MOOG INC.
Form 10-Q
April 26, 2019

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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 10-Q

(Mark One)

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

For the quarterly period ended March 30, 2019

OR

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

For the transition period from ________ to _________

Commission File Number: **1-05129**

(Exact name of registrant as specified in its charter)

New York State	**16-0757636**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
East Aurora, New York	**14052-0018**

(Address of principal executive offices) (Zip Code)
(716) 652-2000
(Telephone number including area code)

Former name, former address and former fiscal year, if changed since last report.

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 ý No ¨

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files).
Yes ý No ¨

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, 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 ý Accelerated filer ¨ Non-accelerated filer ¨ (Do not check if smaller reporting company) Smaller reporting company ¨ Emerging growth company ¨

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for the 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 ý

The number of shares outstanding of each class of common stock as of April 23, 2019 was:
Class A common stock, $1.00 par value, 32,477,568 shares
Class B common stock, $1.00 par value, 2,423,575 shares

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Moog Inc.
QUARTERLY REPORT ON FORM 10-Q
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PART I FINANCIAL INFORMATION
Item 1. Financial Statements
Consolidated Condensed Statements of Earnings
(Unaudited)

	Three Months Ended		Six Months Ended	
(dollars in thousands, except share and per share data)	March 30, 2019	March 31, 2018	March 30, 2019	March 31, 2018
Net sales	$718,811	$ 689,049	$1,398,487	$1,316,584
Cost of sales	521,410	488,788	1,001,584	931,938
Inventory write-down - restructuring	—	7,329	—	7,329
Gross profit	197,401	192,932	396,903	377,317
Research and development	31,344	33,995	63,220	66,329
Selling, general and administrative	99,860	98,665	196,186	193,284
Interest	9,939	9,089	19,621	17,735
Restructuring	—	24,058	—	24,058
Other	640	1,456	4,074	2,408
Earnings before income taxes	55,618	25,669	113,802	73,503
Income taxes	13,259	11,704	27,374	58,239
Net earnings	$42,359	$ 13,965	$86,428	$15,264
Net earnings per share				
Basic	$1.21	$ 0.39	$2.48	$0.43
Diluted	$1.20	$ 0.39	$2.46	$0.42
Dividends declared per share	$0.25	$ 0.25	$0.50	$0.25
Average common shares outstanding				
Basic	34,886,541	35,770,089	34,850,898	35,771,247
Diluted	35,241,113	36,179,858	35,183,471	36,190,455

See accompanying Notes to Consolidated Condensed Financial Statements.

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Consolidated Condensed Statements of Comprehensive Income (Loss)
(Unaudited)

(dollars in thousands)	Three Months Ended		Six Months Ended	
	March 30, 2019	March 31, 2018	March 30, 2019	March 31, 2018
Net earnings	$42,359	$13,965	$86,428	$15,264
Other comprehensive income (loss), net of tax:				
Foreign currency translation adjustment	1,106	20,297	(8,281)	30,661
Retirement liability adjustment	4,677	4,682	9,496	8,938
Change in accumulated income (loss) on derivatives	(79)	(579)	585	655
Other comprehensive income (loss), net of tax	5,704	24,400	1,800	40,254
Tax Cuts and Jobs Act, reclassification from AOCIL to retained earnings	—	(47,077)	—	(47,077)
Comprehensive income (loss)	$48,063	$(8,712)	$88,228	$8,441

See accompanying Notes to Consolidated Condensed Financial Statements.

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Consolidated Condensed Balance Sheets
(Unaudited)

(dollars in thousands)	March 30, 2019	September 29, 2018
ASSETS		
Current assets		
Cash and cash equivalents	$112,072	$ 125,584
Receivables	898,801	793,911
Inventories	489,067	512,522
Prepaid expenses and other current assets	47,229	44,404
Total current assets	1,547,169	1,476,421
Property, plant and equipment, net of accumulated depreciation of $812,879 and $816,837, respectively	569,624	552,865
Goodwill	791,398	797,217
Intangible assets, net	88,089	95,537
Deferred income taxes	15,671	17,328
Other assets	21,006	24,680
Total assets	$3,032,957	$ 2,964,048
LIABILITIES AND SHAREHOLDERS' EQUITY		
Current liabilities		
Short-term borrowings	$90	$ 3,623
Current installments of long-term debt	315	365
Accounts payable	224,555	213,982
Accrued compensation	126,819	147,765
Contract advances	169,836	151,687
Contract and contract-related loss reserves	49,383	42,258
Other accrued liabilities	117,094	120,944
Total current liabilities	688,092	680,624
Long-term debt, excluding current installments	825,692	858,836
Long-term pension and retirement obligations	116,466	117,471
Deferred income taxes	53,272	46,477
Other long-term liabilities	34,993	35,654
Total liabilities	1,718,515	1,739,062
Commitments and contingencies (Note 19)	—	—
Shareholders' equity		
Common stock - Class A	43,786	43,785
Common stock - Class B	7,494	7,495
Additional paid-in capital	510,538	502,257
Retained earnings	2,057,435	1,973,514
Treasury shares	(749,845)	(738,494)
Stock Employee Compensation Trust	(109,506)	(118,449)
Supplemental Retirement Plan Trust	(75,079)	(72,941)
Accumulated other comprehensive loss	(370,381)	(372,181)
Total shareholders' equity	1,314,442	1,224,986
Total liabilities and shareholders' equity	$3,032,957	$ 2,964,048

See accompanying Notes to Consolidated Condensed Financial Statements.

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Consolidated Condensed Statements of Shareholders' Equity
(Unaudited)

(dollars in thousands)	Three Months Ended March 30, 2019	Three Months Ended March 31, 2018	Six Months Ended March 30, 2019	Six Months Ended March 31, 2018
COMMON STOCK				
Beginning and end of period	$51,280	$51,280	$51,280	$51,280
ADDITIONAL PAID-IN CAPITAL				
Beginning of period	491,945	498,699	502,257	492,246
Issuance of treasury shares	(1,390)	(1,100)	1,070	(2,733)
Equity-based compensation expense	1,683	1,499	3,691	3,500
Adjustment to market - SECT, SERP and other	18,300	(9,043)	3,520	(2,958)
End of period	510,538	490,055	510,538	490,055
RETAINED EARNINGS				
Beginning of period	2,023,803	1,849,118	1,973,514	1,847,819
Net earnings	42,359	13,965	86,428	15,264
Dividends	(8,727)	(8,978)	(17,430)	(8,978)
Adoption of ASC 606	—	—	14,923	—
Tax Cuts and Jobs Act, reclassification from AOCIL to retained earnings	—	47,077	—	47,077
End of period	2,057,435	1,901,182	2,057,435	1,901,182
TREASURY SHARES AT COST				
Beginning of period	(747,900)	(739,210)	(738,494)	(739,157)
Class A and B shares issued related to compensation	3,833	2,503	4,968	5,184
Class A and B shares purchased	(5,778)	(2,384)	(16,319)	(5,118)
End of period	(749,845)	(739,091)	(749,845)	(739,091)
STOCK EMPLOYEE COMPENSATION TRUST (SECT)				
Beginning of period	(102,182)	(98,990)	(118,449)	(89,919)
Issuance of shares	8,918	1,941	17,679	1,941
Purchase of shares	(5,424)	(4,091)	(7,354)	(7,914)
Adjustment to market	(10,818)	7,810	(1,382)	2,562
End of period	(109,506)	(93,330)	(109,506)	(93,330)
SUPPLEMENTAL RETIREMENT PLAN (SERP) TRUST				
Beginning of period	(67,597)	(13,311)	(72,941)	(12,474)
Adjustment to market	(7,482)	1,233	(2,138)	396
End of period	(75,079)	(12,078)	(75,079)	(12,078)
ACCUMULATED OTHER COMPREHENSIVE LOSS				
Beginning of period	(376,085)	(319,637)	(372,181)	(335,491)
Other comprehensive income (loss)	5,704	24,400	1,800	40,254
Tax Cuts and Jobs Act, reclassification from AOCIL to retained earnings	—	(47,077)	—	(47,077)
End of period	(370,381)	(342,314)	(370,381)	(342,314)
TOTAL SHAREHOLDERS' EQUITY	$1,314,442	$1,255,704	$1,314,442	$1,255,704

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Consolidated Statements of Shareholders’ Equity, Shares
(Unaudited)

(share data)	Three Months Ended March 30, 2019	Three Months Ended March 31, 2018	Six Months Ended March 30, 2019	Six Months Ended March 31, 2018
COMMON STOCK - CLASS A				
Beginning of period	43,785,435	43,715,586	43,784,489	43,704,286
Conversion of Class B to Class A	—	19,972	946	31,272
End of period	43,785,435	43,735,558	43,785,435	43,735,558
COMMON STOCK - CLASS B				
Beginning of period	7,494,278	7,564,127	7,495,224	7,575,427
Conversion of Class B to Class A	—	(19,972)	(946)	(31,272)
End of period	7,494,278	7,544,155	7,494,278	7,544,155
TREASURY SHARES - CLASS A COMMON STOCK				
Beginning of period	(10,897,407)	(10,901,537)	(10,872,575)	(10,933,003)
Class A shares issued related to compensation	48,122	15,193	71,863	79,679
Class A shares purchased	(33,495)	(4,764)	(82,068)	(37,784)
End of period	(10,882,780)	(10,891,108)	(10,882,780)	(10,891,108)
TREASURY SHARES - CLASS B COMMON STOCK				
Beginning of period	(3,348,499)	(3,328,064)	(3,323,996)	(3,333,927)
Class B shares issued related to compensation	39,536	22,361	98,329	28,239
Class B shares purchased	(38,287)	(22,150)	(121,583)	(22,165)
End of period	(3,347,250)	(3,327,853)	(3,347,250)	(3,327,853)
SECT - CLASS A COMMON STOCK				
Beginning and end of period	(425,148)	(425,148)	(425,148)	(425,148)
SECT - CLASS B COMMON STOCK				
Beginning of period	(899,864)	(699,415)	(983,772)	(654,753)
Issuance of shares	113,749	21,871	221,326	21,871
Purchase of shares	(60,412)	(46,419)	(84,081)	(91,081)
End of period	(846,527)	(723,963)	(846,527)	(723,963)
SERP - CLASS B COMMON STOCK				
Beginning and end of period	(876,170)	(150,000)	(876,170)	(150,000)

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Consolidated Condensed Statements of Cash Flows
(Unaudited)

(dollars in thousands)	Six Months Ended March 30, 2019	Six Months Ended March 31, 2018
CASH FLOWS FROM OPERATING ACTIVITIES		
Net earnings	$86,428	$15,264
Adjustments to reconcile net earnings to net cash provided (used) by operating activities:		
Depreciation	36,074	35,536
Amortization	7,212	9,425
Deferred income taxes	2,182	30,709
Equity-based compensation expense	3,691	3,500
Impairment of long-lived assets and inventory write-down associated with restructuring	—	21,811
Other	1,331	2,960
Changes in assets and liabilities providing (using) cash:		
Receivables	(16,621)	(30,111)
Inventories	(44,428)	(20,685)
Accounts payable	11,158	11,351
Contract advances	17,127	5,547
Accrued expenses	(6,715)	10,558
Accrued income taxes	(1,767)	4,953
Net pension and post retirement liabilities	13,039	(70,309)
Other assets and liabilities	137	14,721
Net cash provided by operating activities	108,848	45,230
CASH FLOWS FROM INVESTING ACTIVITIES		
Acquisitions of businesses, net of cash acquired	—	(42,116)
Purchase of property, plant and equipment	(59,971)	(43,924)
Other investing transactions	2,447	(3,710)
Net cash (used) by investing activities	(57,524)	(89,750)
CASH FLOWS FROM FINANCING ACTIVITIES		
Net short-term repayments	(3,560)	—
Proceeds from revolving lines of credit	327,300	209,500
Payments on revolving lines of credit	(361,300)	(269,610)
Proceeds from long-term debt	—	10,000
Payments on long-term debt	(167)	(20,614)
Payment of dividends	(17,430)	—
Proceeds from sale of treasury stock	2,443	2,451
Purchase of outstanding shares for treasury	(16,319)	(5,118)
Proceeds from sale of stock held by SECT	9,479	1,941
Purchase of stock held by SECT	(7,354)	(7,914)
Net cash (used) by financing activities	(66,908)	(79,364)
Effect of exchange rate changes on cash	(50)	11,418
Increase (decrease) in cash, cash equivalents and restricted cash	(15,634)	(112,466)
Cash, cash equivalents and restricted cash at beginning of period	127,706	386,969
Cash, cash equivalents and restricted cash at end of period	$112,072	$274,503

SUPPLEMENTAL CASH FLOW INFORMATION

Treasury shares issued as compensation	$11,795	$—
Equipment acquired through financing	148	—

See accompanying Notes to Consolidated Condensed Financial Statements.

