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

FORM 10-Q

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

For the Quarterly Period Ended September 30, 2019

or

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

Commission File Number 1-16411

NORTHROP GRUMMAN CORPORATION

(Exact name of registrant as specified in its charter)

Delaware	**80-0640649**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
2980 Fairview Park Drive	
Falls Church, Virginia	**22042**
(Address of principal executive offices)	(Zip Code)

(703) 280-2900
(Registrant’s telephone number, including area code)

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock	NOC	New York Stock Exchange

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.

Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files).

Yes ☒ No ☐

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

Large Accelerated Filer ☒ Accelerated Filer ☐

Non-accelerated Filer ☐ Smaller Reporting Company ☐

Emerging Growth Company ☐

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

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).

Yes ☐ No ☒

Indicate the number of shares outstanding of each of the issuer’s classes of common stock, as of the latest practicable date.
As of October 21, 2019, 168,532,761 shares of common stock were outstanding.

NORTHROP GRUMMAN CORPORATION

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PART I. FINANCIAL INFORMATION

Item 1. Financial Statements

CONDENSED CONSOLIDATED STATEMENTS OF EARNINGS AND COMPREHENSIVE INCOME
(Unaudited)

	Three Months Ended September 30		Nine Months Ended September 30	
$ in millions, except per share amounts	**2019**	2018	**2019**	2018
Sales				
Product	**$ 5,997**	$ 5,614	**$ 17,605**	$ 14,693
Service	**2,478**	2,471	**7,515**	7,246
Total sales	**8,475**	8,085	**25,120**	21,939
Operating costs and expenses				
Product	**4,777**	4,233	**13,955**	11,200
Service	**1,971**	1,863	**6,012**	5,635
General and administrative expenses	**776**	817	**2,320**	2,267
Operating income	**951**	1,172	**2,833**	2,837
Other (expense) income				
Interest expense	**(123)**	(133)	**(398)**	(420)
FAS (non-service) pension benefit	**200**	270	**600**	782
Other, net	**27**	55	**82**	140
Earnings before income taxes	**1,055**	1,364	**3,117**	3,339
Federal and foreign income tax expense	**122**	120	**460**	466
Net earnings	**$ 933**	$ 1,244	**$ 2,657**	$ 2,873
Basic earnings per share	**$ 5.52**	$ 7.15	**$ 15.67**	$ 16.48
Weighted-average common shares outstanding, in millions	**169.1**	174.1	**169.6**	174.3
Diluted earnings per share	**$ 5.49**	$ 7.11	**$ 15.60**	$ 16.40
Weighted-average diluted shares outstanding, in millions	**169.9**	174.9	**170.3**	175.2
Net earnings (from above)	**$ 933**	$ 1,244	**$ 2,657**	$ 2,873
Other comprehensive loss				
Change in unamortized prior service credit, net of tax	**(12)**	(15)	**(35)**	(45)
Change in cumulative translation adjustment and other, net	**—**	(3)	**—**	(9)
Other comprehensive loss, net of tax	**(12)**	(18)	**(35)**	(54)
Comprehensive income	**$ 921**	$ 1,226	**$ 2,622**	$ 2,819

The accompanying notes are an integral part of these unaudited condensed consolidated financial statements.

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NORTHROP GRUMMAN CORPORATION

CONDENSED CONSOLIDATED STATEMENTS OF FINANCIAL POSITION
(Unaudited)

$ in millions, except par value		**September 30, 2019**		December 31, 2018
Assets				
Cash and cash equivalents	**$**	**1,127**	$	1,579
Accounts receivable, net		**2,111**		1,448
Unbilled receivables, net		**5,777**		5,026
Inventoried costs, net		**810**		654
Prepaid expenses and other current assets		**1,011**		973
Total current assets		**10,836**		9,680
Property, plant and equipment, net of accumulated depreciation of $5,709 for 2019 and $5,369 for 2018		**6,611**		6,372
Operating lease right-of-use assets		**1,511**		—
Goodwill		**18,707**		18,672
Intangible assets, net		**1,123**		1,372
Deferred tax assets		**83**		94
Other non-current assets		**1,682**		1,463
Total assets	**$**	**40,553**	$	37,653
Liabilities				
Trade accounts payable	**$**	**2,021**	$	2,182
Accrued employee compensation		**1,744**		1,676
Advance payments and billings in excess of costs incurred		**2,127**		1,917
Other current liabilities		**2,524**		2,499
Total current liabilities		**8,416**		8,274
Long-term debt, net of current portion of $45 for 2019 and $517 for 2018		**13,826**		13,883
Pension and other postretirement benefit plan liabilities		**5,431**		5,755
Operating lease liabilities		**1,304**		—
Deferred tax liabilities		**111**		108
Other non-current liabilities		**1,734**		1,446
Total liabilities		**30,822**		29,466
Commitments and contingencies (Note 7)				
Shareholders' equity				
Preferred stock, $1 par value; 10,000,000 shares authorized; no shares issued and outstanding		**—**		—
Common stock, $1 par value; 800,000,000 shares authorized; issued and outstanding: 2019—168,701,653 and 2018—170,607,336		**169**		171
Paid-in capital		**—**		—
Retained earnings		**9,649**		8,068
Accumulated other comprehensive loss		**(87)**		(52)
Total shareholders' equity		**9,731**		8,187
Total liabilities and shareholders' equity	**$**	**40,553**	$	37,653

The accompanying notes are an integral part of these unaudited condensed consolidated financial statements.

NORTHROP GRUMMAN CORPORATION

CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS
(Unaudited)

	Nine Months Ended September 30	
$ in millions	**2019**	2018
Operating activities		
Net earnings	**$ 2,657**	$ 2,873
Adjustments to reconcile to net cash provided by operating activities:		
Depreciation and amortization	**737**	534
Non-cash lease expense	**187**	—
Stock-based compensation	**93**	82
Deferred income taxes	**24**	275
Changes in assets and liabilities:		
Accounts receivable, net	**(663)**	(52)
Unbilled receivables, net	**(778)**	(898)
Inventoried costs, net	**(156)**	(102)
Prepaid expenses and other assets	**(81)**	(109)
Accounts payable and other liabilities	**320**	(125)
Income taxes payable, net	**(34)**	(114)
Retiree benefits	**(422)**	(847)
Other, net	**(51)**	(67)
Net cash provided by operating activities	**1,833**	1,450
Investing activities		
Acquisition of Orbital ATK, net of cash acquired	**—**	(7,657)
Capital expenditures	**(793)**	(786)
Other, net	**8**	23
Net cash used in investing activities	**(785)**	(8,420)
Financing activities		
Payments of long-term debt	**(500)**	(2,276)
Net payments to credit facilities	**(31)**	(314)
Net borrowings on commercial paper	**201**	499
Common stock repurchases	**(444)**	(209)
Cash dividends paid	**(658)**	(616)
Payments of employee taxes withheld from share-based awards	**(63)**	(84)
Other, net	**(5)**	(27)
Net cash used in financing activities	**(1,500)**	(3,027)
Decrease in cash and cash equivalents	**(452)**	(9,997)
Cash and cash equivalents, beginning of year	**1,579**	11,225
Cash and cash equivalents, end of period	**$ 1,127**	$ 1,228

The accompanying notes are an integral part of these unaudited condensed consolidated financial statements.

NORTHROP GRUMMAN CORPORATION

CONDENSED CONSOLIDATED STATEMENTS OF CHANGES IN SHAREHOLDERS' EQUITY
(Unaudited)

	Three Months Ended September 30		Nine Months Ended September 30	
$ in millions, except per share amounts	**2019**	2018	**2019**	2018
Common stock				
Beginning of period	**$ 169**	$ 174	**$ 171**	$ 174
Common stock repurchased	**—**	(1)	**(2)**	(1)
Shares issued for employee stock awards and options	**—**	1	**—**	1
End of period	**169**	174	**169**	174
Paid-in capital				
Beginning of period	**—**	—	**—**	44
Common stock repurchased	**—**	—	**—**	(34)
Stock compensation	**—**	—	**—**	(10)
End of period	**—**	—	**—**	—
Retained earnings				
Beginning of period	**9,120**	8,066	**8,068**	6,913
Impact from adoption of ASU 2018-02 and ASU 2016-01	**—**	—	**—**	(21)
Common stock repurchased	**(215)**	(164)	**(449)**	(179)
Net earnings	**933**	1,244	**2,657**	2,873
Dividends declared	**(226)**	(211)	**(658)**	(616)
Stock compensation	**37**	26	**31**	(9)
End of period	**9,649**	8,961	**9,649**	8,961
Accumulated other comprehensive (loss) income				
Beginning of period	**(75)**	(14)	**(52)**	1
Impact from adoption of ASU 2018-02 and ASU 2016-01	**—**	—	**—**	21
Other comprehensive loss, net of tax	**(12)**	(18)	**(35)**	(54)
End of period	**(87)**	(32)	**(87)**	(32)
Total shareholders' equity	**$ 9,731**	$ 9,103	**$ 9,731**	$ 9,103
Cash dividends declared per share	**$ 1.32**	$ 1.20	**$ 3.84**	$ 3.50

The accompanying notes are an integral part of these unaudited condensed consolidated financial statements.

NORTHROP GRUMMAN CORPORATION

NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS (Unaudited)

1. BASIS OF PRESENTATION

Principles of Consolidation and Reporting
These unaudited condensed consolidated financial statements (the "financial statements") include the accounts of Northrop Grumman Corporation and its subsidiaries and joint ventures or other investments for which we consolidate the financial results (herein referred to as "Northrop Grumman," the "company," "we," "us," or "our"). Material intercompany accounts, transactions and profits are eliminated in consolidation. Investments in equity securities and joint ventures where the company has significant influence, but not control, are accounted for using the equity method.

On June 6, 2018 (the "Merger date"), the company completed its previously announced acquisition of Orbital ATK, Inc. ("Orbital ATK") (the "Merger"). On the Merger date, Orbital ATK became a wholly-owned subsidiary of the company and its name was changed to Northrop Grumman Innovation Systems, Inc., which we established as a new, fourth business sector ("Innovation Systems"). The operating results of Innovation Systems subsequent to the Merger date have been included in the company's unaudited condensed consolidated results of operations. See Note 2 for further information regarding the Merger.

