(384,608)	952,626
Accumulated earnings (deficit)	(926,092)	390,691	(12,475)	(378,216)	(926,092)
Accumulated other comprehensive income (loss)	(20,442)	4,324	(22,023)	17,699	(20,442)
Due from ION Geophysical Corporation	—	(270,677)	(79,496)	350,173	—
Total stockholders' (deficit) equity	6,232	595,498	137,690	(733,188)	6,232
Noncontrolling interest	—	—	1,592	—	1,592
Total equity	6,232	595,498	139,282	(733,188)	7,824
Total liabilities and equity	$ 875,213	$ 700,677	$ 165,901	$ (1,449,239)	$ 292,552

Income Statement	Three Months Ended September 30, 2019 ION Geophysical Corporation	The Guarantors	All Other Subsidiaries	Consolidating Adjustments	Total Consolidated
			(In thousands)		
Net revenues	$ —	$ 21,474	$ 31,765	$ —	$ 53,239
Cost of sales	—	20,165	7,786	—	27,951
Gross profit	—	1,309	23,979	—	25,288
Total operating expenses	9,514	7,976	3,940	—	21,430
Income (loss) from operations	(9,514)	(6,667)	20,039	—	3,858
Interest expense, net	(3,197)	(49)	91	—	(3,155)
Intercompany interest, net	65	(2,077)	2,012	—	—
Equity in earnings of investments	8,988	18,398	—	(27,386)	—
Other income (expense), net	16	(55)	(203)	—	(242)
Net income (loss) before income taxes	(3,642)	9,550	21,939	(27,386)	461
Income tax expense (benefit)	81	(403)	4,112	—	3,790
Net income (loss)	(3,723)	9,953	17,827	(27,386)	(3,329)
Net income attributable to noncontrolling interest	—	—	(394)	—	(394)
Net income (loss) attributable to ION	$ (3,723)	$ 9,953	$ 17,433	$ (27,386)	$ (3,723)
Comprehensive net income (loss)	$ (4,751)	$ 9,953	$ 16,403	$ (25,962)	$ (4,357)
Comprehensive income attributable to noncontrolling interest	—	—	(394)	—	(394)
Comprehensive net income (loss) attributable to ION	$ (4,751)	$ 9,953	$ 16,009	$ (25,962)	$ (4,751)

Income Statement	Three Months Ended September 30, 2018 ION Geophysical Corporation	The Guarantors	All Other Subsidiaries	Consolidating Adjustments	Total Consolidated
			(In thousands)		
Net revenues	$ —	$ 39,211	$ 7,989	$ —	$ 47,200
Cost of sales	—	26,328	4,397	—	30,725
Gross profit	—	12,883	3,592	—	16,475
Total operating expenses	7,349	7,911	3,667	—	18,927
Income (loss) from operations	(7,349)	4,972	(75)	—	(2,452)
Interest expense, net	(3,046)	(7)	31	—	(3,022)
Intercompany interest, net	265	(3,649)	3,384	—	—
Equity in earnings (losses) of investments	2,291	(301)	—	(1,990)	—
Other income (expense), net	19	(2)	74	—	91
Net income (loss) before income taxes	(7,820)	1,013	3,414	(1,990)	(5,383)
Income tax expense (benefit)	(284)	(2,358)	4,721	—	2,079
Net income (loss)	(7,536)	3,371	(1,307)	(1,990)	(7,462)
Net income attributable to noncontrolling interest	—	—	(74)	—	(74)
Net income (loss) attributable to ION	$ (7,536)	$ 3,371	$ (1,381)	$ (1,990)	$ (7,536)
Comprehensive net income (loss)	$ (7,493)	$ 3,370	$ 11,382	$ (14,678)	$ (7,419)
Comprehensive income attributable to noncontrolling interest	—	—	(74)	—	(74)
Comprehensive net income (loss) attributable to ION	$ (7,493)	$ 3,370	$ 11,308	$ (14,678)	$ (7,493)

Income Statement	Nine Months Ended September 30, 2019				
	ION Geophysical Corporation	The Guarantors	All Other Subsidiaries	Consolidating Adjustments	Total Consolidated
	(In thousands)				
Net revenues	$ —	$ 65,552	$ 66,418	$ —	$ 131,970
Cost of sales	—	56,106	21,081	—	77,187
Gross profit	—	9,446	45,337	—	54,783
Total operating expenses	31,330	26,204	11,881	—	69,415
Income (loss) from operations	(31,330)	(16,758)	33,456	—	(14,632)
Interest expense, net	(9,560)	(156)	338	—	(9,378)
Intercompany interest, net	588	521	(1,109)	—	—
Equity in earnings of investments	7,330	26,786	—	(34,116)	—
Other income (expense), net	4	(265)	(677)	—	(938)
Net income (loss) before income taxes	(32,968)	10,128	32,008	(34,116)	(24,948)
Income tax expense (benefit)	737	(532)	7,711	—	7,916
Net income (loss)	(33,705)	10,660	24,297	(34,116)	(32,864)
Net income attributable to noncontrolling interest	—	—	(841)	—	(841)
Net income (loss) attributable to ION	$ (33,705)	$ 10,660	$ 23,456	$ (34,116)	$ (33,705)
Comprehensive net income (loss)	$ (34,703)	$ 10,617	$ 22,444	$ (32,220)	$ (33,862)
Comprehensive income attributable to noncontrolling interest	—	—	(841)	—	(841)
Comprehensive net income (loss) attributable to ION	$ (34,703)	$ 10,617	$ 21,603	$ (32,220)	$ (34,703)

Income Statement	Nine Months Ended September 30, 2018				
	ION Geophysical Corporation	The Guarantors	All Other Subsidiaries	Consolidating Adjustments	Total Consolidated
	(In thousands)				
Net revenues	$ —	$ 63,465	$ 41,986	$ —	$ 105,451
Cost of sales	—	60,869	22,771	—	83,640
Gross profit	—	2,596	19,215	—	21,811
Total operating expenses	26,592	22,050	10,780	—	59,422
Income (loss) from operations	(26,592)	(19,454)	8,435	—	(37,611)
Interest expense, net	(9,876)	(20)	127	—	(9,769)
Intercompany interest, net	842	(8,779)	7,937	—	—
Equity in earnings (losses) of investments	(13,826)	14,081	—	(255)	—
Other income (expense), net	(206)	66	(476)	—	(616)
Net income (loss) before income taxes	(49,658)	(14,106)	16,023	(255)	(47,996)
Income tax expense (benefit)	2,170	(3,141)	4,276	—	3,305
Net income (loss)	(51,828)	(10,965)	11,747	(255)	(51,301)
Net income attributable to noncontrolling interests	—	—	(527)	—	(527)
Net income (loss) applicable to ION	$ (51,828)	$ (10,965)	$ 11,220	$ (255)	$ (51,828)
Comprehensive net income (loss)	$ (52,540)	$ (11,013)	$ 10,505	$ 1,035	$ (52,013)
Comprehensive income attributable to noncontrolling interest	—	—	(527)	—	(527)
Comprehensive net income (loss) attributable to ION	$ (52,540)	$ (11,013)	$ 9,978	$ 1,035	$ (52,540)

Statement of Cash Flows	Nine Months Ended September 30, 2019			
	ION Geophysical Corporation	The Guarantors	All Other Subsidiaries	Total Consolidated
	(In thousands)			
Cash flows from operating activities:				
Net cash provided by operating activities	$ 8,955	$ 9,619	$ 730	$ 19,304
Cash flows from investing activities:				
Cash invested in multi-client data library	—	(15,197)	(6,028)	(21,225)
Purchase of property, plant and equipment	(259)	(118)	(895)	(1,272)
Net cash used in investing activities	(259)	(15,315)	(6,923)	(22,497)
Cash flows from financing activities:				
Payments under revolving line of credit	(15,000)	—	—	(15,000)
Borrowings under revolving line of credit	15,000	—	—	15,000
Payments on notes payable and long-term debt	(1,159)	(801)	—	(1,960)
Intercompany lending	(13,511)	6,495	7,016	—
Other financing activities	(655)	—	—	(655)
Net cash provided by (used in) financing activities	(15,325)	5,694	7,016	(2,615)
Effect of change in foreign currency exchange rates on cash, cash equivalents and restricted cash	—	—	151	151
Net increase (decrease) in cash, cash equivalents and restricted cash	(6,629)	(2)	974	(5,657)
Cash, cash equivalents and restricted cash at beginning of period	14,085	47	19,722	33,854
Cash, cash equivalents and restricted cash at end of period	$ 7,456	$ 45	$ 20,696	$ 28,197