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Notes to Consolidated Condensed Financial Statements
Six Months Ended Ended March 30, 2019
(Unaudited)
(dollars in thousands, except per share data)

Note 1 - Basis of Presentation

The accompanying unaudited consolidated condensed financial statements have been prepared by management in accordance with U.S. generally accepted accounting principles for interim financial information and with the instructions to Form 10-Q and Article 10 of Regulation S-X. In the opinion of management, all adjustments consisting of normal recurring adjustments considered necessary for the fair presentation of results for the interim period have been included. The results of operations for the three and six months ended March 30, 2019 are not necessarily indicative of the results expected for the full year.

The accompanying unaudited consolidated condensed financial statements should be read in conjunction with the financial statements and notes thereto included in our Form 10-K for the fiscal year ended September 29, 2018. All references to years in these financial statements are to fiscal years.

Certain prior year amounts have been reclassified to conform to current year's presentation. Management does not consider the amounts reclassified to be material.

Recent Accounting Pronouncements Adopted

Standard	Description	Financial Statement Effect or Other Significant Matters
ASU no. 2014-09 *Revenue from Contracts with Customers (and all related ASUs)*	The standard requires revenue recognition to depict the transfer of goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. The standard also requires additional disclosures about the nature, amount, timing and uncertainty of revenue and cash flows arising from customer contracts. The provisions of the standard, as well as all subsequently issued clarifications to the standard, are effective for fiscal years beginning after December 15, 2017 and interim periods within those fiscal years. The standard can be adopted using either a full retrospective or modified retrospective approach.	We adopted this standard using the modified retrospective method, under which prior years' results are not restated, but supplemental information is provided in our disclosures to present 2019 results before effect of the standard. In addition, a cumulative adjustment was made to shareholders' equity at the beginning of 2019. Supplemental information is provided in our disclosures to present 2019 results before effect of the standard. Date adopted: Q1 2019
ASU no. 2017-07 *Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost*	The standard amends existing guidance on the presentation of net periodic benefit cost in the income statement and what qualifies for capitalization on the balance sheet. The provisions of the standard are effective for fiscal years beginning after December 15, 2017 and interim periods within those fiscal years. Early adoption is permitted as of the beginning of an annual period. The amendment requires income statement presentation provisions to be applied retrospectively and capitalization in assets provisions to be applied prospectively.	We adopted this standard retrospectively for the presentation of the service cost component and the other components of net periodic pension cost and net periodic postretirement benefit cost in the Consolidated Condensed Statement of Earnings. Supplemental information is provided in our disclosures to present 2018 results before effect of the standard. Date adopted: Q1 2019

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Recent Accounting Pronouncements Not Yet Adopted

Standard	Description	Financial Statement Effect or Other Significant Matters
ASU no. 2016-02 *Leases* *(and all related ASUs)*	The standard requires most lease arrangements to be recognized in the balance sheet as lease assets and lease liabilities. The standard also requires additional disclosures about the leasing arrangements. The provisions of the standard are effective for fiscal years beginning after December 15, 2018 and interim periods within those years. Early adoption is permitted.	We are currently evaluating the effect on our financial statements and related disclosures. Planned date of adoption: Q1 2020
ASU no. 2017-12 *Targeted Improvements to Accounting for Hedging Activities*	The standard expands the hedging strategies eligible for hedge accounting, while simplifying presentation and disclosure by eliminating separate measurement and reporting of hedge ineffectiveness. The provisions of the standard are effective for fiscal years beginning after December 15, 2018 and interim periods within those fiscal years. Early adoption is permitted.	We are currently evaluating the effect on our financial statements and related disclosures. Planned date of adoption: Q1 2020
ASU no. 2018-15 *Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract*	The standard amends ASC 350 to include in its scope implementation costs of a Cloud Computing Arrangement (CCA) that is a service contract and clarifies that a customer should apply ASC 350-40 to determine which implementation costs should be capitalized in a CCA that is considered a service contract. The ASU is effective for fiscal years beginning after December 15, 2019 and interim periods within those fiscal years. Early adoption is permitted. The amendments should be applied either retrospectively or prospectively to all implementation costs incurred after the date of adoption.	We are currently evaluating the effect on our financial statements and related disclosures. Planned date of adoption: Q1 2021

We consider the applicability and impact of all ASUs. ASUs not listed above were assessed and determined to be either not applicable, or had or are expected to have minimal impact on our financial statements and related disclosures.

In accordance with SEC Final Rule Release No. 33-10532, we have adopted Rule 3-04 of Regulation S-X during the first quarter of 2019 and have disclosed changes in the Consolidated Condensed Statement of Shareholders' Equity and the amount of dividends per share for each class of shares for all periods presented. Refer to Note 16, Earnings per Share and Dividends.

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Impact of Recent Accounting Pronouncements Adopted

On September 30, 2018, we adopted ASC 606: *Revenue from Contracts with Customers* and the related amendments (ASC 606), using the modified retrospective method, as described above. ASC 606 was applied to contracts that were not completed as of September 29, 2018. Prior periods have not been restated and continue to be reported under the accounting standard in effect for those periods. Previously, we recognized revenue under ASC 605: *Revenue Recognition* (ASC 605).

The cumulative effect from the adoption of ASC 606 as of September 30, 2018 was as follows:

	September 29, 2018	Adjustments due to adoption of ASC 606	September 30, 2018
ASSETS			
Receivables	$ 793,911	$ 89,121	$ 883,032
Inventories	512,522	(65,991)	446,531
Deferred income taxes	17,328	134	17,462
LIABILITIES AND SHAREHOLDERS' EQUITY			
Contract advances	$ 151,687	$ 921	$ 152,608
Contract and contract-related loss reserves	42,258	2,430	44,688
Other accrued liabilities	120,944	1,139	122,083
Deferred income taxes	46,477	3,851	50,328
Retained earnings	1,973,514	14,923	1,988,437

The tables below represent the impact of the adoption of ASC 606 on the Consolidated Condensed Statement of Earnings for the three and six months ended March 30, 2019.

	Three Months Ended		
	Under ASC 605	Effect of ASC 606	As Reported Under ASC 606
Net sales	$704,600	$14,211	$718,811
Cost of sales	511,889	9,521	521,410
Gross profit	192,711	4,690	197,401
Earnings before income taxes	50,928	4,690	55,618
Income taxes	12,025	1,234	13,259
Net earnings	$38,903	$3,456	$42,359

	Six Months Ended		
	Under ASC 605	Effect of ASC 606	As Reported Under ASC 606
Net sales	$1,381,934	$16,553	$1,398,487
Cost of sales	989,768	11,816	1,001,584
Gross profit	392,166	4,737	396,903
Earnings before income taxes	109,065	4,737	113,802
Income taxes	26,128	1,246	27,374
Net earnings	$82,937	$3,491	$86,428

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The table below represents the impact of the adoption of ASC 606 on the Consolidated Condensed Balance Sheet as of March 30, 2019.

	Under ASC 605	Effect of ASC 606	As Reported Under ASC 606
ASSETS			
Current assets			
Receivables	$792,124	$106,677	$898,801
Inventories	568,287	(79,220)	489,067
Total current assets	1,519,712	27,457	1,547,169
Deferred income taxes	15,776	(105)	15,671
Total assets	3,005,605	27,352	3,032,957
LIABILITIES AND SHAREHOLDERS' EQUITY			
Current liabilities			
Contract advances	$169,349	$487	$169,836
Contract and contract-related loss reserves	47,223	2,160	49,383
Other accrued liabilities	114,728	2,366	117,094
Total current liabilities	683,079	5,013	688,092
Deferred income taxes	49,658	3,614	53,272
Total liabilities	1,709,888	8,627	1,718,515
Shareholders' equity			
Retained earnings	2,039,021	18,414	2,057,435
Accumulated other comprehensive loss	(370,692)	311	(370,381)
Total shareholders' equity	1,295,717	18,725	1,314,442
Total liabilities and shareholders' equity	3,005,605	27,352	3,032,957

The tables below represent the impact of the adoption of ASU 2017-07 on the Consolidated Condensed Statement of Earnings for the three and six months ended March 31, 2018.

	Three Months Ended		
	As Reported, March 31, 2018	Impact of Adoption	As Adjusted, March 31, 2018
Cost of sales	$489,071	$ (283)	$488,788
Gross profit	192,649	283	192,932
Research and development	34,085	(90)	33,995
Selling, general and administrative	99,999	(1,334)	98,665
Other	(251)	1,707	1,456

	Six Months Ended		
	As Reported, March 31, 2018	Impact of Adoption	As Adjusted, March 31, 2018
Cost of sales	$932,497	$ (559)	$931,938
Gross profit	376,758	559	377,317
Research and development	66,505	(176)	66,329
Selling, general and administrative	195,949	(2,665)	193,284
Other	(992)	3,400	2,408

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The tables below represent the impact of the adoption of ASU 2017-07 on operating profit and deductions from operating profit for the three and six months ended March 31, 2018.

	Three Months Ended		
	As Reported, March 31, 2018	Impact of Adoption	As Adjusted, March 31, 2018
Operating profit (loss):			
Aircraft Controls	$33,480	$313	$33,793
Space and Defense Controls	16,841	201	17,042
Industrial Systems	(6,050)	622	(5,428)
Total operating profit	$44,271	$1,136	$45,407
Deductions from operating profit:			
Non-service pension expense	$—	$1,707	$1,707
Corporate and other expenses, net	$8,014	$(571)	$7,443

	Six Months Ended		
	As Reported, March 31, 2018	Impact of Adoption	As Adjusted, March 31, 2018
Operating profit (loss):			
Aircraft Controls	$64,248	$588	$64,836
Space and Defense Controls	33,130	385	33,515
Industrial Systems	13,196	1,287	14,483
Total operating profit	$110,574	$2,260	$112,834
Deductions from operating profit:			
Non-service pension expense	$—	$3,400	$3,400
Corporate and other expenses, net	$15,836	$(1,140)	$14,696

Note 2 - Revenue from Contracts with Customers

We recognize revenue from contracts with customers using the five-step model prescribed in ASC 606. The first step is identifying the contract. The identification of a contract with a customer requires an assessment of each party’s rights and obligations regarding the products or services to be transferred, including an evaluation of termination clauses and presently enforceable rights and obligations. Each party’s rights and obligations and the associated terms and conditions are typically determined in purchase orders. For sales that are governed by master supply agreements under which provisions define specific program requirements, purchase orders are issued under these agreements to reflect presently enforceable rights and obligations for the units of products and services being purchased.

Contracts are sometimes modified to account for changes in contract specifications and requirements. When this occurs, we assess the modification as prescribed in ASC 606 and determine whether the existing contract needs to be modified (and revenue cumulatively caught up), whether the existing contract needs to be terminated and a new contract needs to be created, or whether the existing contract remains and a new contract needs to be created. This is determined based on the rights and obligations within the modification as well as the associated transaction price.

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The next step is identifying the performance obligations. A performance obligation is a promise to transfer goods or services to a customer that is distinct in the context of the contract, as defined by ASC 606. We identify a performance obligation for each promise in a contract to transfer a distinct good or service to the customer. As part of our assessment, we consider all goods and/or services promised in the contract, regardless of whether they are explicitly stated or implied by customary business practices. The products and services in our contracts are typically not distinct from one another due to their complexity and reliance on each other or, in many cases, we provide a significant integration service. Accordingly, many of our contracts are accounted for as one performance obligation. In limited cases, our contracts have more than one distinct performance obligation, which occurs when we perform activities that are not highly complex or interrelated or involve different product life cycles. Warranties are provided on certain contracts, but do not typically provide for services beyond standard assurances and are therefore not distinct performance obligations under ASC 606.