At September 30, 2019, the company was aligned in four operating sectors: Aerospace Systems, Innovation Systems, Mission Systems and Technology Services. In September 2019, the company announced changes effective January 1, 2020, which are intended to better align the company's broad portfolio to serve its customers' needs. There will be four sectors: Aeronautics Systems, Defense Systems, Mission Systems and Space Systems. This realignment is not reflected in any of the accompanying financial information.

These financial statements are prepared in conformity with accounting principles generally accepted in the United States of America ("GAAP" or "FAS") and in accordance with the rules of the Securities and Exchange Commission (SEC) for interim reporting. The financial statements include adjustments of a normal recurring nature considered necessary by management for a fair presentation of the company's unaudited condensed consolidated financial position, results of operations and cash flows.

The results reported in these financial statements are not necessarily indicative of results that may be expected for the entire year. These financial statements should be read in conjunction with the information contained in the company's 2018 Annual Report on Form 10-K.

The quarterly information is labeled using a calendar convention; that is, first quarter is consistently labeled as ending on March 31, second quarter as ending on June 30 and third quarter as ending on September 30. It is the company's long-standing practice to establish actual interim closing dates using a "fiscal" calendar, in which we close our books on a Friday near these quarter-end dates in order to normalize the potentially disruptive effects of quarterly closings on business processes. This practice is only used at interim periods within a reporting year.

As previously announced, effective January 1, 2019, we adopted Accounting Standards Codification (ASC) Topic 842, *Leases*, using the optional transition method to apply the standard through a cumulative effect adjustment in the period of adoption. The adoption of this standard is reflected in the amounts and disclosures set forth in this Form 10-Q.

Accounting Estimates
Preparation of the financial statements requires management to make estimates and judgments that affect the reported amounts of assets and liabilities and the disclosure of contingencies at the date of the financial statements, as well as the reported amounts of sales and expenses during the reporting period. Estimates have been prepared using the most current and best available information; however, actual results could differ materially from those estimates.

Revenue Recognition
The majority of our sales are derived from long-term contracts with the U.S. government for the production of goods, the provision of services, or a combination of both. The company classifies sales as product or service based on the predominant attributes of each performance obligation.

The company recognizes revenue for each separately identifiable performance obligation in a contract representing a promise to transfer a distinct good or service to a customer. In most cases, goods and services provided under the company's contracts are accounted for as single performance obligations due to the complex and integrated nature of our products and services. These contracts generally require significant integration of a group of goods and/or services to deliver a combined output. In some contracts, the company provides multiple distinct goods or services to a customer, most commonly when a contract covers multiple phases of the product lifecycle (e.g., development, production, sustainment, etc.). In those cases, the company accounts for the distinct contract deliverables as separate performance obligations and allocates the transaction price to each performance obligation based on its relative standalone selling price, which is generally estimated using a cost plus a reasonable margin approach. Warranties are provided on certain contracts, but do not typically provide for services beyond standard assurances and are therefore not considered to be separate performance obligations. Assets recognized from the costs to obtain or fulfill a contract are not material.

Contracts are often modified for changes in contract specifications or requirements, which may result in scope and/or price changes. Most of the company's contract modifications are for goods or services that are not distinct in the context of the contract and are therefore accounted for as part of the original performance obligation through a cumulative estimate-at-completion (EAC) adjustment.

The company recognizes revenue as control is transferred to the customer, either over time or at a point in time. In general, our U.S. government contracts contain termination for convenience and/or other clauses that generally provide the customer rights to goods produced and/or in-process. Similarly, our non-U.S. government contracts generally contain contractual termination clauses or entitle the company to payment for work performed to date for goods and services that do not have an alternative use. As control is effectively transferred while we perform on our contracts, we generally recognize revenue over time using the cost-to-cost method (cost incurred relative to total cost estimated at completion) as the company believes this represents the most appropriate measurement towards satisfaction of its performance obligations. Revenue for contracts in which the control of goods produced does not transfer until delivery to the customer is recognized at a point in time (i.e., typically upon delivery).

Contract Estimates

Use of the cost-to-cost method requires us to make reasonably dependable estimates regarding the revenue and cost associated with the design, manufacture and delivery of our products and services. The company estimates profit on these contracts as the difference between total estimated sales and total estimated cost at completion and recognizes that profit as costs are incurred. Significant judgment is used to estimate total sales and cost at completion.

Contract sales may include estimates of variable consideration, including cost or performance incentives (such as award and incentive fees), contract claims and requests for equitable adjustment (REAs). Variable consideration is included in total estimated sales to the extent it is probable that a significant reversal in the amount of cumulative revenue recognized will not occur when the uncertainty associated with the variable consideration is subsequently resolved. We estimate variable consideration as the most likely amount to which we expect to be entitled.

We recognize changes in estimated contract sales or costs and the resulting changes in contract profit on a cumulative basis. Cumulative EAC adjustments represent the cumulative effect of the changes on current and prior periods; sales and operating margins in future periods are recognized as if the revised estimates had been used since contract inception. If it is determined that a loss is expected to result on an individual performance obligation, the entire amount of the estimable future loss, including an allocation of general and administrative (G&A) costs, is charged against income in the period the loss is identified. Each loss provision is first offset against costs included in Unbilled receivables or Inventoried costs; remaining amounts are reflected in Other current liabilities.

The following table presents the effect of aggregate net EAC adjustments:

	Three Months Ended September 30		Nine Months Ended September 30	
$ in millions, except per share data	**2019**	2018	**2019**	2018
Revenue	**$ 142**	$ 149	**$ 462**	$ 438
Operating income	**125**	149	**421**	408
Net earnings[1]	**99**	117	**333**	322
Diluted earnings per share[1]	**0.58**	0.67	**1.96**	1.84

[1] Based on a 21 percent statutory tax rate.

EAC adjustments on a single performance obligation can have a material effect on the company's financial statements. When such adjustments occur, we generally disclose the nature, underlying conditions and financial impact of the adjustments. No such adjustments were material to the financial statements during the three months ended September 30, 2019 and 2018.

Backlog
Backlog represents the future sales we expect to recognize on firm orders received by the company and is equivalent to the company's remaining performance obligations at the end of each period. It comprises both funded backlog (firm orders for which funding is authorized and appropriated) and unfunded backlog. Unexercised contract options and indefinite delivery indefinite quantity (IDIQ) contracts are not included in backlog until the time the option or IDIQ task order is exercised or awarded.

Company backlog as of September 30, 2019 was $65.0 billion. We expect to recognize approximately 40 percent and 65 percent of our September 30, 2019 backlog as revenue over the next 12 and 24 months, respectively, with the remainder to be recognized thereafter.

Contract Assets and Liabilities
For each of the company's contracts, the timing of revenue recognition, customer billings, and cash collections results in a net contract asset or liability at the end of each reporting period. Fixed-price contracts are typically billed to the customer either using progress payments, whereby amounts are billed monthly as costs are incurred or work is completed, or performance based payments, which are based upon the achievement of specific, measurable events or accomplishments defined and valued at contract inception. Cost-type contracts are typically billed to the customer on a monthly or semi-monthly basis.

Contract assets are equivalent to and reflected as Unbilled receivables in the unaudited condensed consolidated statements of financial position and are primarily related to long-term contracts where revenue recognized under the cost-to-cost method exceeds amounts billed to customers. Unbilled receivables are classified as current assets and, in accordance with industry practice, include amounts that may be billed and collected beyond one year due to the long-cycle nature of many of our contracts. Accumulated contract costs in unbilled receivables include costs such as direct production costs, factory and engineering overhead, production tooling costs, and allowable G&A. Unbilled receivables also include certain estimates of variable consideration described above. These contract assets are not considered a significant financing component of the company's contracts as the payment terms are intended to protect the customer in the event the company does not perform on its obligations under the contract.

Contract liabilities are equivalent to and reflected as Advance payments and billings in excess of costs incurred in the unaudited condensed consolidated statements of financial position. Certain customers make advance payments prior to the company's satisfaction of its obligations on the contract. These amounts are recorded as contract liabilities until such obligations are satisfied, either over time as costs are incurred or at a point in time when deliveries are made. Contract liabilities are not a significant financing component as they are generally utilized to pay for contract costs within a one-year period or are used to ensure the customer meets contractual requirements.

The amount of revenue recognized for the three and nine months ended September 30, 2019 that was included in the December 31, 2018 contract liability balance was $209 million and $1.2 billion, respectively. The amount of revenue recognized for the three and nine months ended September 30, 2018 that was included in the December 31, 2017 contract liability balance was $168 million and $1.2 billion, respectively.

Disaggregation of Revenue
See Note 11 for information regarding the company's sales by customer type, contract type and geographic region for each of our segments. We believe those categories best depict how the nature, amount, timing and uncertainty of our revenue and cash flows are affected by economic factors.

Accumulated Other Comprehensive Loss
The components of accumulated other comprehensive loss are as follows:

$ in millions	**September 30, 2019**	December 31, 2018
Unamortized prior service credit, net of tax expense of $21 for 2019 and $32 for 2018	**$ 63**	$ 98
Cumulative translation adjustment	**(148)**	(144)
Other, net	**(2)**	(6)
Total accumulated other comprehensive loss	**$ (87)**	$ (52)

Reclassifications from accumulated other comprehensive loss to net earnings related to the amortization of prior service credit were $12 million and $35 million, net of taxes, for the three and nine months ended September 30, 2019, respectively and were $15 million and $45 million, net of taxes, for the three and nine months ended

September 30, 2018, respectively. The reclassifications are included in the computation of net periodic pension cost (benefit). See Note 8 for further information.

Reclassifications from accumulated other comprehensive loss to net earnings relating to cumulative translation adjustments and effective cash flow hedges were not material for the three and nine months ended September 30, 2019 and 2018.

Leases
The company leases certain buildings, land and equipment. Under ASC 842, at contract inception we determine whether the contract is or contains a lease and whether the lease should be classified as an operating or a finance lease. Operating leases are included in Operating lease right-of-use assets, Other current liabilities, and Operating lease liabilities in our unaudited condensed consolidated statements of financial position.