The following table is a reconciliation of cash and cash equivalents to total cash, cash equivalents, and restricted cash:

	September 30, 2019			
	ION Geophysical Corporation	The Guarantors	All Other Subsidiaries	Total Consolidated
	(In thousands)			
Cash and cash equivalents	$ 7,153	$ 45	$ 20,696	$ 27,894
Restricted cash included in prepaid expenses and other current assets	303	—	—	303
Total cash, cash equivalents, and restricted cash shown in statements of cash flows	$ 7,456	$ 45	$ 20,696	$ 28,197

Statement of Cash Flows	ION Geophysical Corporation	The Guarantors	All Other Subsidiaries	Total Consolidated
	Nine Months Ended September 30, 2018			
	(In thousands)			
Cash flows from operating activities:				
Net cash provided by (used in) operating activities	$ (32,495)	$ 28,151	$ (2,980)	$ (7,324)
Cash flows from investing activities:				
Investment in multi-client data library	—	(17,427)	(2,484)	(19,911)
Proceeds from sale (purchase) of property, plant and equipment	(282)	91	(122)	(313)
Net cash used in investing activities	(282)	(17,336)	(2,606)	(20,224)
Cash flows from financing activities:				
Payments under revolving line of credit	(10,000)	—	—	(10,000)
Payments on notes payable and long-term debt	(29,879)	(192)	—	(30,071)
Intercompany lending	8,555	(10,671)	2,116	—
Net proceeds from issuance of stock	46,999	—	—	46,999
Dividend payment to non-controlling interest	(200)	—	—	(200)
Other financing activities	(1,489)	—	—	(1,489)
Net cash provided by (used in) financing activities	13,986	(10,863)	2,116	5,239
Effect of change in foreign currency exchange rates on cash, cash equivalents and restricted cash	—	—	296	296
Net decrease in cash, cash equivalents and restricted cash	(18,791)	(48)	(3,174)	(22,013)
Cash, cash equivalents and restricted cash at beginning of period	39,707	66	12,646	52,419
Cash, cash equivalents and restricted cash at end of period	$ 20,916	$ 18	$ 9,472	$ 30,406

The following table is a reconciliation of cash and cash equivalents to total cash, cash equivalents, and restricted cash:

	ION Geophysical Corporation	The Guarantors	All Other Subsidiaries	Total Consolidated
	September 30, 2018			
	(In thousands)			
Cash and cash equivalents	$ 20,553	$ 18	$ 9,472	$ 30,043
Restricted cash included in prepaid expenses and other current assets	60	—	—	60
Restricted cash included in other long-term assets	303	—	—	303
Total cash, cash equivalents, and restricted cash shown in statement of cash flows	$ 20,916	$ 18	$ 9,472	$ 30,406

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

Executive Summary

Our Business

In this Form 10-Q, "ION Geophysical," "ION," "the company" (or, "the Company"), "we," "our," "ours" and "us" refer to ION Geophysical Corporation and its consolidated subsidiaries, except where the context otherwise requires or as otherwise indicated.

The information contained in this Quarterly Report on Form 10-Q contains references to trademarks, service marks and registered marks of ION and our subsidiaries, as indicated. Except where stated otherwise or unless the context otherwise requires, the terms "Marlin," "Marlin SmartPorts," "Gator," "SailWing," and "4Sea" refers to the Marlin™, Marlin SmartPorts™, Gator™, SailWing™ and 4Sea™ trademarks and service marks owned by ION.

We have been a technology leader for over 50 years with a strong history of innovation. While the traditional focus of our cutting-edge technology has been on the exploration and production ("E&P") industry, we are now broadening and diversifying our business into relevant adjacent markets such as offshore logistics, port management, harbor security, defense and marine robotics.

Leveraging innovative technologies, we create value through data capture, analysis and optimization to enhance companies' critical decision-making abilities and returns. Our offerings are focused on improving E&P decision-making and optimizing offshore operations. Our E&P offerings are designed to enable oil and gas companies to obtain higher resolution images of the Earth's subsurface to reduce their risk in hydrocarbon exploration and development. We acquire, process and interpret data from seismic surveys on a multi-client or proprietary basis. Multi-client surveys are pre-funded, or underwritten, in part by our customers, and we contract with third party seismic data acquisition companies to acquire the seismic data, all of which is intended to minimize our risk exposure. We serve customers in most major energy producing regions of the world from strategically located offices.

Seismic imaging plays a fundamental role in hydrocarbon exploration and reservoir development by delineating structures, rock types and fluid locations in the subsurface. Our technologies and services are used by E&P companies to generate high-resolution images of the Earth's subsurface to identify hydrocarbons and pinpoint drilling locations for wells and to monitor production from existing wells.

During the first quarter of 2019, we consolidated our operating segments from three into two, eliminating the separate presentation of our Ocean Bottom Integrated Technologies segment. This consolidation aligns with our asset light business model and evolved strategy to commercialize components of our next generation ocean bottom nodal system, 4Sea, instead of operating a crew. We are offering 4Sea components more broadly to the growing number of OBS service providers under recurring revenue commercial strategies that will enable us to share in the value our technology delivers. We may also license the right to manufacture and use the 4Sea nodal technology to a service provider on a value-based pricing model, such as a royalty stream. Revenues from 4Sea are being recognized through the relevant segments, either E&P Technology & Services or Operations Optimization.

We provide our services and products through two business segments: E&P Technology & Services and Operations Optimization. In addition, we have a 49% ownership interest in our INOVA Geophysical Equipment Limited joint venture ("INOVA Geophysical" or "INOVA").

The advanced technologies we currently offer include our Orcaand Gator command and control software systems, Full Waveform Inversion ("FWI") data processing technology, Marlin operations optimization software, and other technologies, each of which is designed to deliver improvements in image quality, safety and/or productivity. In 2017, we introduced our fully integrated ocean bottom nodal system, 4Sea, which is designed to deliver a step change in economics, QHSE performance and final image delivery time, creating more value for clients by providing data in time for critical reservoir decisions, such as determining drilling locations and informing enhanced recovery techniques.

We made significant headway on the commercialization of 4Sea and SailWing, which target one of the real growth segments in our industry.

We have approximately 600 patents and pending patent applications in various countries around the world. Approximately 40% of our employees are in technical roles and over 19% of our employees have advanced degrees.

As of September 30, 2019, BGP Inc. ("BGP") owns 10.6% of our outstanding common stock. BGP is a subsidiary of China National Petroleum Corporation, and is generally regarded as the world's largest land geophysical service contractor.

E&P Technology & Services. Our E&P Technology & Services segment provides three distinct activities that often work together.

Our E&P Technology & Services segment creates digital data assets and delivers services to help E&P companies improve decision-making, reduce risk and maximize value. For example, E&P Technology & Services provides information to better understand new frontiers or complex subsurface geologies, how to maximize portfolio value, or how to optimize license round success and acreage values.

Our Ventures group leverages the world-class geoscience skills of both the Imaging Services and E&P Advisors groups to create global digital data assets that are licensed to multiple E&P companies to optimize their investment decisions. The global data library consists of over 652,000 km of 2-D and 250,000 sq. km of 3-D multi-client seismic data in virtually all major offshore petroleum provinces. Ventures provides services to manage multi-client or proprietary surveys, from survey planning and design to data acquisition and management, to final subsurface imaging and reservoir characterization. We focus on the technologically intensive components of the image development process, such as survey planning and design, and data processing and interpretation, while outsourcing asset-intensive components (such as field acquisition) to experienced contractors.