The third step is determining the transaction price, which represents the amount of consideration we expect to be entitled to receive from a customer in exchange for providing the goods or services. There are times when this consideration is variable, for example a volume discount, and must be estimated. Sales, use, value-added, and excise taxes are excluded from the transaction price, where applicable.

The fourth step is allocating the transaction price. The transaction price must be allocated to the performance obligations identified in the contract based on relative stand-alone selling prices when available, or an estimate for each distinct good or service in the contract when standalone prices are not available. Our contracts with customers generally require payment under normal commercial terms after delivery. Payment terms are typically within 30 to 60 days of delivery. The timing of satisfaction of our performance obligations does not significantly vary from the typical timing of payment.

The final step is the recognition of revenue. We recognize revenue as the performance obligations are satisfied. ASC 606 provides guidance to help determine if we are satisfying the performance obligation at a point in time or over time. In determining when performance obligations are satisfied, we consider factors such as contract terms, payment terms and whether there is an alternative use of the product or service. In essence, we recognize revenue when or as control of the promised goods or services transfer to the customer.

Under ASC 606, revenue recognized over time using the cost-to-cost method of accounting for the three and six months ended March 30, 2019 was 65% and 64%, respectively. The over time method of revenue recognition is predominantly used in Aircraft Controls and Space and Defense Controls. We use this method for U.S. Government contracts and repair and overhaul arrangements as we are creating or enhancing assets that the customer controls as the assets are being created or enhanced. In addition, many of our large commercial contracts qualify for over time accounting as our performance does not create an asset with an alternative use and we have enforceable right to payment for performance completed to date. Our over time contracts are primarily firm fixed price.

and higher revenues of $10,438

Contract costs include only allocable, allowable and reasonable costs which are included in cost of sales when incurred. For applicable U.S. Government contracts, contract costs are determined in accordance with the Federal Acquisition Regulations and the related Cost Accounting Standards. The nature of these costs includes development engineering costs and product manufacturing costs such as direct material, direct labor, other direct costs and indirect overhead costs. Contract profit is recorded as a result of the revenue recognized less costs incurred in any reporting period. Variable consideration and contract modifications, such as performance incentives, penalties, contract claims or change orders are considered in estimating revenues, costs and profits when they can be reliably estimated and realization is considered probable. Revenue recognized on contracts for unresolved claims or unapproved contract change orders was not material for the three and six months ended March 30, 2019.

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As of March 30, 2019, we had contract and contract-related loss reserves of $49,383. For contracts with anticipated losses at completion, a provision for the entire amount of the estimated remaining loss is charged against income in the period in which the loss becomes known. Contract losses are determined considering all direct and indirect contract costs, exclusive of any selling, general or administrative cost allocations that are treated as period expenses. Loss reserves are more common on firm fixed-price contracts that involve, to varying degrees, the design and development of new and unique controls or control systems to meet the customers' specifications. Contract-related loss reserves are recorded for the additional work needed on completed and delivered products in order for them to meet contract specifications. In accordance with ASC 606, we calculate contract losses at the contract level, versus the performance obligation level.

For the three and six months ended March 30, 2019, 35% and 36% of revenue, respectively, was recognized at the point in time control transferred to the customer. This method of revenue recognition is used most frequently in Industrial Systems. We use this method for commercial contracts in which the asset being created has an alternative use. We determine the point in time control transfers to the customer by weighing the five indicators provided by ASC 606 - the entity has a present right to payment; the customer has legal title; the customer has physical possession; the customer has the significant risks and rewards of ownership; and the customer has accepted the asset. When control has transferred to the customer, profit is generated as cost of sales is recorded and as revenue is recognized. Inventory costs include all product manufacturing costs such as direct material, direct labor, other direct costs and indirect overhead cost allocations. Shipping and handling costs are considered costs to fulfill a contract and not considered performance obligations. They are included in cost of sales as incurred.

Contract Assets and Liabilities

Unbilled receivables (contract assets) primarily represent revenues recognized for performance obligations that have been satisfied but for which amounts have not been billed. These are included as Receivables on the Consolidated Condensed Balance Sheets. Contract advances (contract liabilities) relate to payments received from customers in advance of the satisfaction of performance obligations for a contract. We do not consider contract advances to be significant financing components as the intent of these payments in advance are for reasons other than providing a significant financing benefit and are customary in our industry.

Total contract assets and contract liabilities as of March 30, 2019 are as follows:

	March 30, 2019	September 30, 2018
Unbilled receivables	$430,901	$ 405,610
Contract advances	169,836	152,608
Net contract assets	$261,065	$ 253,002

The increase in contract assets reflects the net impact of additional unbilled revenues recorded in excess of revenue recognized during the period. The increase in contract liabilities reflects the net impact of additional deferred revenues recorded in excess of revenue recognized during the period. For the three and six months ended March 30, 2019, we recognized $46,078 and $93,586 of revenue, respectively, that was included in the contract liability balance at the beginning of the period.

Remaining Performance Obligations

As of March 30, 2019, the aggregate amount of the transaction price allocated to the performance obligations that are unsatisfied (or partially unsatisfied), also known as backlog, was approximately $2,230,000. We expect to recognize approximately 73% of that amount as sales over the next twelve months and the balance thereafter.

Disaggregation of Revenue
See Note 17, Segments, for disclosures related to disaggregation of revenue.

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Note 3 - Acquisitions, Divestitures and Equity Method Investments

In the first quarter of 2019, we sold a non-core business of our Industrial Systems segment for $4,191 in cash and recorded a gain in other income of $2,641.

On April 30, 2018, we acquired Electro-Optical Imaging, a designer and manufacturer of video trackers and imaging products, located in Florida, for a purchase price, net of acquired cash, of $5,442. This operation is included in our Space and Defense Controls segment.

On March 29, 2018, we acquired a 100% ownership interest in VUES Brno s.r.o ("Vues") located in the Czech Republic, which included a 74% ownership interest in a subsidiary located in Germany. The purchase price, net of acquired cash, was $64,140, consisting of $42,961 in cash and $21,179 of assumed debt. VUES designs and manufactures electric motors and generators, and provides customized solutions. On September 6, 2018, we acquired the remaining 26% noncontrolling interest for $1,843 in cash. The difference between the cash paid and the adjustment to the noncontrolling interest is reflected in additional paid-in capital. This operation is included in our Industrial Systems segment. The purchase price allocations for this acquisition are complete.

On October 3, 2017, we, in collaboration with SIA Engineering Company, announced the joint venture company, Moog Aircraft Services Asia ("MASA"), in Singapore, of which we currently hold a 51% ownership. MASA is intended to provide maintenance, repair and overhaul services for our manufactured flight control systems. As we hold a majority ownership in MASA, but share voting control, we are accounting for this investment using the equity method. As of March 30, 2019, we have made total contributions of $5,100. This operation is included in our Aircraft Controls segment.

Note 4 - Receivables

Receivables consist of:

	March 30, 2019	September 29, 2018
Accounts receivable	$240,180	$ 295,180
Long-term contract receivables:		
Billed receivables	210,464	156,414
Unbilled receivables	430,901	316,489
Total long-term contract receivables	641,365	472,903
Other	21,900	30,787
Less allowance for doubtful accounts	(4,644)	(4,959)
Receivables	$898,801	$ 793,911

We securitize certain trade receivables in transactions that are accounted for as secured borrowings (Securitization Program). We maintain a subordinated interest in a portion of the pool of trade receivables that are securitized. The retained interest, which is included in Receivables in the consolidated condensed balance sheets, is recorded at fair value, which approximates the total amount of the designated pool of accounts receivable. Refer to Note 7, Indebtedness, for additional disclosures related to the Securitization Program.

Note 5 - Inventories

Inventories, net of reserves, consist of:

	March 30, 2019	September 29, 2018
Raw materials and purchased parts	$173,916	$ 197,071
Work in progress	244,948	240,885
Finished goods	70,203	74,566
Inventories	$489,067	$ 512,522

There are no material inventoried costs relating to long-term contracts where revenue is accounted for using the cost-to-cost method of accounting as of March 30, 2019 or September 29, 2018.

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Note 6 - Goodwill and Intangible Assets

The changes in the carrying amount of goodwill are as follows:

	Aircraft Controls	Space and Defense Controls	Industrial Systems	Total
Balance at September 29, 2018	$179,907	$261,732	$355,578	$797,217
Divestitures	—	—	(1,237)	(1,237)
Foreign currency translation	(32)	(1)	(4,549)	(4,582)
Balance at March 30, 2019	$179,875	$261,731	$349,792	$791,398

Goodwill in our Space and Defense Controls segment is net of a $4,800 accumulated impairment loss at March 30, 2019.

Goodwill in our Medical Devices reporting unit, included in our Industrial Systems segment, is net of a $38,200 accumulated impairment loss at March 30, 2019.

The components of intangible assets are as follows:

		March 30, 2019		September 29, 2018	
	Weighted-Average Life (years)	Gross Carrying Amount	Accumulated Amortization	Gross Carrying Amount	Accumulated Amortization
Customer-related	11	$134,124	$(98,531)	$135,379	$(96,090)
Technology-related	9	69,771	(51,081)	69,393	(49,731)
Program-related	19	64,955	(35,627)	64,988	(33,740)
Marketing-related	8	23,418	(19,518)	23,489	(18,868)
Other	10	4,164	(3,586)	4,305	(3,588)
Intangible assets	12	$296,432	$(208,343)	$297,554	$(202,017)

Substantially all acquired intangible assets other than goodwill are being amortized. Customer-related intangible assets primarily consist of customer relationships. Technology-related intangible assets primarily consist of technology, patents, intellectual property and software. Program-related intangible assets consist of long-term programs represented by current contracts and probable follow on work. Marketing-related intangible assets primarily consist of trademarks, trade names and non-compete agreements.

Amortization of acquired intangible assets was $3,402 and $7,085 for the three and six months ended March 30, 2019 and $4,671 and $9,271 for the three and six months ended March 31, 2018. Based on acquired intangible assets recorded at March 30, 2019, amortization is expected to be approximately $13,300 in 2019, $11,600 in 2020, $9,700 in 2021, $8,100 in 2022 and $7,300 in 2023.

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Note 7 - Indebtedness

We maintain short-term line of credit facilities with banks throughout the world that are principally demand lines subject to revision by the banks.

Long-term debt consists of:

	March 30, 2019	September 29, 2018
U.S. revolving credit facility	$392,000	$ 430,000
SECT revolving credit facility	4,000	—
Senior notes	300,000	300,000
Securitization program	130,000	130,000
Obligations under capital leases	870	918
Senior debt	826,870	860,918
Less deferred debt issuance cost	(863)	(1,717)
Less current installments	(315)	(365)
Long-term debt	$825,692	$ 858,836

Our U.S. revolving credit facility matures on June 28, 2021. Our U.S. revolving credit facility has a capacity of $1,100,000 and provides an expansion option, which permits us to request an increase of up to $200,000 to the credit facility upon satisfaction of certain conditions. The credit facility is secured by substantially all of our U.S. assets. The loan agreement contains various covenants which, among others, specify interest coverage and maximum leverage. We are in compliance with all covenants.

The SECT has a revolving credit facility with a borrowing capacity of $35,000, maturing on July 26, 2020. Interest is based on LIBOR plus an applicable margin. A commitment fee is also charged based on a percentage of the unused amounts available and is not material.

At March 30, 2019, we had $300,000 principal amount of 5.25% senior notes due December 1, 2022 with interest paid semiannually on June 1 and December 1 of each year. The senior notes are unsecured obligations, guaranteed on a senior unsecured basis by certain subsidiaries and contain normal incurrence-based covenants and limitations such as the ability to incur additional indebtedness, pay dividends, make other restricted payments and investments, create liens and certain corporate acts such as mergers and consolidations.

The Securitization Program, effectively increasing our borrowing capacity by up to $130,000, was extended on October 30, 2018 and now matures on October 30, 2020. Under the Securitization Program, we sell certain trade receivables and related rights to an affiliate, which in turn sells an undivided variable percentage ownership interest in the trade receivables to a financial institution, while maintaining a subordinated interest in a portion of the pool of trade receivables. Interest for the Securitization Program is based on 30-day LIBOR plus an applicable margin. A commitment fee is also charged based on a percentage of the unused amounts available and is not material. The agreement governing the Securitization Program contains restrictions and covenants which include limitations on the making of certain restricted payments, creation of certain liens, and certain corporate acts such as mergers, consolidations and sale of substantially all assets. The Securitization Program has a minimum borrowing requirement equal to the lesser of either 80% of our borrowing capacity or 100% of our borrowing base, which is a subset of the trade receivables sold under this agreement. As of March 30, 2019, our minimum borrowing requirement was $104,000.