The company recognizes operating lease right-of-use assets and operating lease liabilities based on the present value of the future minimum lease payments over the lease term at commencement date. We use our incremental borrowing rate based on the information available at commencement date to determine the present value of future payments and the appropriate lease classification. Many of our leases include renewal options aligned with our contract terms. We define the initial lease term to include renewal options determined to be reasonably certain. In our adoption of ASC 842, we elected not to recognize a right-of-use asset and a lease liability for leases with an initial term of 12 months or less; we recognize lease expense for these leases on a straight-line basis over the lease term. We elected the practical expedient to not separate lease components from nonlease components and applied that practical expedient to all material classes of leased assets.

Many of the company's real property lease agreements contain incentives for tenant improvements, rent holidays or rent escalation clauses. For tenant improvement incentives, if the incentive is determined to be a leasehold improvement owned by the lessee, the company generally records a deferred rent liability and amortizes the deferred rent over the term of the lease as a reduction to rent expense. For rent holidays and rent escalation clauses during the lease term, the company records rental expense on a straight-line basis over the term of the lease. For these lease incentives, the company uses the date of initial possession as the commencement date, which is generally when the company is given the right of access to the space and begins to make improvements in preparation for intended use.

Finance leases are not material to our unaudited condensed consolidated financial statements and the company is not a lessor in any material arrangements. We do not have any material restrictions or covenants in our lease agreements, sale-leaseback transactions, land easements or residual value guarantees.

Related Party Transactions
The company had no material related party transactions in any period presented.

Accounting Standards Updates
On February 25, 2016, the FASB issued ASU No. 2016-02, *Leases (Topic 842)*. ASC Topic 842 supersedes existing lease guidance, including ASC 840 - *Leases*. Among other things, ASU 2016-02 requires recognition of a right-of-use asset and liability for future lease payments for contracts that meet the definition of a lease and requires disclosure of certain information about leasing arrangements. On July 30, 2018, the FASB issued ASU No. 2018-11, *Leases (Topic 842): Targeted Improvements*, which, among other things, allows companies to elect an optional transition method to apply the new lease standard through a cumulative-effect adjustment in the period of adoption.

We adopted the standard on January 1, 2019 using the optional transition method and, as a result, did not recast prior period unaudited condensed consolidated comparative financial statements. All prior period amounts and disclosures are presented under ASC 840. We elected the package of practical expedients, which, among other things, allows us to carry forward our prior lease classifications under ASC 840. We did not elect to adopt the hindsight practical expedient and are therefore maintaining the lease terms we previously determined under ASC 840. Adoption of the new standard resulted in the recording of additional lease assets and lease liabilities on the unaudited condensed consolidated statements of financial position with no cumulative impact to retained earnings and did not have a material impact on our results of operations or cash flows.

Other accounting standards updates adopted and/or issued, but not effective until after September 30, 2019, are not expected to have a material effect on the company's unaudited condensed consolidated financial position, annual results of operations and/or cash flows.

2. ACQUISITION OF ORBITAL ATK

On June 6, 2018, the company completed its previously announced acquisition of Orbital ATK, by acquiring all of the outstanding shares of Orbital ATK for a purchase price of $7.7 billion in cash. On the Merger date, Orbital ATK became a wholly-owned subsidiary of the company and its name was changed to Northrop Grumman Innovation Systems, Inc. We established Innovation Systems as a new, fourth business sector. Its main products include precision munitions and armaments; tactical missiles and subsystems; ammunition; launch vehicles; space and strategic propulsion systems; aerospace structures; space exploration products; and national security and commercial satellite systems and related components/services. The acquisition was financed with proceeds from the company's debt financing completed in October 2017 and cash on hand. We believe this acquisition will enable us to broaden our capabilities and offerings, provide additional innovative solutions to meet our customers' emerging requirements, create value for shareholders and provide expanded opportunities for our combined employees.

Purchase Price Allocation

The acquisition was accounted for as a purchase business combination. As such, the company recorded the assets acquired and liabilities assumed at fair value, with the excess of the purchase price over the fair value of assets acquired and liabilities assumed recorded as goodwill. Determining the fair value of assets acquired and liabilities assumed requires significant judgment, including the amount and timing of expected future cash flows, long-term growth rates and discount rates. In some cases, the company used discounted cash flow analyses, which were based on our best estimate of future sales, earnings and cash flows after considering such factors as general market conditions, customer budgets, existing firm and future orders, changes in working capital, long term business plans and recent operating performance. Use of different estimates and judgments could yield materially different results.

During the second quarter of 2019, the company finalized its determination of the fair values of the assets acquired and liabilities assumed as of the Merger date. Based on additional information obtained during the measurement period, the company refined its initial assessment of fair value and recognized the following significant adjustments to its preliminary purchase price allocation: Intangible assets increased $220 million, Other current liabilities increased $114 million, Pension and other postretirement benefit (OPB) plan liabilities increased $56 million, Other non-current liabilities increased $53 million, Other current assets increased $44 million and Goodwill decreased $36 million. These adjustments did not result in a material impact on the financial results of prior periods.

The Merger date fair value of the consideration transferred totaled $7.7 billion in cash, which was comprised of the following:

$ in millions, except per share amounts		Purchase price
Shares of Orbital ATK common stock outstanding as of the Merger date		57,562,152
Cash consideration per share of Orbital ATK common stock	$	134.50
Total purchase price	$	7,742

The following purchase price allocation table presents the company's final determination of the fair values of assets acquired and liabilities assumed at the Merger date:

$ in millions		As of June 6, 2018
Cash and cash equivalents	$	85
Accounts receivable		596
Unbilled receivables		1,237
Inventoried costs		220
Other current assets		237
Property, plant and equipment		1,509
Goodwill		6,259
Intangible assets		1,525
Other non-current assets		151
Total assets acquired		11,819
Trade accounts payable		(397)
Accrued employee compensation		(158)
Advance payments and billings in excess of costs incurred		(222)
Below market contracts[1]		(151)
Other current liabilities		(412)
Long-term debt		(1,687)
Pension and OPB plan liabilities		(613)
Deferred tax liabilities		(248)
Other non-current liabilities		(189)
Total liabilities assumed		(4,077)
Total purchase price	$	7,742

[1] Included in Other current liabilities in the unaudited condensed consolidated statements of financial position.

The following table presents a summary of purchased intangible assets and their related estimated useful lives:

		Fair Value (in millions)	Estimated Useful Life in Years
Customer contracts	$	1,245	9
Commercial customer relationships		280	13
Total customer-related intangible assets	$	1,525	

The purchase price allocation resulted in the recognition of $6.3 billion of goodwill, a majority of which was allocated to the Innovation Systems sector. The goodwill recognized is attributable to expected revenue synergies generated by the integration of Aerospace Systems, Mission Systems and Technology Services products and technologies with those of legacy Orbital ATK, synergies resulting from the consolidation or elimination of certain costs, and intangible assets that do not qualify for separate recognition, such as the assembled workforce of Orbital ATK. None of the goodwill is expected to be deductible for tax purposes.

Unaudited Supplemental Pro Forma Information
The following table presents unaudited pro forma financial information prepared in accordance with Article 11 of Regulation S-X and computed as if Orbital ATK had been included in our results as of January 1, 2017:

$ in millions, except per share amounts		Nine Months Ended September 30, 2018
Sales	$	24,163
Net earnings		3,050
Diluted earnings per share		17.41

The unaudited supplemental pro forma financial data has been calculated after applying our accounting policies and adjusting the historical results of Orbital ATK with pro forma adjustments, net of tax, that assume the acquisition occurred on January 1, 2017. Significant pro forma adjustments include the following:

1. The elimination of intercompany sales and costs of sales between the company and Orbital ATK of $80 million for the nine months ended September 30, 2018.
2. The elimination of nonrecurring transaction costs incurred by the company and Orbital ATK in connection with the Merger of $71 million for the nine months ended September 30, 2018.
3. The recognition of additional depreciation expense, net of removal of historical depreciation expense, of $10 million for the nine months ended September 30, 2018 related to the step-up in fair value of acquired property, plant and equipment.
4. The recognition of additional amortization expense, net of removal of historical amortization expense, of $101 million for the nine months ended September 30, 2018 related to the fair value of acquired intangible assets.
5. The elimination of Orbital ATK’s historical amortization of net actuarial losses and prior service credits and impact of the revised pension and OPB net periodic benefit cost as determined under the company’s plan assumptions of $51 million for the nine months ended September 30, 2018.
6. The income tax effect on the pro forma adjustments, which was calculated using the federal statutory tax rate, of $(2) million for the nine months ended September 30, 2018.

The unaudited pro forma financial information does not reflect the potential realization of revenue synergies or cost savings, nor does it reflect other costs relating to the integration of the two companies. This unaudited pro forma financial information should not be considered indicative of the results that would have actually occurred if the acquisition had been consummated on January 1, 2017, nor are they indicative of future results.

3. EARNINGS PER SHARE, SHARE REPURCHASES AND DIVIDENDS ON COMMON STOCK

Basic Earnings Per Share
We calculate basic earnings per share by dividing net earnings by the weighted-average number of shares of common stock outstanding during each period.

Diluted Earnings Per Share
Diluted earnings per share include the dilutive effect of awards granted to employees under stock-based compensation plans. The dilutive effect of these securities totaled 0.8 million shares and 0.7 million shares for the three and nine months ended September 30, 2019. The dilutive effect of these securities totaled 0.8 million shares and 0.9 million shares for the three and nine months ended September 30, 2018, respectively.

Share Repurchases
On September 16, 2015, the company’s board of directors authorized a share repurchase program of up to $4.0 billion of the company’s common stock (the “2015 Repurchase Program”). Repurchases under the 2015 Repurchase Program commenced in March 2016.

On December 4, 2018, the company’s board of directors authorized a new share repurchase program of up to an additional $3.0 billion in share repurchases of the company’s common stock (the “2018 Repurchase Program”). By its terms, repurchases under the 2018 Repurchase Program will commence upon completion of the 2015 Repurchase Program and will expire when we have used all authorized funds for repurchases.