Our Imaging Services group offers data processing and imaging services designed to maximize image quality, helping E&P companies reduce exploration and production risk, evaluate and develop reservoirs, and increase production. Imaging Services develops subsurface images by applying its processing technology to data owned or licensed by its customers. We maintain approximately 19 petabytes of digital seismic data storage in four global data centers, including a core data center located in Houston.

Our E&P Advisors provide technical, commercial and strategic advice to host governments, E&P companies and private equity firms to evaluate oil and gas opportunities and/or assets worldwide, sharing in the value we create.

Operations Optimization. Our Operations Optimization segment develops mission-critical subscription offerings and provides engineering services that enable operational control and optimization offshore. This segment is comprised of our Optimization Software & Services and Devices offerings.

Our Optimization Software & Services group provides command and control software systems for marine towed streamer and ocean bottom seismic operations as well as survey design software and related services. Our Orca software is installed on towed streamer marine vessels worldwide, and our Gator software is used by ocean bottom seismic crews. Our latest offering, Marlin is used to optimize offshore operations, including a holistic digital management of ports and harbors operations through Marlin SmartPorts.

Our Devices group is engaged in the manufacture and repair of marine towed streamer positioning and control systems, analog geophone sensors and compasses, which have been deployed in marine robotics, scientific, E&P and other commercial applications.

Our team develops re-deployable OBS acquisition technology. We introduced our fully integrated ocean bottom nodal system, 4Sea, in 2017. 4Sea is differentiated in its ability to deliver a step change in economics, QHSE performance and final image delivery time, creating more value for the client by providing information in time for critical decisions, such as determining drilling locations, fluid injections, and the like.

We are pursuing two asset light business models for commercializing our 4Sea technology that we believe will deliver a higher, more sustainable return over the long-term for our shareholders. The first is making the individual components of 4Sea available more broadly to all OBS service providers on a value-based pricing model, allowing us to participate in the success we enable. The second approach is to license the right to manufacture and use the 4Sea nodal technology to a service provider on a value-based pricing model, such as a royalty stream.

INOVA Geophysical. Historically, we conducted our land seismic equipment business through INOVA Geophysical, which is a joint venture with BGP. BGP owns a 51% equity interest in INOVA Geophysical, and we own the remaining 49% interest. INOVA manufactures cable-based and cableless data acquisition systems, digital sensors, vibroseis vehicles (i.e., vibrator trucks) and source controllers for land seismic surveys. We wrote our investment in INOVA down to zero as of December 31, 2014.

WesternGeco Litigation Update

On August 30, 2019, the District Court refused WesternGeco’s request to reinstate the lost profits awards against us, and instead ordered a new trial to determine what lost profits, if any, WesternGeco is entitled to from surveys performed by our customers outside of the United States.

The District Court’s basis for granting the new trial as to lost profits was that, subsequent to the jury verdict that awarded lost profits, the Patent Trial and Appeal Board (“PTAB”) of the Patent and Trademark Office, in an administrative proceeding, invalidated four of the five patent claims that formed the basis for the lost profits judgment against us (that is, the PTAB held that those four patent claims should never have been granted), and the Court of Appeals and the Supreme Court both subsequently refused to overturn that finding. A trial date for the new trial has not yet been set.

See Note 8 “*Litigation*” of *Footnotes to Unaudited Condensed Financial Statements”* and Part II - Item 1. *“Legal Proceedings”* for further details.

Macroeconomic Conditions

Demand for our services and products is cyclical and dependent upon activity levels in the oil and gas industry, particularly our customers’ willingness to invest capital in the exploration for oil and natural gas. Our customers’ capital spending programs are generally based on their outlook for near-term and long-term economic growth, resource supply and demand, and commodity prices. Oil and gas projections suggest continued demand growth may create a supply gap in the middle of the next decade that production from US shale developments may be unable to meet, necessitating offshore exploration and development. The decline rate in existing oil fields is about 10%, which can be reduced to about 5% per year with infill and other enhanced recovery techniques. Due to the time it takes to develop and start producing oil and gas from new discoveries offshore, there’s an increasing need to reinvest in conventional resources offshore to meet demand in the middle of the next decade. We’re starting to see increasing pressure for a resumption in offshore investment and exploration activity to replace reserves and existing production.

Third-party reports indicate that global exploration and production spending is expected to increase by 8% in 2019, consistent with 8% in 2018 and up from 4% growth in 2017. In addition, this is the second consecutive year that international spending is expected to increase, where our offerings are more relevant.

The following is a summary of recent oil and gas pricing trends:

	Average Price [(a)]		
Quarter Ended	**Brent Crude (per bbl)**	**WTI Crude (per bbl)**	**Henry Hub Natural Gas (per mcf)**
9/30/2019	61.95	56.34	2.38
6/30/2019	69.04	59.88	2.57
3/31/2019	63.10	54.82	2.92
12/31/2018	67.99	59.50	3.77
9/30/2018	75.07	69.69	2.93
6/30/2018	74.44	67.60	2.84
3/31/2018	66.95	62.96	3.08

(a) Source: U.S. Energy Information Administration (“EIA”).

Oil prices rose pretty steadily in the first half of 2018 due to moderate global demand growth and continued OPEC production cut compliance, the combination of which resulted in relative market equilibrium. In late June 2018, OPEC voted to boost production to offset potential losses due to sanctions in Venezuela and Iran as well as underproduction by some OPEC countries. However, those shortage concerns quickly dissipated as supply started outpacing demand due to Iran sanction waivers and higher than expected United States production. Crude prices dropped to nearly $50 per barrel before the end of 2018, reflecting global oil inventory builds and at or near record levels of production from the world’s three largest producers - the United States, Saudi Arabia and Russia. The EIA forecasts the Brent crude oil spot price will average $59 per barrel in the fourth quarter of 2019 and $60 per barrel in 2020, compared with an average of $71 per barrel in 2018. The EIA further noted that despite the recent increase in supply disruption due to attacks on major Saudi Arabian oil infrastructure, continued oil price pressure is expected as global inventories rise during the first half of 2020. The lower 2019 price forecast largely reflects uncertainty about the strength of global oil demand growth.

Given the historical volatility of crude prices, there is a continued risk that if commodity prices do not continue to improve, or if they start to deteriorate again, demand for our services and products could decline.

Impact to Our Business

We are seeing signs of increasing activity in our business, primarily due to the strategic shift we made to move our offerings closer to the reservoir and the associated continued success of our 3-D multi-client reimaging programs as well as clients starting to renew interest in conventional offshore exploration. Generally, our revenue and EBITDA generation starts off slowly as customers set budgets in the first quarter, then picks up as they firm up plans throughout the year. Investments in our multi-client data library are dependent upon the timing of our new venture projects and the availability of underwriting by our customers. We continue to maintain high standards for underwriting new projects. Our asset light strategy enables us to scale our business to market conditions avoiding significant fixed costs and maintaining flexibility to manage the timing and amount of our capital expenditures.

In our E&P Technology & Services segment, new venture revenues decreased compared to the third quarter of 2018. This decrease was more than offset by the significant increase in our data library revenues. We invested $21.2 million in our multi-client data library during the first three quarters of 2019 and we expect investments in our multi-client data library to be in the range of $30.0 million to $35.0 million for 2019 (a portion of which will be pre-funded or underwritten by our customers) compared to the $28.3 million invested in 2018.

As of September 30, 2019, our E&P Technology & Services segment backlog, which consists of commitments for (i) Imaging Services work, (ii) new venture projects (both multi-client and proprietary) by our Ventures group underwritten by our customers and (iii) E&P Advisor projects, was $24.8 million compared to $21.9 million at December 31, 2018 and $33.1 million at September 30, 2018. The majority of our backlog relates to our multi-client seismic programs and our proprietary Imaging Services work. We anticipate that the majority of our backlog will be recognized as revenue over the remainder of 2019 and early 2020.