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Note 8 - Product Warranties

In the ordinary course of business, we warrant our products against defects in design, materials and workmanship typically over periods ranging from twelve to sixty months. We determine warranty reserves needed by product line based on historical experience and current facts and circumstances. Activity in the warranty accrual is summarized as follows:

	Three Months Ended		Six Months Ended	
	March 30, 2019	March 31, 2018	March 30, 2019	March 31, 2018
Warranty accrual at beginning of period	$24,256	$27,748	$25,537	$25,848
Warranties issued during current period	4,055	3,280	6,025	8,037
Adjustments to pre-existing warranties	(307)	(175)	(398)	(245)
Reductions for settling warranties	(3,892)	(3,007)	(6,869)	(5,922)
Foreign currency translation	105	409	(78)	537
Warranty accrual at end of period	$24,217	$28,255	$24,217	$28,255

Note 9 - Derivative Financial Instruments

We principally use derivative financial instruments to manage interest rate risk associated with long-term debt and foreign exchange risk related to foreign operations and foreign currency transactions. We enter into derivative financial instruments with a number of major financial institutions to minimize counterparty credit risk.

Derivatives designated as hedging instruments

Interest rate swaps are used to adjust the proportion of total debt that is subject to variable and fixed interest rates. The interest rate swaps are designated as hedges of the amount of future cash flows related to interest payments on variable-rate debt that, in combination with the interest payments on the debt, convert a portion of the variable-rate debt to fixed-rate debt. At March 30, 2019, we had interest rate swaps with notional amounts totaling $105,000. The interest rate swaps effectively convert this amount of variable-rate debt to fixed-rate debt at 2.99%, including the applicable margin of 1.63% as of March 30, 2019. The interest will revert back to variable rates based on LIBOR plus the applicable margin upon the maturity of the interest rate swaps. These interest rate swaps mature at various times through June 23, 2020.

We use foreign currency contracts as cash flow hedges to effectively fix the exchange rates on future payments and revenue. To mitigate exposure in movements between various currencies, including the Philippine peso, the British pound and the Czech koruna, we had outstanding foreign currency forwards with notional amounts of $69,048 at March 30, 2019. These contracts mature at various times through February 26, 2021.

We use forward currency contracts to hedge our net investment in certain foreign subsidiaries. As of March 30, 2019, we had no outstanding net investment hedges.

These interest rate swaps, foreign currency contracts and net investment hedges are recorded in the Consolidated Condensed Balance Sheets at fair value and the related gains or losses are deferred in Shareholders' Equity as a component of Accumulated Other Comprehensive Income (Loss) (AOCIL). These deferred gains and losses are reclassified into the Consolidated Condensed Statements of Earnings, as necessary, during the periods in which the related payments or receipts affect earnings. However, to the extent the interest rate swaps and foreign currency contracts are not perfectly effective in offsetting the change in the value of the payments and revenue being hedged, the ineffective portion of these contracts is recognized in earnings immediately. Ineffectiveness was not material in the first six months of 2019 or 2018.

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Derivatives not designated as hedging instruments

We also have foreign currency exposure on balances, primarily intercompany, that are denominated in foreign currencies and are adjusted to current values using period-end exchange rates. The resulting gains or losses are recorded in the Consolidated Condensed Statements of Earnings. To minimize foreign currency exposure, we had foreign currency contracts with notional amounts of $78,359 at March 30, 2019. The foreign currency contracts are recorded in the Consolidated Condensed Balance Sheets at fair value and resulting gains or losses are recorded in the Consolidated Condensed Statements of Earnings. We recorded the following gains or losses on foreign currency contracts which are included in other income or expense and generally offset the gains or losses from the foreign currency adjustments on the intercompany balances that are also included in other income or expense:

	Three Months Ended		Six Months Ended	
	March 30, 2019	March 31, 2018	March 30, 2019	March 31, 2018
Net gain (loss)	$ 2,419	$ (2,381)	$ 769	$ (3,009)

Summary of derivatives

The fair value and classification of derivatives is summarized as follows:

		March 30, 2019	September 29, 2018
Derivatives designated as hedging instruments:			
Foreign currency contracts	Other current assets	$ 690	$ 659
Foreign currency contracts	Other assets	178	41
Interest rate swaps	Other current assets	673	1,444
Interest rate swaps	Other assets	24	322
	Total asset derivatives	$ 1,565	$ 2,466
Foreign currency contracts	Other accrued liabilities	$ 703	$ 1,842
Foreign currency contracts	Other long-term liabilities	63	464
	Total liability derivatives	$ 766	$ 2,306
Derivatives not designated as hedging instruments:			
Foreign currency contracts	Other current assets	$ 376	$ 285
Foreign currency contracts	Other accrued liabilities	$ 477	$ 87

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Note 10 - Fair Value

Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. Depending on the nature of the asset or liability, various techniques and assumptions can be used to estimate fair value. The definition of the fair value hierarchy is as follows:

Level 1 – Quoted prices in active markets for identical assets and liabilities.

Level 2 – Observable inputs other than quoted prices in active markets for similar assets and liabilities.

Level 3 – Inputs for which significant valuation assumptions are unobservable in a market and therefore value is based on the best available data, some of which is internally developed and considers risk premiums that a market participant would require.

Our derivatives are valued using various pricing models or discounted cash flow analyses that incorporate observable market data, such as interest rate yield curves and currency rates, and are classified as Level 2 within the valuation hierarchy.

The following table presents the fair values and classification of our financial assets and liabilities measured on a recurring basis, all of which are classified as Level 2.

	Classification	March 30, 2019	September 29, 2018
Foreign currency contracts	Other current assets	$ 1,066	$ 944
Foreign currency contracts	Other assets	178	41
Interest rate swaps	Other current assets	673	1,444
Interest rate swaps	Other assets	24	322
	Total assets	$ 1,941	$ 2,751
Foreign currency contracts	Other accrued liabilities	$ 1,180	$ 1,929
Foreign currency contracts	Other long-term liabilities	63	464
	Total liabilities	$ 1,243	$ 2,393

Our only financial instrument for which the carrying value differs from its fair value is long-term debt. At March 30, 2019, the fair value of long-term debt was $826,120 compared to its carrying value of $826,870. The fair value of long-term debt is classified as Level 2 within the fair value hierarchy and was estimated based on quoted market prices.

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Note 11 - Employee Benefit Plans

Net periodic benefit costs for our defined benefit pension plans are as follows:

	Three Months Ended		Six Months Ended	
	March 30, 2019	March 31, 2018	March 30, 2019	March 31, 2018
U.S. Plans				
Service cost	$5,251	$ 5,633	$10,502	$11,267
Interest cost	9,231	8,073	18,462	16,146
Expected return on plan assets	(11,771)	(13,575)	(23,542)	(27,151)
Amortization of prior service cost (credit)	47	47	93	94
Amortization of actuarial loss	5,466	6,902	10,932	13,804
Pension expense for U.S. defined benefit plans	$8,224	$ 7,080	$16,447	$14,160
Non-U.S. Plans				
Service cost	$1,248	$ 1,519	$2,494	$2,989
Interest cost	1,101	1,092	2,202	2,147
Expected return on plan assets	(1,303)	(1,290)	(2,601)	(2,533)
Amortization of prior service cost (credit)	(4)	(15)	(9)	(29)
Amortization of actuarial loss	638	648	1,278	1,272
Pension expense for non-U.S. defined benefit plans	$1,680	$ 1,954	$3,364	$3,846

Pension expense for our defined contribution plans consists of:

	Three Months Ended		Six Months Ended	
	March 30, 2019	March 31, 2018	March 30, 2019	March 31, 2018
U.S. defined contribution plans	$4,713	$ 4,136	$9,327	$ 8,108
Non-U.S. defined contribution plans	1,340	1,353	2,536	2,570
Total pension expense for defined contribution plans	$6,053	$ 5,489	$11,863	$ 10,678

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Note 12 - Restructuring

In the second quarter of 2018, we initiated restructuring actions in conjunction with exiting the wind pitch controls business within our Industrial Systems segment. These actions have resulted in workforce reductions, principally in Germany and China. The restructuring charge in 2018 consisted of $12,198 of non-cash inventory reserves, $12,316 of non-cash charges for the impairment of intangible assets, $2,162 of non-cash charges, primarily for the impairment of other long-lived assets, $7,969 for severance, $3,130 for facility closure and $3,217 for other costs.

Restructuring activity for severance and other costs is as follows:

	Aircraft Controls	Space and Defense Controls	Industrial Systems	Corporate	Total
Balance at September 29, 2018	$ 626	$ 64	$ 6,994	$ 429	$ 8,113
Adjustments to provision	20	—	—	—	20
Cash payments - 2016 plan	—	—	—	(297)	(297)
Cash payments - 2018 plan	(650)	(23)	(2,298)	—	(2,971)
Foreign currency translation	4	—	(95)	—	(91)
Balance at March 30, 2019	$ —	$ 41	$ 4,601	$ 132	$ 4,774

As of March 30, 2019, the restructuring accrual consists of $132 for the 2016 plan and $4,642 for the 2018 plan. Restructuring for all plans is expected to be paid by September 28, 2019, except for the non-current portion of the facility closure accrual, which is classified as a long-term liability.

Note 13 - Income Taxes

The effective tax rate for the three and six months ended March 30, 2019 were 23.8% and 24.1%, respectively. The effective tax rate for this period is higher than would be expected by applying the U.S. federal statutory tax rate of 21% to earnings before income taxes primarily due to tax on earnings generated outside of the U.S.

The effective tax rate for the three and six months ended March 31, 2018 were 45.6% and 79.2%, respectively. The effective tax rate for this period was significantly impacted by the enactment of the Tax Cuts and Jobs Act (the "Act") of 2017.

The Act was enacted on December 22, 2017. It reduced the U.S. federal corporate tax rate from 35% to 21%, required companies to pay a one-time transition tax on earnings of certain foreign subsidiaries that were previously tax deferred and created new taxes on certain foreign sourced earnings. In 2018, we recorded provisional amounts by applying the guidance in SAB 118, as we had not yet completed the accounting for the tax effects of enactment of the Act. For the year ended September 29, 2018, we recorded tax expense related to the Act of $30,795 for the one-time transition tax on undistributed foreign earnings deemed to be repatriated and a tax charge of $10,383 as an additional provision for taxes on undistributed earnings not considered to be permanently reinvested. These charges were partially offset by a $10,946 benefit due to the remeasurement of deferred tax assets and liabilities arising from the lower U.S. corporate tax rate. Determining the amount of unrecognized deferred tax liability related to any remaining undistributed foreign earnings not subject to the transition tax and additional outside basis difference in these entities is not practicable.

Upon further analysis of the Act and notices and regulations issued and proposed by the U.S. Department of the Treasury and the Internal Revenue Service, we finalized our calculations of the transition tax liability with no further amounts recorded in the six months ended March 30, 2019.

Some of the provisions of the Act become effective for us in 2019, which include a Global Intangible Low-Taxed Income (GILTI) provision that imposes U.S. tax on certain foreign subsidiary income in the year it is earned. Our accounting policy is to treat tax on the GILTI as a current period cost included in income tax expense in the year incurred.