During the fourth quarter of 2018, the company entered into an accelerated share repurchase (ASR) agreement with Goldman Sachs & Co. LLC (Goldman Sachs) to repurchase $1.0 billion of the company’s common stock under the

2015 Repurchase Program. Under the agreement, we made a payment of $1.0 billion to Goldman Sachs and received an initial delivery of 3.0 million shares valued at $800 million that were immediately canceled by the company. The remaining balance was settled on January 4, 2019 with a final delivery of 0.9 million shares from Goldman Sachs. The final average purchase price was $260.32 per share.

As of September 30, 2019, repurchases under the 2015 Repurchase Program totaled $3.4 billion; $0.6 billion remained under this share repurchase authorization. By its terms, the 2015 Repurchase Program is set to expire when we have used all authorized funds for repurchases.

Share repurchases take place from time to time, subject to market conditions and management's discretion, in the open market and in privately negotiated transactions. The company retires its common stock upon repurchase and, in the periods presented, has not made any purchases of common stock other than in connection with these publicly announced repurchase programs.

The table below summarizes the company's share repurchases to date under the authorizations described above:

Repurchase Program Authorization Date	Amount Authorized (in millions)	Total Shares Retired (in millions)	Average Price Per Share[1]	Date Completed	Shares Repurchased (in millions) Nine Months Ended September 30 2019	2018
September 16, 2015	$ 4,000	13.6	$ 248.91		**2.3**	0.7
December 4, 2018	$ 3,000	—	—		**—**	—

[1] Includes commissions paid.

Dividends on Common Stock

In May 2019, the company increased the quarterly common stock dividend 10 percent to $1.32 per share from the previous amount of $1.20 per share.

In May 2018, the company increased the quarterly common stock dividend 9 percent to $1.20 per share from the previous amount of $1.10 per share.

In January 2018, the company increased the quarterly common stock dividend 10 percent to $1.10 per share from the previous amount of $1.00 per share.

4. INCOME TAXES

$ in millions	Three Months Ended September 30 **2019**	2018	Nine Months Ended September 30 **2019**	2018
Federal and foreign income tax expense	**$ 122**	$ 120	**$ 460**	$ 466
Effective income tax rate	**11.6%**	8.8%	**14.8%**	14.0%

Current Quarter

The third quarter 2019 effective tax rate increased to 11.6 percent from 8.8 percent in the third quarter of 2018. The company's effective tax rate for the third quarter of 2019 includes benefits of $89 million for research credits and $17 million for foreign derived intangible income. The company's tax rate for the third quarter of 2018 included a $106 million benefit for research credits and manufacturing deductions and an $84 million benefit associated with the Tax Cuts and Jobs Act (the "2017 Tax Act").

Year to Date

The year to date 2019 effective tax rate increased to 14.8 percent from 14.0 percent in the prior year period. The company's year to date 2019 effective tax rate includes benefits of $171 million for research credits and $26 million for foreign derived intangible income. The company's year to date 2018 effective tax rate included a $156 million benefit for research credits and manufacturing deductions and an $84 million benefit associated with the 2017 Tax Act.

During the three and nine months ended September 30, 2019, we increased our unrecognized tax benefits by approximately $294 million and $327 million, respectively, related to our methods of accounting associated with the timing of revenue recognition and related costs, and the 2017 Tax Act. Since enactment of the 2017 Tax Act, the IRS and U.S. Treasury Department have issued and are expected to further issue interpretive guidance that impacts taxpayers. We will continue to evaluate such guidance as it is issued.

We file income tax returns in the U.S. federal jurisdiction and in various state and foreign jurisdictions. The Northrop Grumman 2014-2017 federal tax returns and refund claims related to its 2007-2016 federal tax returns are currently under IRS examination. In addition, legacy Orbital ATK federal tax returns for the year ended March 31, 2015, the nine-month transition period ended December 31, 2015 and calendar years 2016-2017 are currently under IRS examination.

5. FAIR VALUE OF FINANCIAL INSTRUMENTS

The company holds a portfolio of marketable securities consisting of securities to partially fund non-qualified employee benefit plans. A portion of these securities are held in common/collective trust funds and are measured at fair value using net asset value (NAV) per share as a practical expedient; and therefore are not required to be categorized in the fair value hierarchy table below. Marketable securities are included in Other non-current assets in the unaudited condensed consolidated statements of financial position.

The company's derivative portfolio consists primarily of commodity forward contracts and foreign currency forward contracts. The company periodically uses commodity forward contracts to hedge forecasted purchases of certain commodities. The contracts generally establish a fixed price for the underlying commodity and are designated and qualify as effective cash flow hedges of such commodity purchases. Commodity derivatives are valued based on prices of future exchanges and recently reported transactions in the marketplace. For foreign currency forward contracts, where model-derived valuations are appropriate, the company utilizes the income approach to determine the fair value and uses the applicable London Interbank Offered Rate (LIBOR) swap rates.

The following table presents the financial assets and liabilities the company records at fair value on a recurring basis identified by the level of inputs used to determine fair value:

	September 30, 2019			December 31, 2018		
$ in millions	**Level 1**	**Level 2**	**Total**	Level 1	Level 2	Total
Financial Assets (Liabilities)						
Marketable securities	**$ 351**	**$ —**	**$ 351**	$ 319	$ 1	$ 320
Marketable securities valued using NAV			**16**			15
Total marketable securities	**351**	**—**	**367**	319	1	335
Derivatives	**—**	**(5)**	**(5)**	—	(10)	(10)

At September 30, 2019, the company had commodity forward contracts outstanding that hedge forecasted commodity purchases of 4 million pounds of copper and 1 million pounds of zinc. Gains or losses on the commodity forward contracts are recognized in product and service cost as the performance obligations on related contracts are satisfied.

The notional value of the company's foreign currency forward contracts at September 30, 2019 and December 31, 2018 was $86 million and $114 million, respectively. The portion of notional value designated as a cash flow hedge at September 30, 2019 was $9 million. At December 31, 2018, no portion of the notional value was designated as a cash flow hedge.

The derivative fair values and related unrealized gains/losses at September 30, 2019 and December 31, 2018 were not material. There were no transfers of financial instruments between the three levels of the fair value hierarchy during the nine months ended September 30, 2019.

The carrying value of cash and cash equivalents and commercial paper approximates fair value.

Long-term Debt

The estimated fair value of long-term debt was $15.2 billion and $14.3 billion as of September 30, 2019 and December 31, 2018, respectively. We calculated the fair value of long-term debt using Level 2 inputs, based on interest rates available for debt with terms and maturities similar to the company's existing debt arrangements. The carrying value of long-term debt was $13.9 billion and $14.4 billion as of September 30, 2019 and December 31, 2018, respectively. The current portion of long-term debt is recorded in Other current liabilities in the unaudited condensed consolidated statements of financial position.

6. INVESTIGATIONS, CLAIMS AND LITIGATION

On May 4, 2012, the company commenced an action, *Northrop Grumman Systems Corp. v. United States*, in the U.S. Court of Federal Claims. This lawsuit relates to an approximately $875 million firm fixed-price contract awarded to the company in 2007 by the U.S. Postal Service (USPS) for the construction and delivery of flats sequencing systems (FSS) as part of the postal automation program. The FSS have been delivered. The company's lawsuit is based on various theories of liability. The complaint seeks approximately $63 million for unpaid portions of the contract price, and approximately $115 million based on the company's assertions that, through various acts and omissions over the life of the contract, the USPS adversely affected the cost and schedule of performance and materially altered the company's obligations under the contract. The United States responded to the company's complaint with an answer, denying most of the company's claims, and counterclaims seeking approximately $410 million, less certain amounts outstanding under the contract. The principal counterclaim alleges that the company delayed its performance and caused damages to the USPS because USPS did not realize certain costs savings as early as it had expected. On April 2, 2013, the U.S. Department of Justice informed the company of a False Claims Act complaint relating to the FSS contract that was filed under seal by a relator in June 2011 in the U.S. District Court for the Eastern District of Virginia. On June 3, 2013, the United States filed a Notice informing the Court that the United States had decided not to intervene in this case. The relator alleged that the company violated the False Claims Act in a number of ways with respect to the FSS contract, alleged damage to the USPS in an amount of at least approximately $179 million annually, alleged that he was improperly discharged in retaliation, and sought an unspecified partial refund of the contract purchase price, penalties, attorney's fees and other costs of suit. The relator later voluntarily dismissed his retaliation claim and reasserted it in a separate arbitration, which he also ultimately voluntarily dismissed. On September 5, 2014, the court granted the company's motion for summary judgment and ordered the relator's False Claims Act case be dismissed with prejudice. On February 16, 2018, both the company and the United States filed motions to dismiss many of the claims and counterclaims referenced above, in whole or in part. The United States also filed a motion seeking to amend its answer and counterclaim, including to reduce its counterclaim to approximately $193 million, which the court granted on June 11, 2018. On October 17, 2018, the court granted in part and denied in part the parties' motions to dismiss. On December 17, 2018, the court issued a Scheduling Order, proposed by the parties, providing for the parties to engage in mediation through March 1, 2019. After the government shutdown, the mediation was rescheduled for May 2019. The parties filed joint motions to suspend the deadlines for pretrial activities while the parties engage in mediation. On April 29, 2019 and June 5, 2019, the court issued Orders suspending the deadlines. Those suspensions ended on July 1, 2019, and on July 12, 2019, the court issued an Order scheduling trial to commence on February 3, 2020. Although the ultimate outcome of these matters ("the FSS matters," collectively), including any possible loss, cannot be predicted or reasonably estimated at this time, the company intends vigorously to pursue and defend the FSS matters.