Within the Operations Optimization segment, both our Optimization Software & Services revenues and Devices revenues increased compared to the third quarter of 2018.

It is our view that technologies that provide a competitive advantage through improved imaging, lower costs, higher productivity, or enhanced safety will continue to be valued in our marketplace. We believe that our newest technologies, such as Marlin and 4Sea, will continue to attract customer interest because these technologies are designed to deliver those desirable attributes.

Key Financial Metrics

The table below provides an overview of key financial metrics for our company as a whole and our two business segments for the three and nine months ended September 30, 2019, compared to the same period of 2018.

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
	(in thousands, except share data)			
Net revenues:				
E&P Technology & Services:				
New Venture	$ 5,905	$ 18,218	$ 24,394	$ 40,069
Data Library	27,288	13,956	55,030	21,629
Total multi-client revenues	33,193	32,174	79,424	61,698
Imaging Services	7,048	4,147	16,443	14,379
Total	40,241	36,321	95,867	76,077
Operations Optimization:				
Devices	6,103	5,356	18,455	14,275
Optimization Software & Services	6,895	5,523	17,648	15,099
Total	12,998	10,879	36,103	29,374
Total net revenues	$ 53,239	$ 47,200	$ 131,970	$ 105,451

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Gross profit (loss):				
E&P Technology & Services	$ 18,316	$ 12,139	$ 36,113	$ 11,626
Operations Optimization	6,972	5,736	18,670	14,980
Segment gross profit	25,288	17,875	54,783	26,606
Other	—	(1,400) (a)	—	(4,795) (a)
Total gross profit	$ 25,288	$ 16,475	$ 54,783	$ 21,811
Gross margin:				
E&P Technology & Services	46 %	33 %	38 %	15 %
Operations Optimization	54 %	53 %	52 %	51 %
Segment gross margin	47 %	38 %	42 %	25 %
Other	— %	(3)%	— %	(4)%
Total gross margin	47 %	35 %	42 %	21 %
Income (loss) from operations:				
E&P Technology & Services	$ 11,878	$ 6,578	$ 15,500	$ (4,422)
Operations Optimization	2,994	1,963	5,808	3,992
Support and other	(11,014) (b)	(10,993) (b)	(35,940) (c)	(37,181) (c)
Income (loss) from operations	$ 3,858	$ (2,452)	$ (14,632)	$ (37,611)
Operating margin:				
E&P Technology & Services	30 %	18 %	16 %	(6)%
Operations Optimization	23 %	18 %	16 %	14 %
Support and other	(21)%	(23)%	(27)%	(35)%
Total operating margin	7 %	(5)%	(11)%	(36)%
Net loss attributable to ION	$ (3,723)	$ (7,536)	$ (33,705)	$ (51,828)
Special items:	732 (d)	275 (e)	5,552 (f)	4,013 (g)
Net loss attributable to ION, as adjusted	$ (2,991)	$ (7,261)	$ (28,153)	$ (47,815)
Net loss per share:				
Basic	$ (0.26)	$ (0.54)	$ (2.39)	$ (3.81)
Diluted	$ (0.26)	$ (0.54)	$ (2.39)	$ (3.81)
Net loss per share as adjusted:				
Basic	$ (0.21)	$ (0.52)	$ (2.00)	$ (3.52)
Diluted	$ (0.21)	$ (0.52)	$ (2.00)	$ (3.52)
Weighted average number of common shares outstanding:				
Basic	14,181	14,003	14,104	13,586
Diluted	14,181	14,003	14,104	13,586

(a) Relates to gross loss primarily related to depreciation expense of our previously reported Ocean Bottom Integrated Technologies segment.
(b) Includes loss from operations of our previously reported Ocean Bottom Integrated Technologies segment of $0.7 million and $2.8 million for the three months ended September 30, 2019 and 2018, respectively, which consists of item (a) above and operating expense of $0.7 million and $1.4 million for the three months ended September 30, 2019 and 2018, respectively.
(c) Includes loss from operations of our previously reported Ocean Bottom Integrated Technologies segment of $2.3 million and $8.6 million for the nine months ended September 30, 2019 and 2018, respectively, which consists of item (a) above and operating expense of $2.3 million and $3.8 million for the nine months ended September 30, 2019 and 2018, respectively.
(d) Represents stock appreciation right awards expense in the third quarter of 2019.
(e) Represents stock appreciation right awards and related expenses in the third quarter of 2018.
(f) Represents severance expense of $2.8 million and stock appreciation right awards expense of $2.7 million for the nine months ended September 30, 2019.
(g) Represents stock appreciation right awards and related expenses for the nine months ended September 30, 2018.

We intend that the following discussion of our financial condition and results of operations will provide information that will assist in understanding our condensed consolidated financial statements, the changes in certain key items in those financial statements from period to period, and the primary factors that accounted for those changes. The financial results are reported in accordance with Generally Accepted Accounting Principles ("GAAP"). However, management believes that certain non-GAAP performance measures may provide users of this financial information, additional meaningful comparisons between current results and results in prior operating periods. One such non-GAAP financial measure is Net loss attributable to ION as adjusted or adjusted net loss, which excludes certain charges or amounts. This adjusted net loss amount is not a measure of financial performance under GAAP. Accordingly, it should not be considered as a substitute for income (loss) from operations, net loss or other income data prepared in accordance with GAAP.

For a discussion of factors that could impact our future operating results and financial condition, see (i) Item 1A. "*Risk Factors*" in our Annual Report on Form 10-K for the year ended December 31, 2018, and (ii) Item 1A. "*Risk Factors*" in Part II of this Form 10-Q.

Results of Operations

Three Months Ended September 30, 2019 Compared to Three Months Ended September 30, 2018

Our consolidated net revenues of $53.2 million for the three months ended September 30, 2019 (the "Current Quarter") increased by $6.0 million, or 13%, compared to total net revenues of $47.2 million for the three months ended September 30, 2018 (the "Comparable Quarter"). Our total gross margin was 47% in the Current Quarter, as compared to 35% in the Comparable Quarter. Our segment gross margin was 47% in the Current Quarter as compared to 38% in the Comparable Quarter. For the Current Quarter, our income from operations was $3.9 million, compared to a loss of $2.5 million for the Comparable Quarter.

Net loss for the Current Quarter was $3.7 million, or $(0.26) per share, compared to $7.5 million, or $(0.54) per share, for the Comparable Quarter. Adjusted net loss for the Current Quarter was $3.0 million, or $(0.21) per share, compared to $7.3 million, or $(0.52) per share for the Comparable Quarter.

Net Revenues, Gross Profits and Gross Margins

E&P Technology & Services — Net revenues for the Current Quarter increased by $3.9 million, or 11%, to $40.2 million, compared to $36.3 million for the Comparable Quarter. Within the E&P Technology & Services segment, total multi-client revenues were $33.2 million, an increase of 3%. The increase in our Data Library revenues was primarily attributable to sales of our Brazil 3D reimaging programs, and to a lesser extent revenues from data sales in North America. Our Current Quarter New Venture revenues decreased compared to the Comparable Quarter primarily due to the scale and timing of new multi-client programs. Imaging Services revenues were $7.0 million, a $2.9 million increase compared to the Comparable Quarter. The Current Quarter reflects a gross profit of $18.3 million, representing a 46% gross margin, compared to a gross profit of $12.1 million, or 33% gross margin, in the Comparable Quarter. These improvements in gross profit and margin were due to an increase in Imaging Services revenues and a more favorable mix of multi-client revenues.

Operations Optimization — Total net revenues for the Current Quarter increased by $2.1 million, or 19% to $13.0 million, compared to $10.9 million for the Comparable Quarter. Optimization Software & Services net revenues for the Current Quarter increased by $1.4 million, or 25% to $6.9 million, compared to $5.5 million for the Comparable Quarter due to an increase in deployments of and associated engineering services related to our Marlin offshore operations optimization software. Devices net revenues for the Current Quarter increased by $0.7 million, or 14%, to $6.1 million, compared to $5.4 million for the Comparable Quarter primarily due to an increase in sales of marine equipment replacement parts and repair revenues. The Current Quarter reflects a gross profit of $7.0 million, representing a 54% gross margin compared to a gross profit of $5.7 million, representing a 53% gross margin for the Comparable Quarter.