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Note 14 - Accumulated Other Comprehensive Income (Loss)

The changes in AOCIL, net of tax, by component for the six months ended March 30, 2019 are as follows:

	Accumulated foreign currency translation	Accumulated retirement liability	Accumulated gain (loss) on derivatives	Total
AOCIL at September 29, 2018	$ (99,415)	$ (272,317)	$ (449)	$ (372,181)
Other comprehensive income (loss) before reclassifications	(4,650)	687	529	(3,434)
Amounts reclassified from AOCIL	(3,631)	8,809	56	5,234
Other comprehensive income (loss)	(8,281)	9,496	585	1,800
AOCIL at March 30, 2019	$ (107,696)	$ (262,821)	$ 136	$ (370,381)

The amounts reclassified from AOCIL into earnings are as follows:

	Statement of earnings classification	Three Months Ended		Six Months Ended	
		March 30, 2019	March 31, 2018	March 30, 2019	March 31, 2018
Retirement liability:					
Prior service cost (credit)		$ (75)	$ (86)	$ (151)	$ (171)
Actuarial losses		5,925	7,423	11,853	14,819
Reclassification from AOCIL into earnings (1)		5,850	7,337	11,702	14,648
Tax effect		(1,446)	(1,796)	(2,893)	(4,488)
Net reclassification from AOCIL into earnings		$ 4,404	$ 5,541	$ 8,809	$ 10,160
Derivatives:					
Foreign currency contracts	Sales	$ (67)	$ (138)	$ (100)	$ (256)
Foreign currency contracts	Cost of sales	235	502	895	1,198
Interest rate swaps	Interest	(317)	(102)	(717)	(116)
Reclassification from AOCIL into earnings		(149)	262	78	826
Tax effect		35	(72)	(22)	(307)
Net reclassification from AOCIL into earnings		$ (114)	$ 190	$ 56	$ 519

(1) The reclassifications are included in the computation of non-service pension expense, which is included in Other on the Consolidated Condensed Statement of Earnings.

The amounts deferred in AOCIL are as follows:

	Net deferral in AOCIL - effective portion			
	Three Months Ended		Six Months Ended	
	March 30, 2019	March 31, 2018	March 30, 2019	March 31, 2018
Foreign currency contracts	$ 150	$ (1,655)	$ 1,049	$ (827)
Interest rate swaps	(107)	630	(342)	1,247
Net gain (loss)	43	(1,025)	707	420
Tax effect	(8)	256	(178)	(284)
Net deferral in AOCIL of derivatives	$ 35	$ (769)	$ 529	$ 136

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Note 15 - Stock Employee Compensation Trust and Supplemental Retirement Plan Trust

The Stock Employee Compensation Trust (SECT) assists in administering and provides funding for equity-based compensation plans and benefit programs, including the Moog Inc. Retirement Savings Plan (RSP) and the Employee Stock Purchase Plan (ESPP). The Supplemental Retirement Plan (SERP) Trust provides funding for benefits under the SERP provisions of the Moog Inc. Plan to Equalize Retirement Income and Supplemental Retirement Income. Both the SECT and the SERP Trust hold Moog shares as investments. The shares in the SECT and SERP Trust are not considered outstanding for purposes of calculating earnings per share. However, in accordance with the trust agreements governing the SECT and SERP Trust, the trustees vote all shares held by the SECT and SERP Trust on all matters submitted to shareholders.

Note 16 - Earnings per Share and Dividends

Basic and diluted weighted-average shares outstanding are as follows:

	Three Months Ended		Six Months Ended	
	March 30, 2019	March 31, 2018	March 30, 2019	March 31, 2018
Basic weighted-average shares outstanding	34,886,541	35,770,089	34,850,898	35,771,247
Dilutive effect of equity-based awards	354,572	409,769	332,573	419,208
Diluted weighted-average shares outstanding	35,241,113	36,179,858	35,183,471	36,190,455

For the three and six months ended March 30, 2019, there were 29,839 and 38,132 common shares from equity-based awards, respectively, excluded from the calculation of diluted earnings per share as they would be anti-dilutive. For the three and six months ended March 31, 2018, there were 21,887 and 17,432 common shares from equity-based awards, respectively, excluded from the calculation of diluted earnings per share as they would be anti-dilutive.

We declared and paid cash dividends of $0.25 per share on our Class A and Class B common stock in the first and second quarters of 2019. We declared a cash dividend of $0.25 per share on our Class A and Class B common stock in the second quarter of 2018.

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Note 17 - Segment Information

Below are net sales by segment for the three and six months ended March 30, 2019 and March 31, 2018 disaggregated by type of good or service and market or type of customer.

	Three Months Ended		Six Months Ended	
	March 30, 2019	March 31, 2018	March 30, 2019	March 31, 2018
Net sales:				
Military	$155,016	$155,659	$301,817	$279,859
Commercial	165,611	155,780	322,855	310,114
Aircraft Controls	320,627	311,439	624,672	589,973
Space	53,349	57,789	103,525	107,202
Defense	111,476	85,738	217,368	169,718
Space and Defense Controls	164,825	143,527	320,893	276,920
Energy	29,977	40,878	59,274	78,980
Industrial Automation	116,369	108,323	225,499	204,768
Simulation and Test	31,245	32,041	60,295	62,878
Medical	55,768	52,841	107,854	103,065
Industrial Systems	233,359	234,083	452,922	449,691
Net sales	$718,811	$689,049	$1,398,487	$1,316,584

Sales by customer are as follows:

	Three Months Ended		Six Months Ended	
	March 30, 2019	March 31, 2018	March 30, 2019	March 31, 2018
Net sales:				
Commercial	$165,611	$155,780	$322,855	$310,114
U.S. Government (including OEM)	122,779	116,886	239,960	212,883
Other	32,237	38,773	61,857	66,976
Aircraft Controls	320,627	311,439	624,672	589,973
Commercial	32,188	33,300	62,241	57,221
U.S. Government (including OEM)	121,821	102,721	236,286	199,185
Other	10,816	7,506	22,366	20,514
Space and Defense Controls	164,825	143,527	320,893	276,920
Commercial	226,894	228,277	437,462	436,890
U.S. Government (including OEM)	4,511	5,081	10,953	10,575
Other	1,954	725	4,507	2,226
Industrial Systems	233,359	234,083	452,922	449,691
Commercial	424,693	417,357	822,558	804,225
U.S. Government (including OEM)	249,111	224,688	487,199	422,643
Other	45,007	47,004	88,730	89,716
Net sales	$718,811	$689,049	$1,398,487	$1,316,584

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Below is operating profit by segment for the three and six months ended March 30, 2019 and March 31, 2018 and a reconciliation of segment operating profit to earnings before income taxes. Operating profit is net sales less cost of sales and other operating expenses, excluding interest expense, equity-based compensation expense and other corporate expenses. Cost of sales and other operating expenses are directly identifiable to the respective segment or allocated on the basis of sales, number of employees or profit.

	Three Months Ended		Six Months Ended	
	March 30, 2019	March 31, 2018	March 30, 2019	March 31, 2018
Operating profit (loss):				
Aircraft Controls	$27,122	$33,793	$60,321	$64,836
Space and Defense Controls	20,504	17,042	38,977	33,515
Industrial Systems	30,228	(5,428)	57,933	14,483
Total operating profit	77,854	45,407	157,231	112,834
Deductions from operating profit:				
Interest expense	9,939	9,089	19,621	17,735
Equity-based compensation expense	1,683	1,499	3,691	3,500
Non-service pension expense	3,187	1,707	6,380	3,400
Corporate and other expenses, net	7,427	7,443	13,737	14,696
Earnings before income taxes	$55,618	$25,669	$113,802	$73,503

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Note 18 - Related Party Transactions

On November 20, 2017, John Scannell was elected to the Board of Directors of M&T Bank Corporation and M&T Bank. We currently engage with M&T Bank in the ordinary course of business for various financing activities, all of which were initiated prior to the election of Mr. Scannell to the Board. M&T Bank provides credit extension for routine purchases, which for the three and six months ended March 30, 2019 totaled $6,726 and $11,078, respectively. Credit extension for the three and six months ended March 31, 2018 totaled $5,759 and $11,218, respectively. At March 30, 2019, we held a $15,000 interest rate swap with M&T Bank and outstanding leases with a total original cost of $27,678. M&T Bank also maintains an interest of approximately 12% in our U.S. revolving credit facility. Further details of the U.S. revolving credit facility can be found in Note 7, Indebtedness.

Note 19 - Commitments and Contingencies

From time to time, we are involved in legal proceedings. We are not a party to any pending legal proceedings which management believes will result in a material adverse effect on our financial condition, results of operations or cash flows.

We are engaged in administrative proceedings with governmental agencies and legal proceedings with governmental agencies and other third parties in the normal course of our business, including litigation under Superfund laws, regarding environmental matters. We believe that adequate reserves have been established for our share of the estimated cost for all currently pending environmental administrative or legal proceedings and do not expect that these environmental matters will have a material adverse effect on our financial condition, results of operations or cash flows.

In the ordinary course of business we could be subject to ongoing claims or disputes from our customers, the ultimate settlement of which could have a material adverse impact on our consolidated results of operations. While the receivables and any loss provisions recorded to date reflect management's best estimate of the projected costs to complete a given project, there may still be significant effort required to complete the ultimate deliverable. Future variability in internal cost as well as future profitability is dependent upon a number of factors including deliveries, performance and government budgetary pressures. The inability to achieve a satisfactory contractual solution, further unplanned delays, additional developmental cost growth or variations in any of the estimates used in the existing contract analysis could lead to further loss provisions. Additional losses could have a material adverse impact on our financial condition, results of operations or cash flows in the period in which the loss may be recognized.

We are contingently liable for $35,285 of standby letters of credit issued to third parties on our behalf at March 30, 2019.

Note 20 - Subsequent Event

On April 25, 2019, the Board of Directors declared a $0.25 per share quarterly dividend payable on issued and outstanding shares of our Class A and Class B common stock on June 3, 2019 to shareholders of record at the close of business on May 15, 2019.

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

The following should be read in conjunction with Management's Discussion and Analysis of Financial Condition and Results of Operations contained in the Company's Annual Report filed on Form 10-K for the fiscal year ended September 29, 2018. All references to years in this Management's Discussion and Analysis of Financial Condition and Results of Operations are to fiscal years and amounts may differ from reported values due to rounding.

OVERVIEW

We are a worldwide designer, manufacturer and systems integrator of high performance precision motion and fluid controls and control systems for a broad range of applications in aerospace and defense and industrial markets.

Within the aerospace and defense market, our products and systems include:

- Defense market - primary and secondary flight controls for military aircraft, stabilization and automatic ammunition loading controls for armored combat vehicles, tactical and strategic missile steering controls and gun aiming controls.
- Commercial aircraft market - primary and secondary flight controls for commercial aircraft.
- Commercial space market - satellite positioning controls and thrust vector controls for space launch vehicles.

In the industrial market, our products are used in a wide range of applications including:

- Industrial automation market - injection molding, metal forming, heavy industry, material and automotive testing and pilot training simulators.
- Medical market - enteral clinical nutrition and infusion therapy pumps, ultrasonic sensors and surgical handpieces and CT scanners.
- Energy market - power generation and oil and gas exploration.

We operate under three segments, Aircraft Controls, Space and Defense Controls and Industrial Systems. Our principal manufacturing facilities are located in the United States, Philippines, United Kingdom, Germany, Czech Republic, Italy, Costa Rica, China, Netherlands, Luxembourg, Japan, Canada, India and Lithuania.

Under ASC 606, 65% of revenue was recognized over time for the quarter ended March 30, 2019, using the cost-to-cost method of accounting. The over time method of revenue recognition is predominantly used in Aircraft Controls and Space and Defense Controls. We use this method for U.S. Government contracts and repair and overhaul arrangements as we are creating or enhancing assets that the customer controls. In addition, many of our large commercial contracts qualify for over time accounting as our performance does not create an asset with an alternative use and we have enforceable right to payment for performance completed to date.

For the quarter ended March 30, 2019, 35% of revenue was recognized at the point in time control transferred to the customer. This method of revenue recognition is used most frequently in Industrial Systems. We use this method for commercial contracts in which the asset being created has an alternative use. We determine the point in time control transfers to the customer by weighing the five indicators provided by ASC 606. When control has transferred to the customer, profit is generated as cost of sales is recorded and as revenue is recognized.

We concentrate on providing our customers with products designed and manufactured to the highest quality standards. Our technical experts work collaboratively around the world, delivering capabilities for mission-critical solutions. These core operational principles are necessary as our products are applied in demanding applications, "When Performance Really Matters.®" By capitalizing on these core foundational strengths, we believe we have achieved a leadership position in the high performance, precision controls market. Additionally, these strengths yield a broad control product portfolio, across a diverse base of customers and end markets.