On August 8, 2013, the company received a court-appointed expert's report in litigation pending in the Second Federal Court of the Federal District in Brazil brought by the Brazilian Post and Telegraph Corporation (ECT), a Brazilian state-owned entity, against Solystic SAS (Solystic), a French subsidiary of the company, and two of its consortium partners. In this suit, commenced on December 17, 2004, and relatively inactive for some period of time, ECT alleges the consortium breached its contract with ECT and seeks damages of approximately R$111 million (the equivalent of approximately $27 million as of September 30, 2019), plus interest, inflation adjustments and attorneys' fees, as authorized by Brazilian law, which amounts could be significant over time. The original suit sought R$89 million (the equivalent of approximately $21 million as of September 30, 2019) in damages. In October 2013, ECT asserted an additional damage claim of R$22 million (the equivalent of approximately $5 million as of September 30, 2019). In its counterclaim, Solystic alleges ECT breached the contract by wrongfully refusing to accept the equipment Solystic had designed and built and seeks damages of approximately €31 million (the equivalent of approximately $34 million as of September 30, 2019), plus interest, inflation adjustments and attorneys' fees, as authorized by Brazilian law. The Brazilian court retained an expert to consider certain issues pending before it. On August 8, 2013 and September 10, 2014, the company received reports from the expert, which contain some recommended findings relating to liability and the damages calculations put forth by ECT. Some of the expert's recommended findings were favorable to the company and others were favorable to ECT. In November 2014, the parties submitted comments on the expert's most recent report. On June 16, 2015, the court published a decision denying the parties' request to present oral testimony. In a decision dated November 13, 2018, the trial court ruled in ECT's favor on one of its claims against Solystic, and awarded damages of R$41 million (the equivalent of approximately $10 million as of September 30, 2019) against Solystic and its consortium partners, with that amount to be adjusted for inflation and interest from November 2004 through any appeal, in accordance with the Manual of Calculations of the Federal Justice, as well as attorneys' fees. On March 22, 2019, ECT appealed the trial court's decision to the intermediate court of appeals. Solystic filed its appeal on April 11, 2019. The parties are exploring whether there is a possible path for a negotiated resolution of the dispute.

We are engaged in remediation activities relating to environmental conditions allegedly resulting from historic operations at the former United States Navy and Grumman facilities in Bethpage, New York. For over 20 years, we have worked closely with the United States Navy, the United States Environmental Protection Agency, the New York State Department of Environmental Conservation, the New York State Department of Health and other federal, state and local governmental authorities, to address legacy environmental conditions in Bethpage. We have incurred, and expect to continue to incur, as included in Note 7, substantial remediation costs related to these environmental conditions. The remediation standards or requirements to which we are subject are being reconsidered and may change and costs may increase materially. As discussed in Note 7, the State of New York issued a Feasibility Study and Proposed Amended Record of Decision, proposing to impose additional remedial requirements. The company, along with other interested parties, has submitted comments on that proposal. The State of New York has said that, among other things, it is also evaluating potential natural resource damages. In addition, we are a party to various, and expect to become a party to additional, legal proceedings and disputes related to remediation, costs, allowability and/or alleged environmental impacts in Bethpage, including with federal and state entities, the Navy, local municipalities and water districts, and insurance carriers, as well as class action and individual plaintiffs alleging personal injury and property damage and seeking both monetary and non-monetary relief. These Bethpage matters could result in additional costs, fines, penalties, sanctions, compensatory or other damages (including natural resource damages), determinations on allocation, allowability and coverage, and non-monetary relief. We cannot at this time predict or reasonably estimate the potential cumulative outcomes or ranges of possible liability of these aggregate Bethpage matters.

On August 12, 2016, a putative class action complaint, naming Orbital ATK and two of its then-officers as defendants, Steven Knurr, et al. v. Orbital ATK, Inc., No. 16-cv-01031 (TSE-MSN), was filed in the United States District Court for the Eastern District of Virginia. The complaint asserts claims on behalf of purchasers of Orbital ATK securities for violations of Sections 10(b) and 20(a) of the Exchange Act and Rule 10b-5, allegedly arising out of false and misleading statements and the failure to disclose that: (i) Orbital ATK lacked effective control over financial reporting; and (ii) as a result, it failed to record an anticipated loss on a long-term contract with the U.S. Army to manufacture and supply small caliber ammunition at the U.S. Army's Lake City Army Ammunition Plant. On April 24, 2017 and October 10, 2017, the plaintiffs filed amended complaints naming additional defendants and asserting claims for alleged violations of additional sections of the Exchange Act and alleged false and misleading statements in Orbital ATK's Form S-4 filed in connection with the Orbital-ATK Merger. The complaint seeks damages, reasonable costs and expenses at trial, including counsel and expert fees, and such other relief as deemed appropriate by the Court. On June 7, 2019, the court approved the parties' proposal to resolve the litigation for $108 million, subject to certain terms and conditions. The company continues to negotiate with and pursue coverage litigation against various of its insurance carriers.

The company is a party to various other investigations, lawsuits, arbitration, claims, enforcement actions and other legal proceedings, including government investigations and claims, that arise in the ordinary course of our business. The nature of legal proceedings is such that we cannot assure the outcome of any particular matter. However, based on information available to the company to date, the company does not believe that the outcome of any of these other matters pending against the company is likely to have a material adverse effect on the company's unaudited condensed consolidated financial position as of September 30, 2019, or its annual results of operations and/or cash flows.

7. COMMITMENTS AND CONTINGENCIES

U.S. Government Cost Claims

From time to time, the company is advised of claims by the U.S. government concerning certain potential disallowed costs, plus, at times, penalties and interest. When such findings are presented, the company and U.S. government representatives engage in discussions to enable the company to evaluate the merits of these claims, as well as to assess the amounts being claimed. Where appropriate, provisions are made to reflect the company's estimated exposure for such potential disallowed costs. Such provisions are reviewed periodically using the most recent information available. The company believes it has adequately reserved for disputed amounts that are probable and reasonably estimable, and that the outcome of any such matters would not have a material adverse effect on its unaudited condensed consolidated financial position as of September 30, 2019, or its annual results of operations and/or cash flows.

Environmental Matters

The table below summarizes management's estimate of the range of reasonably possible future costs for environmental remediation, the amount accrued within that range, and the deferred costs expected to be recoverable through overhead charges on U.S. government contracts as of September 30, 2019 and December 31, 2018:

$ in millions	Range of Reasonably Possible Future Costs[1]	Accrued Costs[2]	Deferred Costs[3]
September 30, 2019	**$528 - $997**	**$ 543**	**$ 423**
December 31, 2018	447 - 835	461	343

(1) Estimated remediation costs are not discounted to present value. The range of reasonably possible future costs does not take into consideration amounts expected to be recoverable through overhead charges on U.S. government contracts.

(2) As of September 30, 2019, $163 million is recorded in Other current liabilities and $380 million is recorded in Other non-current liabilities.

(3) As of September 30, 2019, $128 million is deferred in Prepaid expenses and other current assets and $295 million is deferred in Other non-current assets.

Although management cannot predict whether new information gained as our environmental remediation projects progress, or as changes in facts and circumstances occur, will materially affect the estimated liability accrued, except with respect to Bethpage, we do not anticipate that future remediation expenditures associated with our currently identified projects will have a material adverse effect on the company's unaudited condensed consolidated financial position as of September 30, 2019, or its annual results of operations and/or cash flows. With respect to Bethpage, the State of New York issued a Feasibility Study and Proposed Amended Record of Decision, proposing to impose additional remedial requirements. The company, along with other interested parties, has submitted comments on that proposal. The comments address, among other things, the adequacy of the existing remedy, concerns with the state's proposal, and an alternative approach. As discussed in Note 6, the remediation standards or requirements to which we are subject are being reconsidered and may change and costs may increase materially.

Financial Arrangements

In the ordinary course of business, the company uses standby letters of credit and guarantees issued by commercial banks and surety bonds issued principally by insurance companies to guarantee the performance on certain obligations. At September 30, 2019, there were $452 million of stand-by letters of credit and guarantees and $209 million of surety bonds outstanding.

Commercial Paper

The company maintains a commercial paper program that serves as a source of short-term financing with capacity to issue unsecured commercial paper notes up to $2.0 billion. At September 30, 2019, there were $399 million of outstanding short-term commercial paper borrowings at a weighted-average interest rate of 2.31 percent that have original maturities of three months or less from the date of issuance. The outstanding balance of commercial paper borrowings is recorded in Other current liabilities in the unaudited condensed consolidated statements of financial position.

Credit Facilities

The company maintains a five-year senior unsecured credit facility in an aggregate principal amount of $2.0 billion (the "2018 Credit Agreement") that matures in August 2023. At September 30, 2019, there was no balance outstanding under this facility; however, the outstanding balance of commercial paper borrowings reduces the amount available for borrowing under the 2018 Credit Agreement. In October 2019, the company amended the 2018 Credit Agreement to extend its maturity date by one year from August 2023 to August 2024.

In December 2016, a subsidiary of the company entered into a two-year credit facility, with two additional one-year option periods, in an aggregate principal amount of £120 million (the equivalent of approximately $148 million as of September 30, 2019) (the "2016 Credit Agreement"). The company exercised the second option to extend the maturity to December 2020. The 2016 Credit Agreement is guaranteed by the company. At September 30, 2019, there was £60 million (the equivalent of approximately $74 million) outstanding under this facility, which bears interest at a rate of LIBOR plus 1.10 percent. All of the borrowings outstanding under this facility mature less than one year from the date of issuance, but may be renewed under the terms of the facility. Based on our intent and ability to refinance the obligations on a long-term basis, a large majority of the borrowings are classified as non-current.

At September 30, 2019, the company was in compliance with all covenants under its credit agreements.

8. RETIREMENT BENEFITS

The cost (benefit) to the company of its retirement plans is shown in the following table:

	Three Months Ended September 30				Nine Months Ended September 30			
	Pension Benefits		OPB		Pension Benefits		OPB	
$ in millions	**2019**	2018	**2019**	2018	**2019**	2018	**2019**	2018
Components of net periodic benefit cost (benefit)								
Service cost	**$ 92**	$ 102	**$ 4**	$ 5	**$ 276**	$ 301	**$ 12**	$ 15
Interest cost	**340**	316	**20**	20	**1,020**	906	**60**	58
Expected return on plan assets	**(525)**	(571)	**(23)**	(26)	**(1,576)**	(1,644)	**(69)**	(75)
Amortization of prior service credit	**(15)**	(15)	**(1)**	(5)	**(44)**	(44)	**(2)**	(16)
Net periodic benefit cost (benefit)	**$ (108)**	$ (168)	**$ —**	$ (6)	**$ (324)**	$ (481)	**$ 1**	$ (18)

Employer Contributions

The company sponsors defined benefit pension and OPB plans, as well as defined contribution plans. We fund our defined benefit pension plans annually in a manner consistent with the Employee Retirement Income Security Act of 1974, as amended by the Pension Protection Act of 2006.