Operating Expenses

Research, Development and Engineering — Research, development and engineering expense was consistent with Comparable Quarter.

Marketing and Sales — Marketing and sales expense was consistent with Comparable Quarter.

General, Administrative and Other Operating Expenses — General, administrative and other operating expenses were $11.0 million for the Current Quarter, an increase of $2.3 million, or 26% compared to $8.7 million for the Comparable Quarter primarily due to an increase in compensation expense.

Other Items

Interest Expense, Net — Interest expense, net, was $3.2 million for the Current Quarter compared to $3.0 million for the Comparable Quarter. The increase in interest expense resulted from finance leases that started during the third quarter of 2018. For additional information, please refer to "*Liquidity and Capital Resources — Sources of Capital*" below.

Income Tax Expense — Income tax expense for the Current Quarter was $3.8 million compared to $2.1 million for the Comparable Quarter. Our effective tax rates for the Current Quarter and Comparable Quarter were 822.1% and (38.6)%, respectively. The income tax expense for the Current Quarter and Comparable Quarter primarily relates to results generated by our non-U.S. businesses. Our effective tax rates for the Current Quarter and Comparable Quarter were negatively impacted by the change in valuation allowance related to U.S. operating losses for which we cannot currently recognize a tax benefit. See further discussion of establishment of the deferred tax valuation allowance at Footnote 7 "*Income Taxes*" of *Footnotes to Condensed Consolidated Financial Statements.*

Nine Months Ended September 30, 2019 Compared to Nine Months Ended September 30, 2018

Our consolidated net revenues of $132.0 million for the nine months ended September 30, 2019 (the "Current Period") increased by $26.5 million, or 25%, compared to total net revenues of $105.5 million for the nine months ended September 30, 2018 (the "Comparable Period"). Our total gross margin for the Current Period was 42%, compared to 21%, for the Comparable Period. Our segment gross margin was 42% in the Current Period as compared to 25% in the Comparable Period. For the Current Period, our loss from operations was $14.6 million, compared to $37.6 million, for the Comparable Period.

Net loss for the Current Period was $33.7 million, or $(2.39) per share, compared to $51.8 million, or $(3.81) per share, in the Comparable Period. Adjusted net loss for the Current Period was $28.2 million, or $(2.00) per share, compared to $47.8 million, or $(3.52) per share for the Comparable Period.

Net Revenues, Gross Profits and Gross Margins

E&P Technology & Services — Net revenues for the Current Period increased by $19.8 million, or 26%, to $95.9 million, compared to $76.1 million for the Comparable Period. Within our multi-client, Data Library revenues increased primarily due to sales of North and South American data. This increase was partially offset by a decline in our New Venture revenues due to the scale and timing of new multi-client programs. Increase in Imaging Services revenues resulted from utilization of backlog during the Current Quarter. Gross profit increased by $24.5 million to $36.1 million, or 38% gross margin, compared to $11.6 million, or 15% gross margin, in the Comparable Period. These improvements in gross profit and margin were due to the higher volume and mix of data library programs not subject to royalty expenses.

Operations Optimization — Total net revenues for the Current Period increased by $6.7 million or 23%, to $36.1 million compared to $29.4 million for the Comparable Period. Optimization Software & Services net revenues for the Current Period increased by $2.5 million, or 17%, to $17.6 million compared to $15.1 million for the Comparable Period. Devices net revenues for the Current Period increased by $4.2 million, or 29%, to $18.5 million, compared to $14.3 million. The change in revenues during the Current Period is consistent with the changes described for the Current Quarter discussed above. Gross profit increased by $3.7 million to $18.7 million, representing a 52% gross margin, for the Current Period compared to $15.0 million, representing a 51% gross margin, for the Comparable Period.

Operating Expenses

Research, Development and Engineering — Research, development and engineering expense was $15.4 million for the Current Period, an increase of $1.9 million, or 14%, compared to $13.5 million for the Comparable Period due to higher spend in developing imaging algorithms and infrastructure, devices and software. We see significant long-term potential to invest in offerings that are designed to improve image quality, safety and productivity, which drives our investment decisions.

Marketing and Sales — Marketing and sales expense was $17.4 million for the Current Period, an increase of $1.1 million, or 7%, compared to $16.3 million, for the Comparable Period, primarily due to increased commission expenses driven by increased sales in the E&P Technology and Services segment.

General, Administrative and Other Operating Expenses — General, administrative and other operating expenses were $36.6 million for the Current Period, an increase of $7.0 million, or 24%, compared to $29.6 million for the Comparable Period. This increase was primarily due to an increase in compensation expense related to severance expense and stock compensation expense.

Other Items

Interest Expense, net — Interest expense, net, was $9.4 million for the Current Period compared to $9.8 million for the Comparable Period. The decrease in interest expense resulted from lower outstanding debt during the Current Period. For additional information, please refer to "*Liquidity and Capital Resources — Sources of Capital*" below.

Income Tax Expense — Income tax expense for the Current Period was $7.9 million compared to $3.3 million for the Comparable Period. Our effective tax rates for the Current Period and Comparable Period were (31.7)% and (6.9)%, respectively. Our income tax expense for the Current Period and Comparable Period, were primarily related to results from our non-US businesses. Our effective tax rate for the Current Period and Comparable Period was negatively impacted by the change in valuation allowance related to U.S. operating losses for which we cannot currently recognize a tax benefit. See further discussion of establishment of the deferred tax valuation allowance at Footnote 7 "*Income Taxes*" of *Notes to Condensed Consolidated Financial Statements.*

Liquidity and Capital Resources

Sources of Capital

As of September 30, 2019, we had total liquidity of $65.5 million, consisting of $27.9 million of cash on hand and $37.6 million of available borrowing capacity under our Credit Facility. Our cash requirements include working capital requirements and cash required for our debt service payments, multi-client seismic data acquisition activities and capital expenditures. As of September 30, 2019, we had working capital of $(19.7) million. Excluding current maturities of operating lease liabilities, our working capital would have been $(8.1) million. Working capital requirements are primarily driven by our investment in our multi-client data library ($21.2 million in the Current Period and $30.0 million to $35.0 million for the full year, a portion of which will be pre-funded or underwritten by our customers) and royalty payments for multi-client sales. Also, our headcount has traditionally been a significant driver of our working capital needs. As a significant portion of our business is involved in the planning, processing and interpretation of seismic data services, one of our largest investments is in our employees, which requires cash expenditures for their salaries, bonuses, payroll taxes and related compensation expenses, including stock appreciation awards, typically in advance of related revenue billings and collections.

Our working capital requirements may change from time to time depending upon many factors, including our operating results and adjustments in our operating plan in response to industry conditions, competition and unexpected events. In recent years, our primary sources of funds have been cash flows generated from operations, existing cash balances, debt and equity issuances and borrowings under our Credit Facility.