By focusing on customer intimacy and commitment to solving their most demanding technical problems, we have been able to innovate our control product franchise from one market to another, organically growing from a high-performance components supplier to a high-performance systems supplier. In addition, we continue expanding our content positions on our current platforms, seeking to be the dominant supplier in the niche markets we serve. We also look for innovation in all aspects of our business, employing new technologies to improve productivity and to develop innovative business models.

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Our fundamental strategies to achieve our goals center around talent, lean and innovation and include:

- a strong leadership team that has positioned the company for growth,
- utilizing our global capabilities and strong engineering heritage to innovate,
- maintaining our technological excellence by solving our customers' most demanding technical problems in applications "When Performance Really Matters®,"
- continuing to invest in talent development to strengthen employee performance, and
- maximizing customer value by implementing lean enterprise principles.

These activities will help us achieve our financial objective of increasing shareholder value with sustainable competitive advantages across our segments. In doing so, we expect to maintain a balanced, diversified portfolio in terms of markets served, product applications, customer base and geographic presence.

We focus on improving shareholder value through strategic revenue growth, both acquired and organic, through improving operating efficiencies and manufacturing initiatives and through utilizing low cost manufacturing facilities without compromising quality. Additionally, we take a balanced approach to capital deployment, which may include strategic acquisitions or further share buyback activity, in order to maximize shareholder returns over the long-term.

Acquisitions, Divestitures and Equity Method Investments

All of our acquisitions are accounted for under the purchase method and, accordingly, the operating results for the acquired companies are included in the consolidated statements of earnings from the respective dates of acquisition. Under purchase accounting, we record assets and liabilities at fair value and such amounts are reflected in the respective captions on the consolidated balance sheets. The purchase price described for each acquisition below is net of any cash acquired, includes debt issued or assumed and the fair value of contingent consideration.

In the first quarter of 2019, we sold a non-core business of our Industrials Systems segment for $4 million in cash and recorded a gain in other income of $3 million.

On April 30, 2018, we acquired Electro-Optical Imaging, a designer and manufacturer of video trackers and imaging products, located in Florida, for $5 million. This operation is included in our Space and Defense Controls segment.

On March 29, 2018, we acquired a 100% ownership interest in VUES Brno s.r.o ("Vues") located in the Czech Republic, which included a 74% ownership interest in a subsidiary located in Germany, for $64 million. VUES designs and manufactures electric motors and generators, and provides customized solutions. On September 6, 2018, we acquired the remaining 26% noncontrolling interest for $2 million in cash. This operation is included in our Industrial Systems segment.

On October 3, 2017, we, in collaboration with SIA Engineering Company, announced the joint venture company, Moog Aircraft Services Asia ("MASA"), in Singapore, of which we currently hold a 51% ownership. MASA is intended to provide maintenance, repair and overhaul services for our manufactured flight control systems. As we hold a majority ownership in MASA, but share voting control, we are accounting for this investment using the equity method. As of March 30, 2019, we have made total contributions of $5 million to MASA. This operation is included in our Aircraft Controls segment.

CRITICAL ACCOUNTING POLICIES

On a regular basis, we evaluate the critical accounting policies used to prepare our consolidated financial statements, including, but not limited to, revenue recognition on long-term contracts, contract and contract-related loss reserves, reserves for inventory valuation, reviews for impairment of goodwill, reviews for impairment of long-lived assets, pension assumptions and income taxes. See Note 1 of the Consolidated Condensed Financial Statements included in Item 1, Financial Statements of this report for the impact of the adoption of ASC 606.

Other than the adoption of ASC 606, there have been no material changes in critical accounting policies in the current year from those disclosed in our 2018 Annual Report on Form 10-K.

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RECENT ACCOUNTING PRONOUNCEMENTS

See Note 1 of the Consolidated Condensed Financial Statements included in Item 1, Financial Statements of this report for further information regarding Financial Accounting Standards Board issued Accounting Standards Updates ("ASU").

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CONSOLIDATED RESULTS OF OPERATIONS

(dollars and shares in millions, except per share data)	Three Months Ended March 30, 2019	March 31, 2018	$ Variance	% Variance	Six Months Ended March 30, 2019	March 31, 2018	$ Variance	% Variance
Net sales	$719	$689	$30	4%	$1,398	$1,317	$82	6%
Gross margin	*27.5%*	*28.0%*			*28.4%*	*28.7%*		
Research and development expenses	$31	$34	$(3)	(8%)	$63	$66	$(3)	(5%)
Selling, general and administrative expenses as a percentage of sales	*13.9%*	*14.3%*			*14.0%*	*14.7%*		
Interest expense	$10	$9	$1	9%	$20	$18	$2	11%
Restructuring expense	$—	$24	$(24)	(100%)	$—	$24	$(24)	(100%)
Other	$1	$1	$(1)	(56%)	$4	$2	$2	69%
Effective tax rate	*23.8%*	*45.6%*			*24.1%*	*79.2%*		
Net earnings	$42	$14	$28	n/a	$86	$15	$71	n/a
Diluted earnings per share	$1.20	$0.39	$0.81	n/a	$2.46	$0.42	$2.04	n/a
Total backlog					$2,230	n/a	n/a	n/a
Twelve month backlog					$1,636	$1,295	$341	26%

Net sales increased in the second quarter and in the first half of 2019 compared to the second quarter and first half of 2018, largely attributable to organic sales growth within Space and Defense Controls and Aircraft Controls.

Gross margin decreased in the second quarter of 2019 compared to the second quarter of 2018. Gross profit in the second quarter of 2019 included a $10 million charge associated with a supplier quality issue within Aircraft Controls. Gross profit in the second quarter of 2018 included a $7 million inventory write-down associated with the decision to exit the wind pitch controls business in Industrial Systems. Excluding both of these charges, gross margin was relatively unchanged in both the second quarter and the first half of 2019 compared to the same periods of 2018. Gross margin increased in Industrial Systems, due partly to the absence of the low-margin wind pitch controls business. Mostly offsetting the increased gross margin was an unfavorable sales mix in Space and Defense Controls.

Selling, general and administrative expenses as a percentage of sales decreased in the second quarter and in the first half of 2019 compared to the same periods of 2018. The decrease relates to the incremental margin from higher sales, as well as lower medical claim expenses.

Interest expense increased in the second quarter and the first half of 2019 compared to the second quarter and the first half of 2018 due to higher interest rates on outstanding debt.

In the second quarter of 2018, we decided to exit our wind pitch controls business and incurred $31 million of restructuring expense in Industrial Systems. Of the total expense in the second quarter of 2018, the charges consisted of $7 million of non-cash inventory reserves, $14 million of non-cash charges, primarily for the impairment of long-lived assets, $7 million for severance and $2 million for other costs.

Other expense increased in the first half of 2019 compared to the first half of 2018. Non-service pension expense increased $3 million and the loss associated with foreign currencies increased $1 million. Partly offsetting the higher expenses was a $3 million gain on the sale of a small non-core business in the first quarter of 2019.

The effective tax rate in the second quarter of 2018 was impacted by limited tax benefits associated with the restructuring charges taken in foreign jurisdictions of our Industrial Systems segment. In addition, the effective tax rate in 2018 was significantly impacted by the enactment of the Tax Cuts and Jobs Act of

2017. Excluding the one-time special impacts due to the Act, the effective tax rate for the first half of 2018 was 29.2%.

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Other comprehensive income in the second quarter of 2019 includes $1 million of foreign currency translation gain, whereas other comprehensive income in the second quarter of 2018 includes $20 million of foreign currency translation gain. The change in foreign currency translation is primarily attributable to the depreciation of the Euro relative to the U.S. Dollar. Other comprehensive income in the first half of 2019 includes $8 million of foreign currency translation loss, whereas other comprehensive income in the first half of 2018 includes $30 million of foreign currency translation gain. The change in foreign currency translation is primarily attributable to the depreciation of the Euro and the British Pound relative to the U.S. Dollar.

The twelve-month backlog at March 30, 2019 compared to March 31, 2018 increased in our aerospace and defense business. Within Aircraft Controls, backlog increased due to the timing of orders for military aircraft, driven primarily by the F-35 program, as well as the timing of orders for commercial aircraft, primarily related to the Boeing 787 program. Also within Space and Defense Controls, backlog increased supporting the expected incremental sales for missiles and defense components. The twelve-month backlog for our industrial business decreased as lost energy orders related to the decision to exit the wind pitch controls business more than offset higher orders for our medical products.

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SEGMENT RESULTS OF OPERATIONS

Operating profit, as presented below, is net sales less cost of sales and other operating expenses, excluding interest expense, equity-based compensation expense and other corporate expenses. Cost of sales and other operating expenses are directly identifiable to the respective segment or allocated on the basis of sales, manpower or profit. Operating profit is reconciled to earnings before income taxes in Note 17 of the Notes to Consolidated Condensed Financial Statements included in this report.

Aircraft Controls

(dollars in millions)	Three Months Ended				Six Months Ended			
	March 30, 2019	March 31, 2018	$ Variance	% Variance	March 30, 2019	March 31, 2018	$ Variance	% Variance
Net sales - military aircraft	$ 155	$ 156	$ (1)	— %	$ 302	$ 280	$ 22	8 %
Net sales - commercial aircraft	166	156	10	6 %	323	310	13	4 %
	$ 321	$ 311	$ 9	3 %	$ 625	$ 590	$ 35	6 %
Operating profit	$ 27	$ 34	$ (7)	(20 %)	$ 60	$ 65	$ (5)	(7 %)
Operating margin	*8.5 %*	*10.9 %*			*9.7 %*	*11.0 %*		

The increase in Aircraft Controls' net sales in the second quarter of 2019 compared to the second quarter of 2018 was primarily driven by increases in commercial OEM programs. Additionally, the sales increase in the first half of 2019 compared to the first half of 2018 was driven by increases in military OEM and aftermarket programs, as well as commercial OEM programs.

In the second quarter of 2019, commercial OEM sales increased $13 million compared to the second quarter of 2018. Higher volumes for the Airbus A350 and the Boeing 787 programs increased sales $7 million and $6 million, respectively. Partially offsetting the commercial OEM sales increase was a $3 million decline in commercial aftermarket sales, driven by lower activity on the Boeing 787 program. Also in the second quarter of 2019, military OEM sales declined $7 million, as the high level of helicopter sales in the second quarter of 2018 did not repeat. Mostly offsetting the decline was a $6 million increase in military aftermarket sales, driven by higher V-22 and F-35 spares sales.

In the first half of 2019 compared to the first half of 2018, military OEM sales increased $11 million. Favorable order timing and higher production rates increased sales $18 million for the F-35 program. Partially offsetting the increase was the second quarter's lower helicopter sales. Military aftermarket sales also increased $11 million in the first half of 2019, driven by higher spares activity for the V-22 program. Additionally in the first half of 2019, commercial OEM sales increased $16 million, as higher volumes on the Boeing 787 program increased sales $9 million and higher demand for business jets increased sales $8 million. Partially offsetting the commercial OEM sales growth was a $3 million decline in commercial aftermarket sales, driven mostly by order timing for Airbus A350 and Boeing 787 programs.

Operating margin in the second quarter of 2019 included a $10 million charge related to a supplier quality issue. Excluding this charge, operating margin increased compared to the second quarter of 2018, as well as the first half of 2018. The increase is due primarily to $3 million and $5 million, respectively, of lower research and development expenses across our major OEM programs.

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Space and Defense Controls

(dollars in millions)	Three Months Ended March 30, 2019	March 31, 2018	$ Variance	% Variance	Six Months Ended March 30, 2019	March 31, 2018	$ Variance	% Variance
Net sales	$165	$ 144	$ 21	15 %	$321	$ 277	$ 44	16 %
Operating profit	$21	$ 17	$ 3	20 %	$39	$ 34	$ 5	16 %
Operating margin	*12.4 %*	*11.9 %*			*12.1 %*	*12.1 %*		

The increase in Space and Defense Controls' net sales in the second quarter and in the first half of 2019 compared to the second quarter and the first half of 2018 was driven by increases in our defense market. In the second quarter of 2019 compared to the second quarter of 2018, sales in our defense market increased $26 million across all of our major programs. Sales for missile applications increased $6 million due to higher volumes on both production and funded development programs. Also defense controls sales increased $5 million, driven primarily by higher sales for our new turret system. In addition, sales for defense components increased $5 million and sales for naval systems increased $4 million due to higher orders. Security sales increased $2 million due to the Electro-Optical Imaging acquisition. Partly offsetting the defense market sales increases was a $4 million sales decline in the space market, driven primarily by timing for satellite components and avionics programs.