Contributions made by the company to its retirement plans are as follows:

	Three Months Ended September 30		Nine Months Ended September 30	
$ in millions	**2019**	2018	**2019**	2018
Defined benefit pension plans	**$ 18**	$ 273	**$ 64**	$ 318
OPB plans	**10**	10	**34**	32
Defined contribution plans	**98**	104	**377**	296

9. STOCK COMPENSATION PLANS AND OTHER COMPENSATION ARRANGEMENTS

Stock Awards

The following table presents the number of restricted stock rights (RSRs) and restricted performance stock rights (RPSRs) granted to employees under the company’s long-term incentive stock plan and the grant date aggregate fair value of those stock awards for the periods presented:

	Nine Months Ended September 30	
in millions	**2019**	2018
RSRs granted	**0.1**	0.1
RPSRs granted	**0.2**	0.2
Grant date aggregate fair value	**$ 92**	$ 119

RSRs typically vest on the third anniversary of the grant date, while RPSRs generally vest and pay out based on the achievement of financial metrics over a three-year period.

Cash Awards
The following table presents the minimum and maximum aggregate payout amounts related to cash units (CUs) and cash performance units (CPUs) granted to employees in the periods presented:

	Nine Months Ended September 30	
$ in millions	**2019**	2018
Minimum aggregate payout amount	**$ 36**	$ 36
Maximum aggregate payout amount	**203**	205

CUs typically vest and settle in cash on the third anniversary of the grant date, while CPUs generally vest and pay out in cash based on the achievement of financial metrics over a three-year period.

10. LEASES

As described in Note 1, effective January 1, 2019, we adopted ASC 842 using the optional transition method. In accordance with the optional transition method, we did not recast the prior period unaudited condensed consolidated financial statements and all prior period amounts and disclosures are presented under ASC 840. Finance leases are not material to our unaudited condensed consolidated financial statements and are therefore not included in the following disclosures.

Total Lease Cost
Total lease cost is included in Product and Service costs and G&A expenses in the unaudited condensed consolidated statement of earnings and comprehensive income and is recorded net of immaterial sublease income. Total lease cost is comprised of the following:

$ in millions	Three Months Ended September 30, 2019	Nine Months Ended September 30, 2019
Operating lease cost	$ 78	$ 237
Variable lease cost	3	7
Short-term lease cost	25	54
Total lease cost	$ 106	$ 298

Supplemental Balance Sheet Information
Supplemental operating lease balance sheet information consists of the following:

$ in millions	September 30, 2019
Operating lease right-of-use assets	$ 1,511
Other current liabilities	260
Operating lease liabilities	1,304
Total operating lease liabilities	$ 1,564

Other Supplemental Information
Other supplemental operating lease information consists of the following:

$ in millions	Nine Months Ended September 30, 2019
Cash paid for amounts included in the measurement of operating lease liabilities	$ 223
Right-of-use assets obtained in exchange for new lease liabilities	397
Weighted average remaining lease term	11.7 years
Weighted average discount rate	3.8%

Maturities of Lease Liabilities

Maturities of operating lease liabilities as of September 30, 2019 are as follows:

$ in millions		
Year Ending December 31		
2019 [1]	$	74
2020		298
2021		249
2022		212
2023		175
Thereafter		986
Total lease payments		1,994
Less: imputed interest		(430)
Present value of operating lease liabilities	$	1,564

[1] Excludes the nine months ended September 30, 2019.

As of September 30, 2019, we have approximately $100 million in rental commitments for real estate leases that have not yet commenced. These leases are expected to commence in 2020 and 2021 with lease terms of 2 to 12 years.

Rental expense for operating leases classified under ASC 840 for the three and nine months ended September 30, 2018 was $97 million and $270 million, respectively. These amounts are net of immaterial amounts of sublease income. As of December 31, 2018, future minimum lease payments under long-term non-cancelable operating leases as classified under ASC 840 were as follows:

$ in millions		
Year Ending December 31		
2019	$	312
2020		270
2021		221
2022		186
2023		152
Thereafter		939
Total minimum lease payments	$	2,080

11. SEGMENT INFORMATION

The company is aligned in four operating sectors, which also comprise our reportable segments: Aerospace Systems, Innovation Systems, Mission Systems and Technology Services.

The following table presents sales and operating income by segment:

	Three Months Ended September 30		Nine Months Ended September 30	
$ in millions	**2019**	2018	**2019**	2018
Sales				
Aerospace Systems	**$ 3,458**	$ 3,282	**$ 10,344**	$ 9,899
Innovation Systems	**1,584**	1,415	**4,520**	1,815
Mission Systems	**3,029**	2,911	**9,043**	8,668
Technology Services	**1,067**	1,040	**3,088**	3,232
Intersegment eliminations	**(663)**	(563)	**(1,875)**	(1,675)
Total sales	**8,475**	8,085	**25,120**	21,939
Operating income				
Aerospace Systems	**324**	376	**1,067**	1,074
Innovation Systems	**164**	161	**500**	200
Mission Systems	**398**	399	**1,189**	1,122
Technology Services	**136**	111	**351**	328
Intersegment eliminations	**(82)**	(68)	**(222)**	(204)
Total segment operating income	**940**	979	**2,885**	2,520
Net FAS (service)/CAS pension adjustment	**131**	176	**346**	440
Unallocated corporate (expense) income	**(120)**	17	**(398)**	(123)
Total operating income	**$ 951**	$ 1,172	**$ 2,833**	$ 2,837

Net FAS (Service)/CAS Pension Adjustment
For financial statement purposes, we account for our employee pension plans in accordance with FAS. However, the cost of these plans is charged to our contracts in accordance with the Federal Acquisition Regulation (FAR) and the related U.S. Government Cost Accounting Standards (CAS). The net FAS (service)/CAS pension adjustment reflects the difference between CAS pension expense included as cost in segment operating income and the service cost component of FAS expense included in total operating income.

Unallocated Corporate (Expense) Income
Unallocated corporate expense includes the portion of corporate costs not considered allowable or allocable under applicable CAS or FAR, and therefore not allocated to the segments, such as a portion of management and administration, legal, environmental, compensation, retiree benefits and other corporate unallowable costs. Unallocated corporate expense also includes costs not considered part of management's evaluation of segment operating performance, such as amortization of purchased intangible assets and the additional depreciation expense related to the step-up in fair value of property, plant and equipment acquired through business combinations.

NORTHROP GRUMMAN CORPORATION

Disaggregation of Revenue

Sales by Customer Type	Three Months Ended September 30				Nine Months Ended September 30			
	2019		2018		**2019**		2018	
$ in millions	**$**	**%[3]**	$	%[3]	**$**	**%[3]**	$	%[3]
Aerospace Systems								
U.S. government [1]	**$ 3,014**	**87%**	$ 2,926	89%	**$ 8,954**	**87%**	$ 8,633	87%
International [2]	**353**	**10%**	270	8%	**1,137**	**11%**	990	10%
Other customers	**36**	**1%**	44	2%	**100**	**1%**	124	1%
Intersegment sales	**55**	**2%**	42	1%	**153**	**1%**	152	2%
Aerospace Systems sales	**3,458**	**100%**	3,282	100%	**10,344**	**100%**	9,899	100%
Innovation Systems								
U.S. government [1]	**1,163**	**74%**	972	69%	**3,239**	**72%**	1,237	68%
International [2]	**228**	**14%**	272	19%	**702**	**16%**	364	20%
Other customers	**99**	**6%**	134	9%	**331**	**7%**	164	9%
Intersegment sales	**94**	**6%**	37	3%	**248**	**5%**	50	3%
Innovation Systems sales	**1,584**	**100%**	1,415	100%	**4,520**	**100%**	1,815	100%
Mission Systems								
U.S. government [1]	**2,260**	**75%**	2,232	77%	**6,775**	**75%**	6,577	76%
International [2]	**416**	**14%**	374	12%	**1,242**	**14%**	1,144	13%
Other customers	**32**	**1%**	25	1%	**105**	**1%**	89	1%
Intersegment sales	**321**	**10%**	280	10%	**921**	**10%**	858	10%
Mission Systems sales	**3,029**	**100%**	2,911	100%	**9,043**	**100%**	8,668	100%
Technology Services								
U.S. government [1]	**629**	**59%**	581	56%	**1,799**	**58%**	1,780	55%
International [2]	**208**	**19%**	183	17%	**642**	**21%**	596	18%
Other customers	**37**	**4%**	72	7%	**94**	**3%**	241	8%
Intersegment sales	**193**	**18%**	204	20%	**553**	**18%**	615	19%
Technology Services sales	**1,067**	**100%**	1,040	100%	**3,088**	**100%**	3,232	100%
Total								
U.S. government [1]	**7,066**	**83%**	6,711	83%	**20,767**	**83%**	18,227	83%
International [2]	**1,205**	**14%**	1,099	14%	**3,723**	**15%**	3,094	14%
Other customers	**204**	**3%**	275	3%	**630**	**2%**	618	3%
Total Sales	**$ 8,475**	**100%**	$ 8,085	100%	**$ 25,120**	**100%**	$ 21,939	100%

[1] Sales to the U.S. government include sales from contracts for which we are the prime contractor, as well as those for which we are a subcontractor and the ultimate customer is the U.S. government. Each of the company's segments derives substantial revenue from the U.S. government.

[2] International sales include sales from contracts for which we are the prime contractor, as well as those for which we are a subcontractor and the ultimate customer is an international customer. These sales include foreign military sales contracted through the U.S. government.

[3] Percentages calculated based on total segment sales.