Revolving Credit Facility

On August 16, 2018, we and our material U.S. subsidiaries — GX Technology Corporation, ION Exploration Products (U.S.A), Inc. and I/O Marine Systems, Inc. (the "Material U.S. Subsidiaries") — along with GX Geoscience Corporation, S. de R.L. de C.V., a limited liability company (Sociedad de Responsibilidad Limitada de Capital Variable) organized under the laws of Mexico, and a subsidiary of the Company (the "Mexican Subsidiary") (the Material U.S. Subsidiaries and the Mexican Subsidiary are collectively, the "Subsidiary Borrowers", together with ION Geophysical Corporation are the "Borrowers") — the financial institutions party thereto, as lenders, and PNC Bank, National Association ("PNC"), as agent for the lenders, entered into that certain Third Amendment and Joinder to Revolving Credit and Security Agreement (the "Third Amendment"), amending the Revolving Credit and Security Agreement, dated as of August 22, 2014 (as previously amended by the First Amendment to Revolving Credit and Security Agreement, dated as of August 4, 2015 and the Second Amendment to Revolving Credit and Security Agreement, dated as of April 28, 2016, the "Credit Agreement"). The Credit Agreement, as amended by the First Amendment, the Second Amendment and the Third Amendment is herein called the "Credit Facility"). The Third Amendment amended the Credit Agreement to, among other things:

- extend the maturity date of the Credit Facility by approximately four years (from August 22, 2019 to August 16, 2023), subject to our retirement or extension of the maturity date of our Second Lien Notes, as defined below, which mature on December 15, 2021;
- increase the maximum revolver amount by $10.0 million (from $40.0 million to $50.0 million);
- increase the borrowing base percentage of the net orderly liquidation value as it relates to the multi-client data library (not to exceed $28.5 million, up from the previous maximum of $15.0 million for the multi-client data library component);
- include the eligible billed receivables of the Mexican Subsidiary up to a maximum of $5.0 million in the borrowing base calculation and joins the Mexican Subsidiary as a borrower thereunder (with a maximum exposure of $5.0 million) and require the equity and assets of the Mexican Subsidiary to be pledged to secure obligations under the facility;
- modify the interest rate such that the maximum interest rate remains consistent with the fixed interest rate prior to the Third Amendment (that is, 3.00% per annum for domestic rate loans and 4.00% per annum for LIBOR rate loans), but now lowers the range down to a minimum interest rate of 2.00% for domestic rate loans and 3.00% for LIBOR rate loans based on a leverage ratio for the preceding four-quarter period;
- decrease the minimum excess borrowing availability threshold which (if the Borrowers have minimum excess borrowing availability below any such threshold) triggers the agent's right to exercise dominion over cash and deposit accounts; and

- modify the trigger required to test for compliance with the fixed charges coverage ratio.

The borrowing base under the Credit Facility will increase or decrease monthly using a formula based on certain eligible receivables, eligible inventory and other amounts, including a percentage of the net orderly liquidation value of the Borrowers' multi-client data library. As of September 30, 2019, the undrawn borrowing base availability under the Credit Facility was $37.6 million, and there was no outstanding indebtedness under the Credit Facility. The maturity of the Credit Facility will accelerate to October 31, 2021 if we are unable to repay or extend the maturity of the Second Lien Notes.

The Credit Facility requires us to maintain compliance with various covenants. AtSeptember 30, 2019, we were in compliance with all of the covenants under the Credit Facility. For further information regarding our Credit Facility, see above Footnote 5 "*Long-term Debt*" of *Footnotes to Condensed Consolidated Financial Statements*.

Senior Secured Notes

As of September 30, 2019, ION Geophysical Corporation's 9.125% Senior Secured Second Priority Notes due December 2021 (the "Second Lien Notes") had an outstanding aggregate principal amount of $120.6 million and are senior secured second-priority obligations guaranteed by the Material U.S. Subsidiaries and the Mexican Subsidiary. Interest on the Second Lien Notes is payable semiannually in arrears on June 15 and December 15 of each year during their term, except that the interest payment otherwise payable on June 15, 2021 will be payable on December 15, 2021.

The April 2016 indenture governing the Second Lien Notes contains certain covenants that, among other things, limits or prohibits our ability and the ability of our restricted subsidiaries to take certain actions or permit certain conditions to exist during the term of the Second Lien Notes, including among other things, incurring additional indebtedness in excess of permitted indebtedness, creating liens, paying dividends and making other distributions in respect of our capital stock, redeeming our capital stock, making investments or certain other restricted payments, selling certain kinds of assets, entering into transactions with affiliates, and effecting mergers or consolidations. These and other restrictive covenants contained in the Second Lien Notes Indenture are subject to certain exceptions and qualifications. All of our subsidiaries are currently restricted subsidiaries.

At September 30, 2019, we were in compliance with all of the covenants under the Second Lien Notes.

On or after December 15, 2019, we may, on one or more occasions, redeem all or a part of the Second Lien Notes at the redemption prices set forth below, plus accrued and unpaid interest and special interest, if any, on the Second Lien Notes redeemed during the twelve-month period beginning on December 15th of the years indicated below:

Date	Percentage
2019	105.50%
2020	103.50%
2021 and thereafter	100.00%

Meeting our Liquidity Requirements

As of September 30, 2019, our total outstanding indebtedness (including equipment finance leases) was approximately$120.5 million, consisting primarily of approximately $120.6 million outstanding Second Lien Notes, $2.1 million of equipment finance leases and other short-term debt, partially offset by$2.2 million of debt issuance costs. As of September 30, 2019, there was no outstanding indebtedness under our Credit Facility.

For the Current Period, total capital expenditures, including the investments in our multi-client data library, were$22.5 million. We expect that our capital expenditures related to investments in our multi-client data library this year to be in the range of $30.0 million to $35.0 million, a portion of which will be pre-funded or underwritten by our customers. We expect capital expenditures related to property, plant and equipment to be in the range of $3.0 million to $5.0 million in 2019.

We believe that our existing cash balance, cash from operations and undrawn availability under our Credit Facility will be sufficient to meet our anticipated cash needs for at least the next twelve months. However, as described at Part II, Item 1. "*Legal Proceedings,*" there are possible scenarios involving an outcome in the WesternGeco lawsuit that could materially and adversely affect our liquidity, financial condition and results of operations.

Cash Flow from Operations

In the Current Period, we generated $19.3 million of cash from operating activities compared to cash used from operating activities of$7.3 million for the Comparable Period. The increase was driven primarily by collections of our combined accounts and unbilled receivable balance resulting from improved revenues in the Current Period.

Cash Flow from Investing Activities

Cash used in investing activities was $22.5 million in the Current Period compared to $20.2 million for the Comparable Period. The principal uses of cash in our investing activities during the Current Period were $21.2 million invested in our multi-client data library and $1.3 million for capital expenditures related to property, plant and equipment.

The principal use of cash in our investing activities during the Comparable Period were $19.9 million invested in our multi-client data library and $0.3 million for capital expenditures related to property, plant and equipment.

Cash Flow from Financing Activities

Net cash used in financing activities was $2.6 million in the Current Period, compared to $5.2 million of cash provided by financing activities in the Comparable Period. Cash used in financing activities was related to $2.0 million of payments of long-term debt, including equipment finance leases in the Current Period.

The net cash provided by financing activities during the Comparable Period was related to $47.0 million of net cash received from our equity offering, $30.1 million of payments of long-term debt, including equipment finance leases, and a $10.0 million repayment of our Credit Facility in the Comparable Period.

Inflation and Seasonality

Inflation in recent years has not had a material effect on our cost of goods or labor, or the prices for our products or services. Traditionally, our business has been seasonal, with strongest demand often occurring in the second half of our fiscal year.

Critical Accounting Policies and Estimates

Refer to our Annual Report on Form 10-K for the year ended December 31, 2018, for a complete discussion of our significant accounting policies and estimates.

Leases

On January 1, 2019, we adopted Accounting Standards Update (“ASU”) 2016-2, *“Leases (Topic 842)”* using the modified retrospective method. This ASU requires the recognition of lease assets and lease liabilities by lessees for those leases classified as operating leases under the previous guidance. We used January 1, 2018, the beginning of the earliest comparative period presented in our condensed consolidated financial statements as our date of initial application. We elected the practical expedients upon transition which will retain the lease classification for leases and any unamortized initial direct costs that exist prior to the adoption of the standard.

The adoption of the standard resulted in $59.5 million and $70.6 million of right-of-use (“ROU”) assets and operating lease liabilities, respectively, on our condensed consolidated balance sheets as of January 1, 2018 and no impact on our condensed consolidated statements of operations and cash flows. The difference between the ROU assets and operating lease liabilities is due to the derecognition of $11.1 million in deferred rent recorded within other long-term liabilities. There was no impact on the condensed consolidated statements of operations and cash flows. The standard had no impact on our debt covenant compliance under existing agreements.