In the first half of 2019 compared to the first half of 2018, sales in our defense market increased $48 million across all of our major programs, driven by the same factors in the second quarter. Sales increased $15 million in missile applications, $10 million for defense controls, $7 million for security, $7 million for components and $7 million for naval systems. These defense market increases were slightly offset by the second quarter decline in the space market.

igher amounts of acquired sales at a lower margin.

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Industrial Systems

(dollars in millions)	Three Months Ended March 30, 2019	March 31, 2018	$ Variance	% Variance	Six Months Ended March 30, 2019	March 31, 2018	$ Variance	% Variance
Net sales	$ 233	$ 234	$ (1)	— %	$ 453	$ 450	$ 3	1 %
Operating profit (loss)	$ 30	$ (5)	$ 36	n/a	$ 58	$ 14	$ 43	n/a
Operating margin	*13.0 %*	*(2.3)%*			*12.8 %*	*3.2 %*		

The changes in Industrial Systems' net sales in the second quarter and in the first half of 2019 compared to the second quarter and the first half of 2018 reflects the net effect of acquired sales offsetting the lost sales associated with our decision to exit a business. Additionally, weaker foreign currencies, primarily the Euro relative to the U.S. Dollar, decreased sales $7 million in the second quarter and $11 million in the first half of 2019, offsetting the local currency sales growth.

In the second quarter of 2019 compared to the second quarter of 2018, sales decreased $11 million in our energy market due to the decision to exit the wind pitch controls business in 2018. Mostly offsetting the decline was an increase of $8 million in our industrial automation market, due mostly to the acquisition of Vues Brno s.r.o. Sales also increased $3 million in our medical market due to higher enteral pump and sets sales.

In the first half of 2019 compared to the first half of 2018, sales increased $21 million in our industrial automation market and increased $5 million in our medical market, both driven by the second quarter increases. Partly offsetting the sales increases was $20 million of decreased sales in our energy market, driven mostly by our decision to exit the wind pitch controls business.

Operating margin increased in the second quarter and in the first half of 2019 compared to the second quarter and the first half of 2018, due to the restructuring expense related to the decision to exit the wind pitch controls business. Excluding the effect of this expense in 2018, operating margin also increased in the second quarter and in the first half of 2019 compared to the second quarter and the first half of 2018, driven by the absence of the low-margin wind pitch controls business. Additionally, in the first half of 2019, a $3 million gain on the sale of a small non-core business increased operating margin compared to the first half of 2018.

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CONSOLIDATED AND SEGMENT OUTLOOK

(dollars in millions, except per share data)	2019 Outlook	2018	2019 vs. 2018 $ Variance	2019 vs. 2018 % Variance
Net sales:				
Aircraft Controls	$1,265	$1,194	$71	6 %
Space and Defense Controls	681	581	100	17 %
Industrial Systems	931	935	(4)	— %
	$2,877	$2,709	$167	6 %
Operating profit:				
Aircraft Controls	$134	$130	$5	3 %
Space and Defense Controls	81	68	13	19 %
Industrial Systems	112	65	47	72 %
	$327	$262	$64	24 %
Operating margin:				
Aircraft Controls	10.6 %	10.9 %		
Space and Defense Controls	11.8 %	11.6 %		
Industrial Systems	12.0 %	6.9 %		
	11.4 %	9.7 %		
Net earnings	$178	$97	$82	84 %
Diluted earnings per share	$4.85 - $5.25	$2.68	$2.37	88 %

2019 Outlook – We expect higher amounts of defense sales within both Space and Defense Controls and Aircraft Controls to drive the increased 2019 sales. We also expect commercial aircraft sales growth driven by major OEM program ramp-ups. In addition, we expect Industrial Systems acquisitive growth will offset the lost sales associated with our wind pitch controls business. We expect the 2019 operating margin will increase due to the absence of the 2018 charges associated with exiting the wind pitch controls business, as well as incremental margin from higher sales. Net earnings in 2019, relative to 2018, will benefit due to the absence of the unusually high effective tax rate due to the Tax Cuts and Jobs Act. Excluding the impacts from the wind charge and the one-time special impacts from the Tax Act in 2018, we expect net earnings to increase 8% from an adjusted net earnings in 2018 of $165 million. We expect diluted earnings per share will range between $4.85 and $5.25, with a midpoint of $5.05.

2019 Outlook for Aircraft Controls **–** We expect 2019 sales in Aircraft Controls will increase primarily due to the continued ramp ups of the F-35, the Boeing 787 and the Airbus A350 programs. Partially offsetting the increases is an expected sales decline of commercial aftermarket programs, as the favorable order timing in 2018 does not repeat in 2019. We expect 2019 operating margin will decrease compared to 2018 due to the supplier quality charge in the second quarter of 2019. Excluding this charge, we expect operating margin to increase, due to a more favorable sales mix from higher military aftermarket sales, as well as improving costs on newer commercial programs.

2019 Outlook for Space and Defense Controls **–** We expect 2019 sales in Space and Defense Controls will increase due to higher sales volumes on missile programs, and due to new product offerings and higher sales volumes on existing defense controls programs. We expect 2019 operating margin will increase slightly due to incremental margin from the higher sales volume.

2019 Outlook for Industrial Systems **–** We expect 2019 sales in Industrial Systems to remain fairly consistent with 2018 sales. We expect sales increases across our major markets, due mostly to the Vues Brno s.r.o acquisition, are offset by the lost sales associated with the 2018 decision to exit the wind pitch controls business. We expect 2019 operating margin will increase due to the absence of 2018's charges associated with exiting the wind pitch controls business. Excluding the impact of these charges, 2019 operating margin will increase from an adjusted 2018 operating margin of 10.9%, driven by the absence of the low-margin wind pitch controls business.

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FINANCIAL CONDITION AND LIQUIDITY

(dollars in millions)	Six Months Ended March 30, 2019	March 31, 2018	$ Variance	% Variance
Net cash provided (used) by:				
Operating activities	$ 109	$ 45	$ 64	141 %
Investing activities	(58)	(90)	32	(36 %)
Financing activities	(67)	(79)	12	(16 %)

Our available borrowing capacity and our cash flow from operations provide us with the financial resources needed to run our operations, reinvest in our business and make strategic acquisitions.

At March 30, 2019, our cash balances were $112 million, which is primarily held outside of the U.S. Cash flow from our U.S. operations, together with borrowings on our credit facility, fund on-going activities, debt service requirements and future growth investments.

Operating activities

Net cash provided by operating activities increased in the first half of 2019 compared to the same period of 2018. In 2019, pension contributions decreased $83 million. This was partially offset by higher inventory levels, primarily in Aircraft Controls, which used $24 million more cash in the first half 2019 compared to the first half of 2018.

Investing activities

Net cash used by investing activities in the first half of 2018 included $42 million for the acquisition in our Industrial Systems segment. Net cash used by investing activities in the first half of 2019 included $16 million of higher capital expenditures than the first half of 2018.

We expect our 2019 capital expenditures to be approximately $110 million, due to facilities investments supporting the increased production of the F-35 program as well as engine propulsion testing, and due to investments in machinery and equipment.

Financing activities

Net cash used by financing activities in first half of 2019 and 2018 includes net payments on our credit facilities and $17 million of cash dividends.

Off Balance Sheet Arrangements

We do not have any material off balance sheet arrangements that have or are reasonably likely to have a material future effect on our results of operations or financial condition.

Contractual Obligations and Commercial Commitments

Our contractual obligations and commercial commitments have not changed materially from the disclosures in our 2018 Annual Report on Form 10-K.

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CAPITAL STRUCTURE AND RESOURCES

We maintain bank credit facilities to fund our short and long-term capital requirements, including for acquisitions. From time to time, we also sell debt and equity securities to fund acquisitions or take advantage of favorable market conditions.

Our U.S. revolving credit facility matures on June 28, 2021. The U.S. revolving credit facility has a capacity of $1.1 billion and also provides an expansion option, which permits us to request an increase of up to $200 million to the credit facility upon satisfaction of certain conditions. The U.S. revolving credit facility had an outstanding balance of $392 million at March 30, 2019. The weighted-average interest rate on primarily all of the outstanding credit facility borrowings was 4.12% and is principally based on LIBOR plus the applicable margin, which was 1.63% at March 30, 2019. The credit facility is secured by substantially all of our U.S. assets.

The U.S. revolving credit facility contains various covenants. The covenant for minimum interest coverage ratio, defined as the ratio of EBITDA to interest expense for the most recent four quarters, is 3.0. The covenant for the maximum leverage ratio, defined as the ratio of net debt, including letters of credit, to EBITDA for the most recent four quarters, is 3.5. We are in compliance with all covenants. EBITDA is defined in the loan agreement as (i) the sum of net income, interest expense, income taxes, depreciation expense, amortization expense, other non-cash items reducing consolidated net income and non-cash equity-based compensation expenses minus (ii) other non-cash items increasing consolidated net income.

We are generally not required to obtain the consent of lenders of the U.S. revolving credit facility before raising significant additional debt financing; however, certain limitations and conditions may apply that would require consent to be obtained. In recent years, we have demonstrated our ability to secure consents to access debt markets. We have also been successful in accessing equity markets from time to time. We believe that we will be able to obtain additional debt or equity financing as needed.

The SECT has a revolving credit facility with a borrowing capacity of $35 million, maturing on July 26, 2020. Interest was 4.61% as of March 30, 2019 and is based on LIBOR plus a margin of 2.13%. As of March 30, 2019, there was $4 million of outstanding borrowings.

We have $300 million principal amount of 5.25% senior notes due December 1, 2022 with interest paid semiannually on June 1 and December 1 of each year. The senior notes are unsecured obligations, guaranteed on a senior unsecured basis by certain subsidiaries and contain normal incurrence-based covenants and limitations such as the ability to incur additional indebtedness, pay dividends, make other restricted payments and investments, create liens and certain corporate acts such as mergers and consolidations.

We have a trade receivables securitization facility (the "Securitization Program"), which matures on October 30, 2020. The Securitization Program provides up to $130 million of borrowing capacity and lowers our cost to borrow funds as compared to the U.S. revolving credit facility. Under the Securitization Program, we sell certain trade receivables and related rights to an affiliate, which in turn sells an undivided variable percentage ownership interest in the trade receivables to a financial institution, while maintaining a subordinated interest in a portion of the pool of trade receivables. We had an outstanding balance of $130 million at March 30, 2019. The Securitization Program has a minimum borrowing requirement, which was $104 million at March 30, 2019. Interest on the secured borrowings under the Securitization Program was 3.32% at March 30, 2019 and is based on 30-day LIBOR plus an applicable margin.

At March 30, 2019, we had $716 million of unused capacity, including $673 million from the U.S. revolving credit facility after considering standby letters of credit. However, our leverage ratio covenant limits our total borrowing capacity to $520 million as of March 30, 2019.

Net debt to capitalization was 35% at March 30, 2019 and 38% at September 29, 2018. The decrease in net debt to capitalization is primarily due to our net earnings and positive cash flow.

We believe that our cash on hand, cash flows from operations and available borrowings under short and long-term arrangements will continue to be sufficient to meet our operating needs.

We declared and paid cash dividends of $0.25 per share on our Class A and Class B common stock in the first and second quarters of 2019.

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The Board of Directors has authorized a share repurchase program. This program has been amended from time to time to authorize additional repurchases that includes both Class A and Class B common stock, and allows us to buy up to an aggregate 13 million common shares. Under this program, we have purchased approximately 9.7 million shares for $654 million as of March 30, 2019.

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ECONOMIC CONDITIONS AND MARKET TRENDS

We operate within the aerospace and defense and industrial markets. Our aerospace and defense markets are affected by market conditions and program funding levels, while our industrial markets are influenced by general capital investment trends and economic conditions. A common factor throughout our markets is the continuing demand for technologically advanced products.

Aerospace and Defense

Approximately two-thirds of our 2018 sales were generated in aerospace and defense markets. Within aerospace and defense, we serve three end markets: defense, commercial aircraft and space.