Sales by Contract Type	Three Months Ended September 30				Nine Months Ended September 30			
	2019		2018		**2019**		2018	
$ in millions	**$**	**%[1]**	$	%[1]	**$**	**%[1]**	$	%[1]
Aerospace Systems								
Cost-type	**$ 1,995**	**59%**	$ 1,953	60%	**$ 5,976**	**59%**	$ 5,789	59%
Fixed-price	**1,408**	**41%**	1,287	40%	**4,215**	**41%**	3,958	41%
Intersegment sales	**55**		42		**153**		152	
Aerospace Systems sales	**3,458**		3,282		**10,344**		9,899	
Innovation Systems								
Cost-type	**419**	**28%**	373	27%	**1,232**	**29%**	472	27%
Fixed-price	**1,071**	**72%**	1,005	73%	**3,040**	**71%**	1,293	73%
Intersegment sales	**94**		37		**248**		50	
Innovation Systems sales	**1,584**		1,415		**4,520**		1,815	
Mission Systems								
Cost-type	**1,264**	**47%**	1,259	48%	**3,854**	**47%**	3,745	48%
Fixed-price	**1,444**	**53%**	1,372	52%	**4,268**	**53%**	4,065	52%
Intersegment sales	**321**		280		**921**		858	
Mission Systems sales	**3,029**		2,911		**9,043**		8,668	
Technology Services								
Cost-type	**398**	**46%**	373	45%	**1,202**	**47%**	1,195	46%
Fixed-price	**476**	**54%**	463	55%	**1,333**	**53%**	1,422	54%
Intersegment sales	**193**		204		**553**		615	
Technology Services sales	**1,067**		1,040		**3,088**		3,232	
Total								
Cost-type	**4,076**	**48%**	3,958	49%	**12,264**	**49%**	11,201	51%
Fixed-price	**4,399**	**52%**	4,127	51%	**12,856**	**51%**	10,738	49%
Total Sales	**$ 8,475**		$ 8,085		**$ 25,120**		$ 21,939	

[1] Percentages calculated based on external customer sales.

Sales by Geographic Region	Three Months Ended September 30				Nine Months Ended September 30			
	2019		2018		**2019**		2018	
$ in millions	**$**	**%[2]**	$	%[2]	**$**	**%[2]**	$	%[2]
Aerospace Systems								
United States	**$ 3,050**	**90%**	$ 2,970	92%	**$ 9,054**	**89%**	$ 8,757	90%
Asia/Pacific	**173**	**5%**	121	4%	**632**	**6%**	499	5%
All other [1]	**180**	**5%**	149	4%	**505**	**5%**	491	5%
Intersegment sales	**55**		42		**153**		152	
Aerospace Systems sales	**3,458**		3,282		**10,344**		9,899	
Innovation Systems								
United States	**1,262**	**85%**	1,105	80%	**3,570**	**84%**	1,401	79%
Asia/Pacific	**30**	**2%**	72	5%	**123**	**3%**	96	6%
All other [1]	**198**	**13%**	201	15%	**579**	**13%**	268	15%
Intersegment sales	**94**		37		**248**		50	
Innovation Systems sales	**1,584**		1,415		**4,520**		1,815	
Mission Systems								
United States	**2,292**	**85%**	2,253	86%	**6,880**	**85%**	6,666	85%
Asia/Pacific	**143**	**5%**	208	8%	**443**	**5%**	521	7%
All other [1]	**273**	**10%**	170	6%	**799**	**10%**	623	8%
Intersegment sales	**321**		280		**921**		858	
Mission Systems sales	**3,029**		2,911		**9,043**		8,668	
Technology Services								
United States	**666**	**76%**	653	78%	**1,893**	**75%**	2,021	77%
Asia/Pacific	**44**	**5%**	45	5%	**144**	**6%**	113	4%
All other [1]	**164**	**19%**	138	17%	**498**	**19%**	483	19%
Intersegment sales	**193**		204		**553**		615	
Technology Services sales	**1,067**		1,040		**3,088**		3,232	
Total								
United States	**7,270**	**86%**	6,981	86%	**21,397**	**85%**	18,845	86%
Asia/Pacific	**390**	**5%**	446	6%	**1,342**	**5%**	1,229	6%
All other [1]	**815**	**9%**	658	8%	**2,381**	**10%**	1,865	8%
Total Sales	**$ 8,475**		$ 8,085		**$ 25,120**		$ 21,939	

[1] All other is principally comprised of Europe and the Middle East.

[2] Percentages calculated based on external customer sales.

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors and Shareholders of
Northrop Grumman Corporation
Falls Church, Virginia

Results of Review of Interim Financial Information

We have reviewed the accompanying condensed consolidated statement of financial position of Northrop Grumman Corporation and subsidiaries (the "Company") as of September 30, 2019, and the related condensed consolidated statements of earnings and comprehensive income and changes in shareholders' equity for the three-month and nine-month periods ended September 30, 2019 and 2018, and of cash flows for the nine-month periods ended September 30, 2019 and 2018, and the related notes (collectively referred to as the "interim financial information"). Based on our review, we are not aware of any material modifications that should be made to the accompanying interim financial information for it to be in conformity with accounting principles generally accepted in the United States of America.

We have previously audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated statement of financial position of Northrop Grumman Corporation and subsidiaries as of December 31, 2018, and the related consolidated statements of earnings and comprehensive income, changes in shareholders' equity, and cash flows for the year then ended (not presented herein); and in our report dated January 30, 2019, we expressed an unqualified opinion on those consolidated financial statements, which included an explanatory paragraph regarding the Company's change in its method of accounting for recognizing pension and other postretirement benefit plans actuarial gains and losses and the manner in which it accounts for revenue from contracts with customers. In our opinion, the information set forth in the accompanying condensed consolidated statement of financial position as of December 31, 2018, is fairly stated, in all material respects, in relation to the audited consolidated statement of financial position from which it has been derived.

Basis for Review Results

This interim financial information is the responsibility of the Company's management. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our reviews in accordance with standards of the PCAOB. A review of interim financial information consists principally of applying analytical procedures and making inquiries of persons responsible for financial and accounting matters. It is substantially less in scope than an audit conducted in accordance with the standards of the PCAOB, the objective of which is the expression of an opinion regarding the financial statements taken as a whole. Accordingly, we do not express such an opinion.

/s/ Deloitte & Touche LLP
McLean, Virginia
October 23, 2019

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

OVERVIEW

Northrop Grumman Corporation (herein referred to as “Northrop Grumman,” the “company,” “we,” “us,” or “our”) is a leading global security company. We offer a broad portfolio of capabilities and technologies that enable us to deliver innovative platforms, systems and solutions for applications that range from undersea to outer space and into cyberspace. We provide capabilities in autonomous systems; cyber; command, control, communications and computers, intelligence, surveillance and reconnaissance (C4ISR); space; strike; and logistics and modernization. We participate in many high-priority defense and government programs in the United States (U.S.) and abroad. We conduct most of our business with the U.S. government, principally the Department of Defense (DoD) and intelligence community. We also conduct business with foreign, state and local governments, as well as commercial customers.

The following discussion should be read along with the financial statements included in this Form 10-Q, as well as our 2018 Annual Report on Form 10-K, which provides additional information on our business and the environment in which we operate and our operating results.

Acquisition of Orbital ATK

On June 6, 2018 (the “Merger date”), the company completed its previously announced acquisition of Orbital ATK, Inc. (“Orbital ATK”) (the “Merger”). On the Merger date, Orbital ATK became a wholly-owned subsidiary of the company and its name was changed to Northrop Grumman Innovation Systems, Inc., which we established as a new, fourth business sector (“Innovation Systems”). The operating results of Innovation Systems subsequent to the Merger date have been included in the company’s unaudited condensed consolidated results of operations. See Note 2 to the financial statements for further information regarding the acquisition of Orbital ATK.

In June 2018, the U.S. Federal Trade Commission (FTC) issued a Decision and Order enabling the acquisition to proceed and providing for solid rocket motors to be available on a non-discriminatory basis under certain circumstances and processes. The company has taken and continues to take robust actions to help ensure compliance with the terms of the Order. Similarly, the Compliance Officer, appointed under the Order, and the FTC have taken and continue to take various actions to oversee compliance. In October 2019, the company received a civil investigative demand from the FTC requesting certain information relating to a potential issue of the company’s compliance with the Order in connection with a pending strategic missile competition. The company is working to respond to the request. We believe the company has been and continues to be in full compliance with the Order, but we cannot predict any potential impact on the pending competition.

U.S. Political and Economic Environment

Since the filing of our 2018 Annual Report on Form 10-K, full year appropriations for FY 2019 were enacted for all remaining U.S. government agencies and the President proposed an FY 2020 budget requesting $750 billion for national security. The President’s budget request addresses various capabilities highlighted in the U.S. National Security Strategy, the National Defense Strategy and the Missile Defense Review. On August 2, 2019, the Bipartisan Budget Act of 2019 was enacted, increasing spending caps under the Budget Control Act (BCA) for FY 2020 and FY 2021, the final two fiscal years covered by the BCA, and suspending the debt ceiling through July 31, 2021. FY 2020 appropriations have not been enacted and on September 27, 2019, a continuing resolution was enacted to provide funding at FY 2019 levels through November 21, 2019. We believe our capabilities, particularly in space, missiles, missile defense, hypersonics, counter-hypersonics, low observable technology and cyber will allow us to continue to profitably grow our business in support of our customers’ needs.

NORTHROP GRUMMAN CORPORATION

CONSOLIDATED OPERATING RESULTS

Selected financial highlights are presented in the table below:

	Three Months Ended September 30		%	Nine Months Ended September 30		%
$ in millions, except per share amounts	**2019**	2018	**Change**	**2019**	2018	**Change**
Sales	**$ 8,475**	$ 8,085	**5 %**	**$ 25,120**	$ 21,939	**14 %**
Operating costs and expenses	**7,524**	6,913	**9 %**	**22,287**	19,102	**17 %**
Operating costs and expenses as a % of sales	***88.8%***	*85.5%*		***88.7%***	*87.1%*	
Operating income	**951**	1,172	**(19)%**	**2,833**	2,837	**— %**
Operating margin rate	***11.2%***	*14.5%*		***11.3%***	*12.9%*	
Federal and foreign income tax expense	**122**	120	**2 %**	**460**	466	**(1)%**
Effective income tax rate	***11.6%***	*8.8%*		***14.8%***	*14.0%*	
Net earnings	**933**	1,244	**(25)%**	**2,657**	2,873	**(8)%**
Diluted earnings per share	**$ 5.49**	$ 7.11	**(23)%**	**$ 15.60**	$ 16.40	**(5)%**

Sales

Current Quarter

Third quarter 2019 sales increased $390 million, or 5 percent, due to higher sales at all four sectors.