We determine if an arrangement is a lease at inception by considering whether (1) explicitly or implicitly identified assets have been deployed in the agreement and (2) we obtain substantially all of the economic benefits from the use of that underlying asset and directs how and for what purpose the asset is used during the term of the agreement. Amounts related to operating leases are included in “Right-of-use assets”, “Current maturities of operating lease liabilities” and “Operating lease liabilities, net of current maturities” in the condensed consolidated balance sheets. Amounts related to finance leases are included in “Property, plant and equipment, net”, “Current maturities of long-term debt”, and “Long-term debt, net of current maturities” in the condensed consolidated balance sheets.

ROU assets represent our right to use an underlying asset for the lease term and operating lease liabilities represent our obligation to make lease payments arising from the lease. ROU assets are recognized at commencement date and consist of the present value of remaining lease payments over the lease term, initial direct costs, prepaid lease payments less any lease incentives. Operating lease liabilities are recognized at commencement date based on the present value of remaining lease payments over the lease term. We use the implicit rate, when readily determinable or the incremental borrowing rate based on the information available at commencement date to determine the present value of lease payments. The lease terms may include options to extend or terminate the lease when it is reasonably certain that we will exercise that option. Lease expense for lease payments is recognized on a straight-line basis over the lease term. Lease agreements with lease and non-lease components are accounted for separately. We do not recognize leases with terms of less than twelve months on the condensed consolidated balance sheets and recognize those lease payments in the condensed consolidated statements of operations on a straight-line basis over the lease term. In the event that our assumptions and expectations change, we may have to revise our ROU assets and operating lease liabilities. See Note 2

"*Recent Accounting Pronouncements*." and Note 11 "*Lease Obligations*." of *Notes to Condensed Consolidated Financial Statements* for further discussion.

Foreign Sales Risks

The majority of our foreign sales are denominated in U.S. dollars. Product revenues are allocated to geographical locations on the basis of the ultimate destination of the equipment, if known. If the ultimate destination of such equipment is not known, product revenues are allocated to the geographical location of initial shipment. Service revenues, which primarily relate to our E&P Technology & Services segment, are allocated based upon the billing location of the customer. For the Current and Comparable Periods, international sales comprised 75% and 76%, respectively, of total net revenues.

	Nine Months Ended September 30,	
	2019	2018
Net revenues by geographic area:	(In thousands)	
Latin America	$ 50,572	$ 37,356
North America	32,984	25,452
Europe	24,850	19,811
Asia Pacific	8,287	11,581
Africa	7,541	8,362
Middle East	6,364	1,907
Commonwealth of Independent States	1,372	982
Total	$ 131,970	$ 105,451

Credit Risks

For the nine months ended September 30, 2019 and 2018, we had one customer with sales that each exceeded 10% of our consolidated net revenues.

At September 30, 2019, we had two customers with balances that, combined, accounted for 40% of our total combined accounts receivable and unbilled receivable balances. At September 30, 2018, we had one customer with a balance that accounted for 29% of our total combined accounts receivable and unbilled receivable balances.

The loss of these customers or deterioration in our relationship with these customers could have a material adverse effect on our results of operations and financial condition.

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

Refer to Item 7A of our Annual Report on Form 10-K for the year ended December 31, 2018 for a discussion regarding our quantitative and qualitative disclosures about market risk. There have been no material changes to those disclosures during the Current Period.

Item 4. *Controls and Procedures*

Disclosure Controls and Procedures. Disclosure controls and procedures are designed to ensure that information required to be disclosed in the reports we file with or submit to the Securities and Exchange Commission (the "SEC") under the Securities Exchange Act of 1934, as amended (the "Exchange Act") is recorded, processed, summarized and reported within the time period specified by the SEC's rules and forms. Disclosure controls and procedures are defined in Rule 13a-15(e) under the Exchange Act, and they include, without limitation, controls and procedures designed to ensure that information required to be disclosed under the Exchange Act is accumulated and communicated to management, including the principal executive officer and the principal financial officer, as appropriate, to allow timely decisions regarding required disclosure.

Our management carried out an evaluation of the effectiveness of the design and operation of our disclosure controls and procedures as of September 30, 2019. Based upon that evaluation, our principal executive officer and principal financial officer have concluded that our disclosure controls and procedures were effective as of September 30, 2019.

Changes in Internal Control over Financial Reporting. There was not any change in our internal control over financial reporting that occurred during the three months ended September 30, 2019, which has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

PART II — OTHER INFORMATION

Item 1. ***Legal Proceedings***

WesternGeco

In June 2009, WesternGeco L.L.C. ("WesternGeco") filed a lawsuit against us in the United States District Court for the Southern District of Texas (the "District Court"). In the lawsuit, styled *WesternGeco L.L.C. v. ION Geophysical Corporation*, WesternGeco alleged that we infringed four of their patents concerning marine seismic surveys.

Trial began in July 2012, and the jury returned a verdict in August 2012. The jury found that we infringed the six "claims" contained in four of WesternGeco's patents by supplying our DigiFIN® lateral streamer control units from the United States. (In patent law, a "claim" is a technical legal term; an infringer infringes on one or more "claims" of a given patent.)

In May 2014, the District Court entered a Final Judgment against us in the amount of $123.8 million. The Final Judgment also enjoined us from supplying DigiFINs or any parts unique to DigiFINs in or from the United States. We conducted our business in compliance with the District Court's orders, and has reorganized our operations such that we no longer supplies DigiFINs or any parts unique to DigiFINs in or from the United States.

As of 2018, we paid WesternGeco the $25.8 million of the Final Judgment (the portion of the judgment representing reasonable royalty damages and enhanced damages, plus interest).

However, as further described below, the balance of the judgment against us ($98.0 million, representing lost profits from surveys performed by our customers outside of the United State, plus interest) has been vacated, and a new trial ordered, to determine what lost profit damages, if any, WesternGeco is entitled to.

The Final Judgment was vacated after it was appealed to the United States Court of Appeals for the Federal Circuit in Washington, D.C. (the "Court of Appeals"), then to the Supreme Court of the United States, which remanded the case, again, to the Court of Appeals.

On January 11, 2019, the Court of Appeals refused to disturb the award of reasonable royalties to WesternGeco (which the Company paid in 2016), but did not reinstate the lost profits award; rather, the Court of Appeals remanded the case back to the District Court to determine whether to hold a new trial as to lost profits.

On August 30, 2019, the District Court refused WesternGeco's request to reinstate the lost profits awards against us, and instead ordered a new trial to determine what lost profits, if any, WesternGeco is entitled to from surveys performed by our customers outside of the United States.

The District Court's basis for granting the new trial as to lost profits was that, subsequent to the jury verdict that awarded lost profits, the Patent Trial and Appeal Board ("PTAB") of the Patent and Trademark Office, in an administrative proceeding, invalidated four of the five patent claims that formed the basis for the lost profits judgment against us (that is, the PTAB held that those four patent claims should never have been granted), and the Court of Appeals and the Supreme Court both subsequently refused to overturn that finding. A trial date for the new trial has not yet been set.

We may not ultimately prevail in the litigation and we could be required to pay lost profits if and when a new judgment issues in the new trial. Our assessment that we do not have a loss contingency may change in the future due to developments at the District Court, and other events, such as changes in applicable law, and such reassessment could lead to the determination that a significant loss contingency is probable, which could have a material effect on our business, financial condition and results of operations. Our assessments disclosed in this Quarterly Report on Form 10-Q or elsewhere are based on currently available information and involve elements of judgment and significant uncertainties. See Note 8 "*Litigation*" of *Notes to Condensed Consolidated Financial Statements.*

Other Litigation

We have been named in various other lawsuits or threatened actions that are incidental to our ordinary business. Litigation is inherently unpredictable. Any claims against us, whether meritorious or not, could be time-consuming, cause us to incur costs and expenses, require significant amounts of management time and result in the diversion of significant operational resources. The results of these lawsuits and actions cannot be predicted with certainty. We currently believe that the ultimate resolution of these matters will not have a material adverse effect on our financial condition or results of operations or our liquidity.