The defense market is dependent on military spending for development and production programs. Aircraft production programs are typically long-term in nature, offering predictability as to capacity needs and future revenues. We maintain positions on numerous high priority programs, including the Lockheed Martin F-35 Joint Strike Fighter, FA-18E/F Super Hornet and V-22 Osprey. The large installed base of our products leads to attractive aftermarket sales and service opportunities. The tactical and strategic missile, missile defense and defense controls markets are dependent on many of the same market conditions as military aircraft, including overall military spending and program funding levels. Our security and surveillance product line is dependent on government funding at federal and local levels, as well as private sector demand.

The 2011 Budget Control Act reduced the Department of Defense spending (or sequestration) by approximately $500 billion. The Bipartisan Budget Act of 2013 and the Bipartisan Budget Act of 2015 provided stability and modest growth in the Department of Defense spending through 2017. After operating under continuing resolutions, which restrict new program starts, the U.S. Government signed the 2019 defense appropriations budget in September 2018, with moderate growth in defense spending. However, future budgeted levels of defense spending beyond 2019 are uncertain and subject to debate. Currently, we expect approximately $850 million of U.S. defense sales in 2019.

The commercial aircraft market is dependent on a number of factors, including global demand for air travel, which generally follows underlying economic growth. As such, the commercial aircraft market has historically exhibited cyclical swings which tend to track the overall economy. In recent years, the development of new, more fuel-efficient commercial air transports has helped drive increased demand in the commercial aircraft market, as airlines replace older, less fuel-efficient aircraft with newer models in an effort to reduce operating costs. The aftermarket is driven by usage of the existing aircraft fleet and the age of the installed fleet, and is impacted by fleet re-sizing programs for passenger and cargo aircraft. Changes in aircraft utilization rates affect the need for maintenance and spare parts impacting aftermarket sales. Boeing and Airbus have historically adjusted production in line with air traffic volume. Demand for our commercial aircraft products is in large part dependent on new aircraft production, which is increasing as Boeing and Airbus work to fulfill large backlogs of unfilled orders.

The commercial space market is comprised of large satellite customers, traditionally communications companies. Trends for this market, as well as for commercial launch vehicles, follow demand for increased capacity. This, in turn tends to track with underlying demand for increased consumption of telecommunication services, satellite replacement and global navigation needs. The space market is also partially dependent on the governmental-authorized levels of funding for satellite communications, as well as investment for commercial and exploration activities.

Industrial

Approximately one-third of our 2018 sales were generated in industrial markets. Within industrial, we serve four end markets: energy, industrial automation, simulation and test and medical.

The industrial automation market we serve is influenced by several factors including capital investment, product innovation, economic growth, cost-reduction efforts and technology upgrades. We experience challenges from the need to react to the demands of our customers, who are in large part sensitive to international and domestic economic conditions. The simulation and test market we serve is largely affected by these same factors and challenges.

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The energy market we serve is affected by changing oil and natural gas prices, global urbanization, the resulting change in supply and demand for global energy and the political climate and corresponding public support for investments in renewable energy generation capacity. Historically, drivers for global growth include investments in power generation infrastructure, including renewable energy, and exploration in search of new oil and gas resources. However, after the significant decline in the price of crude oil from 2014 through 2016, investments in exploration activities have been reduced.

The medical market we serve is influenced by economic conditions, regulatory environments, hospital and outpatient clinic spending on equipment, population demographics, medical advances, patient demands and the need for precision control components and systems. Advances in medical technology and medical treatments have had the effect of extending average life spans, in turn resulting in greater need for medical services. These same technology and treatment advances also drive increased demand from the general population as a means to improve quality of life. Access to medical insurance, whether through government funded health care plans or private insurance, also affects the demand for medical services.

Foreign Currencies

We are affected by the movement of foreign currencies compared to the U.S. dollar, particularly in Aircraft Controls and Industrial Systems. About one-fifth of our 2018 sales were denominated in foreign currencies. During the first six months of 2019, average foreign currency rates generally weakened against the U.S. dollar compared to 2018. The translation of the results of our foreign subsidiaries into U.S. dollars decreased sales by $14 million compared to the same period one year ago.

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Cautionary Statement

Information included or incorporated by reference in this report that does not consist of historical facts, including statements accompanied by or containing words such as “may,” “will,” “should,” “believes,” “expects,” “expected,” “intends,” “plans,” “projects,” “approximate,” “estimates,” “predicts,” “potential,” “outlook,” “forecast,” “anticipates,” “presume” and “assume,” are forward-looking statements. Such forward-looking statements are made pursuant to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995. These statements are not guarantees of future performance and are subject to several factors, risks and uncertainties, the impact or occurrence of which could cause actual results to differ materially from the expected results described in the forward-looking statements. These important factors, risks and uncertainties include:

- the markets we serve are cyclical and sensitive to domestic and foreign economic conditions and events, which may cause our operating results to fluctuate;
- we operate in highly competitive markets with competitors who may have greater resources than we possess;
- we depend heavily on government contracts that may not be fully funded or may be terminated, and the failure to receive funding or the termination of one or more of these contracts could reduce our sales and increase our costs;
- we make estimates in accounting for over time contracts, and changes in these estimates may have significant impacts on our earnings;
- we enter into fixed-price contracts, which could subject us to losses if we have cost overruns;
- we may not realize the full amounts reflected in our backlog as revenue, which could adversely affect our future revenue and growth prospects;
- if our subcontractors or suppliers fail to perform their contractual obligations, our prime contract performance and our ability to obtain future business could be materially and adversely impacted;
- contracting on government programs is subject to significant regulation, including rules related to bidding, billing and accounting kickbacks and false claims, and any non-compliance could subject us to fines and penalties or possible debarment;
- the loss of The Boeing Company as a customer or a significant reduction in sales to The Boeing Company could adversely impact our operating results;
- our new product research and development efforts may not be successful which could reduce our sales and earnings;
- our inability to adequately enforce and protect our intellectual property or defend against assertions of infringement could prevent or restrict our ability to compete;
- our business operations may be adversely affected by information systems interruptions, intrusions or new software implementations;
- our indebtedness and restrictive covenants under our credit facilities could limit our operational and financial flexibility;
- significant changes in discount rates, rates of return on pension assets, mortality tables and other factors could adversely affect our earnings and equity and increase our pension funding requirements;
- a write-off of all or part of our goodwill or other intangible assets could adversely affect our operating results and net worth;
- our sales and earnings may be affected if we cannot identify, acquire or integrate strategic acquisitions, or if we engage in divesting activities;
- our operations in foreign countries expose us to political and currency risks and adverse changes in local legal and regulatory environments;
- unforeseen exposure to additional income tax liabilities may affect our operating results;
- government regulations could limit our ability to sell our products outside the United States and otherwise adversely affect our business;

- governmental regulations and customer demands related to conflict minerals may adversely impact our operating results;
- the failure or misuse of our products may damage our reputation, necessitate a product recall or result in claims against us that exceed our insurance coverage, thereby requiring us to pay significant damages;
- future terror attacks, war, natural disasters or other catastrophic events beyond our control could negatively impact our business;
- our operations are subject to environmental laws, and complying with those laws may cause us to incur significant costs; and
- we are involved in various legal proceedings, the outcome of which may be unfavorable to us.

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These factors are not exhaustive. New factors, risks and uncertainties may emerge from time to time that may affect the forward-looking statements made herein. Given these factors, risks and uncertainties, investors should not place undue reliance on forward-looking statements as predictive of future results. We disclaim any obligation to update the forward-looking statements made in this report.

Item 3. Quantitative and Qualitative Disclosures about Market Risk.

Refer to the Company's Annual Report on Form 10-K for the year endedSeptember 29, 2018 for a complete discussion of our market risk. There have been no material changes in the current year regarding this market risk information.

Item 4. Controls and Procedures.

(a) Disclosure Controls and Procedures. We carried out an evaluation, under the supervision and with the participation of our management, including the Chief Executive Officer and Chief Financial Officer, of the effectiveness of the design and operation of our disclosure controls and procedures as defined in Exchange Act Rules 13a-15(e) and 15d-15(e). Based on that evaluation, the Chief Executive Officer and Chief Financial Officer concluded that these disclosure controls and procedures are effective as of the end of the period covered by this report, to ensure that information required to be disclosed in reports filed or submitted under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the Securities and Exchange Commission's rules and forms, and that such information is accumulated and communicated to management, including our Chief Executive Officer and Chief Financial Officer, as appropriate, to allow timely decisions regarding required disclosures.

(b) Changes in Internal Control over Financial Reporting. There have been no changes during the most recent fiscal quarter that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

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PART II OTHER INFORMATION

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

(c) The following table summarizes our purchases of our common stock for the quarter ended March 30, 2019.

Period	(a) Total Number of Shares Purchased (1)(2)	(b) Average Price Paid Per Share	(c) Total number of Shares Purchased as Part of Publicly Announced Plans or Programs (3)	(d) Maximum Number (or Approx. Dollar Value) of Shares that May Yet Be Purchased Under Plans or Programs (3)
December 30, 2018 - January 31, 2019	63,586	$ 77.02	18,001	3,290,130
February 1, 2019 - February 28, 2019	61,121	92.08	186	3,289,944
March 1, 2019 - March 30, 2019	7,487	90.38	40	3,289,904
Total	132,194	$ 84.74	18,227	3,289,904

(1) Reflects purchases by the Moog Inc. Stock Employee Compensation Trust Agreement ("SECT") of shares of Class B common stock from the Moog Inc. Retirement Savings Plan ("RSP") at average prices as follows: 7,777 shares at $79.04 per share during January; 45,188 shares at $91.53 per share during February; and 7,447 shares at $90.41 per share during March. In connection with the issuance of shares to the Employee Stock Purchase Plan ("ESPP"), we purchased 37,069 Class B shares at $77.48 per share from the SECT.

(2) In connection with the exercise of equity-based compensation awards, we accept delivery of shares to pay for the exercise price and withhold shares for tax withholding obligations. In January, we accepted delivery of 739 shares at $83.88 per share, and in February, we accepted delivery of 15,747 shares at $93.66 per share, in connection with the exercise of equity-based awards.

(3) The Board of Directors has authorized a share repurchase program. This program has been amended from time to time to authorize additional repurchases up to an aggregate 13 million common shares. The program permits the purchase of shares of Class A or Class B common stock in open market or privately negotiated transactions at the discretion of management. In January, we purchased 17,858 Class A shares at an average price of $74.87 per share and 143 Class B shares at an average price of $79.86 per share, in February, we purchased 186 Class B shares at an average price of $93.04 per share, and in March, we purchased 40 Class B shares at an average price of $85.16 per share.

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Item 6. Exhibits.

(a) Exhibits

31.1 Certification of Chief Executive Officer pursuant to Exchange Act Rule 13a-14(a) as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.

31.2 Certification of Chief Financial Officer pursuant to Exchange Act Rule 13a-14(a) as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.

32.1 Certification pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.

101 Interactive Date files (submitted electronically herewith)

(101.INS) XBRL Instance Document - the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.

(101.SCH) XBRL Taxonomy Extension Schema Document

(101.CAL) XBRL Taxonomy Extension Calculation Linkbase Document

(101.DEF) XBRL Taxonomy Extension Definition Linkbase Document

(101.LAB) XBRL Taxonomy Extension Label Linkbase Document

(101.PRE) XBRL Taxonomy Extension Presentation Linkbase Document

In accordance with Rule 406T of Regulation S-T, the XBRL related information in Exhibit 101 to this Quarterly Report on Form 10-Q shall not be deemed to be “filed” for purposes of Section 18 of the Exchange Act, or otherwise subject to the liability of that section and shall not be part of any registration or other document filed under the Securities Act or the Exchange Act, except as shall be expressly set forth by specific reference in such filing.

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SIGNATURES

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

Moog Inc.

(Registrant)

Date: April 26, 2019 By /s/ John R. Scannell
John R. Scannell
Chairman of the Board and Director
Chief Executive Officer
(Principal Executive Officer)

Date: April 26, 2019 By /s/ Donald R. Fishback
Donald R. Fishback
Director
Vice President and Chief Financial Officer
(Principal Financial Officer)

Date: April 26, 2019 By /s/ Michael J. Swope
Michael J. Swope
Controller (Principal Accounting Officer)