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

This report contains or incorporates by reference statements concerning our future results and performance and other matters that are “forward-looking” statements within the meaning of Section 27A of the Securities Act of 1933, as amended (“Securities Act”), and Section 21E of the Securities Exchange Act of 1934, as amended (“Exchange Act”). These statements involve known and unknown risks, uncertainties, and other factors that may cause our or our industry’s results, levels of activity, performance, or achievements to be materially different from any future results, levels of activity, performance, or achievements expressed or implied by such forward-looking statements. In some cases, you can identify forward-looking statements by terminology such as “may,” “will,” “would,” “should,” “intend,” “expect,” “plan,” “anticipate,” “believe,” “estimate,” “predict,” “potential,” or “continue” or the negative of such terms or other comparable terminology. Examples of other forward-looking statements contained or incorporated by reference in this report include statements regarding:

- any additional damages or adverse rulings in the WesternGeco litigation and future potential adverse effects on our financial results and liquidity;
- future levels of our capital expenditures and of our customers for seismic activities;
- future oil and gas commodity prices;
- the effects of current and future worldwide economic conditions (particularly in developing countries) and demand for oil and natural gas and seismic equipment and services;
- future implication of our negative working capital and shareholders deficit, including future cash needs and availability of cash, to fund our operations and pay our obligations;
- the effects of current and future unrest in the Middle East, Africa, South America, and other regions;
- the timing of anticipated revenues and the recognition of those revenues for financial accounting purposes;
- the effects of ongoing and future industry consolidation, including, in particular, the effects of consolidation and vertical integration in the towed marine seismic streamers market;
- the timing of future revenue realization of anticipated orders for multi-client survey projects and data processing work in our E&P Technology & Services segment;
- future government laws or regulations pertaining to the oil and gas industry, including trade restrictions, embargoes and sanctions imposed by the U.S government;
- future government actions that may result in the deprivation of our contractual rights, including the potential for adverse decisions by judicial or administrative bodies in foreign countries with unpredictable or corrupt judicial systems;
- expected net revenues, gross margins, income from operations and net income for our services and products;
- future seismic industry fundamentals, including future demand for seismic services and equipment;
- future benefits to our customers to be derived from new services and products;
- future benefits to be derived from our investments in technologies, joint ventures and acquired companies;
- future growth rates for our services and products;
- the degree and rate of future market acceptance of our new services and products;
- expectations regarding E&P companies and seismic contractor end-users purchasing our more technologically-advanced services and products;
- anticipated timing and success of commercialization and capabilities of services and products under development and start-up costs associated with their development, including 4Sea and Marlin SmartPorts;
- future opportunities for new products and projected research and development expenses;
- expected continued compliance with our debt financial covenants;
- expectations regarding realization of deferred tax assets;
- expectations regarding the impact of the U.S. Tax Cuts and Jobs Act;
- anticipated results with respect to certain estimates we make for financial accounting purposes;
- future success dependent on our continuing ability to identify, hire, develop, motivate and retain skilled personnel for all areas of our organization;

- breaches to our systems could lead to loss of intellectual property, dissemination of highly confidential information, increased costs and impairment of our ability to conduct our operations; and
- compliance with the U.S. Foreign Corrupt Practices Act and other applicable U.S. and foreign laws prohibiting corrupt payments to government officials and other third parties.

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

(c) During the three months ended September 30, 2019, in connection with the vesting of (or lapse of restrictions on) shares of our restricted stock held by certain employees, we acquired shares of our common stock in satisfaction of tax withholding obligations that were incurred on the vesting date. The date of acquisition, number of shares and average effective acquisition price per share were as follows:

Period	(a) Total Number of Shares Acquired	(b) Average Price Paid Per Share	(c) Total Number of Shares Purchased as Part of Publicly Announced Plans or Program	(d) Maximum Number (or Approximate Dollar Value) of Shares That May Yet Be Purchased Under the Plans or Program
July 1, 2019 to July 31, 2019	—	$ —	Not applicable	Not applicable
August 1, 2019 to August 31, 2019	—	$ —	Not applicable	Not applicable
September 1, 2019 to September 30, 2019	29,377	$ 9.69	Not applicable	Not applicable
Total	29,377	$ 9.69		

Item 5. ***Other Information***

None.

Item 6. ***Exhibits***

31.1	Certification of Chief Executive Officer
31.2	Certification of Chief Financial Officer
32.1	Certification of Chief Executive Officer
32.2	Certification of Chief Financial Officer
10.22	Restricted Stock Agreement (Time Based) dated September 1, 2019 between the ION Geophysical Corporation and Christopher T. Usher filed on September 4, 2019 as Exhibit 10.1 to the Company’s Current Report on Form 8-K, and incorporated herein by reference.
10.23	Restricted Stock Agreement (Performance Based) dated September 1, 2019 between the ION Geophysical Corporation and Christopher T. Usher filed on September 4, 2019 as Exhibit 10.2 to the Company’s Current Report on Form 8-K, and incorporated herein by reference.
101	The following materials are formatted in Extensible Business Reporting Language (XBRL): (i) Condensed Consolidated Balance Sheets as of September 30, 2019 and December 31, 2018, (ii) Condensed Consolidated Statements of Operations for the three- and nine-months ended September 30, 2019 and 2018, (iii) Condensed Consolidated Statements of Comprehensive Loss for the three- and nine-months ended September 30, 2019 and 2018, (iv) Condensed Consolidated Statements of Cash Flows for the nine months ended September 30, 2019 and 2018, (v) Condensed Consolidated Statements of Stockholders' (Deficit) Equity for the three- and nine-months ended September 30, 2019 and 2018 and (vi) Footnotes to Condensed Consolidated Financial Statements.

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.

ION GEOPHYSICAL CORPORATION

By /s/ Steven A. Bate

Steven A. Bate

Executive Vice President and Chief Financial Officer

Date: October 31, 2019

EXHIBIT 31.1

CERTIFICATION OF CHIEF EXECUTIVE OFFICER
PURSUANT TO RULE 13a-14(a) OR RULE 15d-14(a)

I, Christopher Usher, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q for the period endedSeptember 30, 2019, of ION Geophysical Corporation;

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

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

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

Date: October 31, 2019

/s/ Christopher Usher
Christopher Usher
President and Chief Executive Officer

EXHIBIT 31.2

CERTIFICATION OF CHIEF FINANCIAL OFFICER
PURSUANT TO RULE 13a-14(a) OR RULE 15d-14(a)

I, Steven A. Bate, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q for the period endedSeptember 30, 2019, of ION Geophysical Corporation;

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

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

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

Date: October 31, 2019

/s/ Steven A. Bate

Steven A. Bate
Executive Vice President and Chief Financial Officer

EXHIBIT 32.1

CERTIFICATION OF CHIEF EXECUTIVE OFFICER
PURSUANT TO 18 U.S.C. §1350

In connection with the Quarterly Report of ION Geophysical Corporation (the "Company") on Form 10-Q for the period ended September 30, 2019, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Christopher Usher, 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, to my knowledge that:

1. The Report fully complies with the requirements of Section 13(a) or 15(d), as applicable, 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 results of operations of the Company.

Date: October 31, 2019

/s/ Christopher Usher

Christopher Usher
President and Chief Executive Officer

EXHIBIT 32.2

CERTIFICATION OF CHIEF FINANCIAL OFFICER
PURSUANT TO 18 U.S.C. §1350

In connection with the Quarterly Report of ION Geophysical Corporation (the "Company") on Form 10-Q for the period ended September 30, 2019, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Steven A. Bate, Executive Vice President and Chief Financial 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, to my knowledge, that:

1. The Report fully complies with the requirements of Section 13(a) or 15(d), as applicable, 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 results of operations of the Company.

Date: October 31, 2019

/s/ Steven A. Bate

Steven A. Bate
Executive Vice President and Chief Financial Officer