Year to Date

Year to date 2019 sales increased $3.2 billion due to the addition of a full nine months of Innovation Systems sales as well as higher sales at Aerospace Systems and Mission Systems, partially offset by lower sales at Technology Services.

See “Segment Operating Results” below for further information by segment and “Product and Service Analysis” for product and service detail. See Note 11 to the financial statements for information regarding the company’s sales by customer type, contract type and geographic region for each of our segments.

Operating Income and Margin Rate

Current Quarter

Third quarter 2019 operating income decreased $221 million and operating margin rate declined to 11.2 percent primarily due to higher unallocated corporate expense, a decrease in the net FAS (service)/CAS pension adjustment and lower segment operating income. Third quarter 2018 unallocated corporate expense included a $223 million benefit recognized for the finalization of certain prior year cost claims.

Third quarter 2019 general and administrative (G&A) costs as a percentage of sales decreased to 9.2 percent from 10.1 percent primarily due to cost management, including cost synergies realized in connection with the 2018 acquisition of Orbital ATK, and higher sales.

Year to Date

Year to date 2019 operating income was comparable to the prior year period and reflects a $365 million increase in segment operating income, including a full nine months of operating income from Innovation Systems, offset by higher unallocated corporate expense, largely due to the previously noted 2018 cost claim benefit, and a decrease in the net FAS (service)/CAS pension adjustment. Operating margin rate declined to 11.3 percent principally due to the increase in unallocated corporate expense and decrease in the net FAS (service)/CAS pension adjustment.

Year to date 2019 G&A costs as a percentage of sales decreased to 9.2 percent from 10.3 percent primarily due to cost management, including the cost synergies described above.

For information regarding product and service operating costs and expenses, see “Product and Service Analysis” below.

Federal and Foreign Income Taxes

Current Quarter

The third quarter 2019 effective tax rate increased to 11.6 percent from 8.8 percent in the third quarter of 2018. See Note 4 to the financial statements for additional information.

Year to Date
The year to date 2019 effective tax rate increased to 14.8 percent from 14.0 percent in the prior year period. See Note 4 to the financial statements for additional information.

Net Earnings
Current Quarter
Third quarter 2019 net earnings decreased $311 million primarily due to lower operating income as well as a $70 million decrease in FAS (non-service) pension benefit.

Year to Date
Year to date 2019 net earnings decreased $216 million primarily due to a $182 million decrease in FAS (non-service) pension benefit and a $58 million decrease in other, net, principally due to lower interest income.

Diluted Earnings Per Share
Current Quarter
Third quarter 2019 diluted earnings per share decreased $1.62, or 23 percent, principally reflecting a 25 percent decrease in net earnings.

Year to Date
Year to date 2019 diluted earnings per share decreased $0.80, or 5 percent, reflecting an 8 percent decrease in net earnings, partially offset by a 3 percent reduction in weighted-average diluted shares outstanding.

SEGMENT OPERATING RESULTS

Basis of Presentation
The company is aligned in four operating sectors, which also comprise our reportable segments: Aerospace Systems, Innovation Systems, Mission Systems and Technology Services. As described above, on the effective date of the Merger, we established Innovation Systems as a new, fourth business sector. The segment operating results below include sales and operating income for Innovation Systems subsequent to the Merger date.

We present our sectors in the following business areas, which are reported in a manner reflecting core capabilities:

Aerospace Systems	Innovation Systems	Mission Systems	Technology Services
Autonomous Systems	Defense Systems	Advanced Capabilities	Global Logistics and Modernization
Manned Aircraft	Flight Systems	Cyber and ISR	Global Services
Space	Space Systems	Sensors and Processing	

Effective January 1, 2019, the former Advanced Defense Services and System Modernization and Services business areas of Technology Services were merged to create the Global Services business area. This change had no impact on the segment operating results of Technology Services as a whole.

In September 2019, the company announced changes effective January 1, 2020, which are intended to better align the company’s broad portfolio to serve its customers’ needs. There will be four sectors: Aeronautics Systems, Defense Systems, Mission Systems and Space Systems. This realignment is not reflected in any of the accompanying financial information.

This section discusses segment sales, operating income and operating margin rates. In evaluating segment operating performance, we look primarily at changes in sales and operating income. Where applicable, significant fluctuations in operating performance attributable to individual contracts or programs, or changes in a specific cost element across multiple contracts, are described in our analysis. Based on this approach and the nature of our operations, the discussion of results of operations below first focuses on our four segments before distinguishing between products and services. Changes in sales are generally described in terms of volume, while changes in margin rates are generally described in terms of performance and/or contract mix. For purposes of this discussion, volume generally refers to increases or decreases in sales or cost from production/service activity levels and performance generally refers to non-volume related changes in profitability. Contract mix generally refers to changes in the ratio of contract type and/or lifecycle (e.g., cost-type, fixed-price, development, production, and/or sustainment).

Segment Operating Income and Margin Rate

Segment operating income, as reconciled in the table below, and segment operating margin rate (segment operating income divided by sales) are non-GAAP (accounting principles generally accepted in the United States of America) measures that reflect total earnings from our four segments, including allocated pension expense recognized under the Federal Acquisition Regulation (FAR) and the related U.S. Government Cost Accounting Standards (CAS), and excluding FAS pension expense and unallocated corporate items (certain corporate-level expenses, which are not considered allowable or allocable under applicable CAS or FAR, and costs not considered part of management's evaluation of segment operating performance). These non-GAAP measures may be useful to investors and other users of our financial statements as supplemental measures in evaluating the financial performance and operational trends of our sectors. These measures may not be defined and calculated by other companies in the same manner and should not be considered in isolation or as alternatives to operating results presented in accordance with GAAP.

$ in millions	Three Months Ended September 30 **2019**	Three Months Ended September 30 2018	% **Change**	Nine Months Ended September 30 **2019**	Nine Months Ended September 30 2018	% **Change**
Segment operating income	**$ 940**	$ 979	**(4)%**	**$ 2,885**	$ 2,520	**14 %**
Segment operating margin rate	***11.1%***	*12.1%*		***11.5%***	*11.5%*	
CAS pension expense	**223**	278	**(20)%**	**622**	741	**(16)%**
Less: FAS (service) pension expense	**(92)**	(102)	**(10)%**	**(276)**	(301)	**(8)%**
Net FAS (service)/CAS pension adjustment	**131**	176	**(26)%**	**346**	440	**(21)%**
Intangible asset amortization and PP&E step-up depreciation	**(98)**	(97)	**1 %**	**(292)**	(127)	**NM**
Other unallocated corporate (expense) income	**(22)**	114	**NM**	**(106)**	4	**NM**
Unallocated corporate (expense) income	**(120)**	17	**NM**	**(398)**	(123)	**NM**
Operating income	**$ 951**	$ 1,172	**(19)%**	**$ 2,833**	$ 2,837	**— %**

Current Quarter

Third quarter 2019 segment operating income decreased $39 million, or 4 percent, primarily due to lower segment operating income at Aerospace Systems, partially offset by higher operating income at Technology Services. Segment operating margin rate decreased to 11.1 percent principally due to a lower operating margin rate at Aerospace Systems.

Year to Date

Year to date 2019 segment operating income increased $365 million, or 14 percent, primarily due to the inclusion of a full nine months of operating income from Innovation Systems as well as higher operating income at Mission Systems and Technology Services. Segment operating margin rate of 11.5 percent was comparable to the prior year period.

Net FAS (service)/CAS Pension Adjustment

The decrease in our third quarter and year to date 2019 net FAS (service)/CAS pension adjustment is primarily due to lower CAS expense largely as a result of changes in actuarial assumptions as of December 31, 2018. The year to date decrease is partially offset by increased CAS expense due to the addition of Innovation Systems.

Unallocated Corporate (Expense) Income

Current Quarter

The increase in third quarter 2019 unallocated corporate expense is primarily due to the absence in 2019 of a $223 million benefit recognized for the finalization of certain prior year cost claims, partially offset by $57 million of lower deferred state taxes and legal expenses.

Year to Date

The increase in year to date 2019 unallocated corporate expense is primarily due to the absence of the 2018 cost claim benefit noted above and $165 million of higher intangible asset amortization and PP&E step-up depreciation. This increase was partially offset by $61 million of lower deferred state taxes and legal expenses as well as $29 million of non-recurring Merger-related transaction costs in 2018.

NORTHROP GRUMMAN CORPORATION

Net Estimate-at-Completion (EAC) Adjustments - We record changes in estimated contract earnings at completion (net EAC adjustments) using the cumulative catch-up method of accounting. Net EAC adjustments can have a significant effect on reported sales and operating income and the aggregate amounts are presented in the table below:

	Three Months Ended September 30		Nine Months Ended September 30	
$ in millions	**2019**	2018	**2019**	2018
Favorable EAC adjustments	**$ 285**	$ 296	**$ 803**	$ 740
Unfavorable EAC adjustments	**(160)**	(147)	**(382)**	(332)
Net EAC adjustments	**$ 125**	$ 149	**$ 421**	$ 408

Net EAC adjustments by segment are presented in the table below:

	Three Months Ended September 30		Nine Months Ended September 30	
$ in millions	**2019**	2018	**2019**	2018
Aerospace Systems	**$ 13**	$ 80	**$ 117**	$ 229
Innovation Systems[(1)]	**33**	16	**114**	16
Mission Systems	**46**	37	**134**	132
Technology Services	**40**	22	**71**	42
Eliminations	**(7)**	(6)	**(15)**	(11)
Net EAC adjustments	**$ 125**	$ 149	**$ 421**	$ 408

[(1)] Amounts reflect EAC adjustments after the percent complete on Innovation Systems contracts was reset to zero as of the Merger date.

For purposes of the discussion in the remainder of this Segment Operating Results section, references to operating income and operating margin rate reflect segment operating income and segment operating margin rate, respectively.

AEROSPACE SYSTEMS	Three Months Ended September 30		%	Nine Months Ended September 30		%
$ in millions	**2019**	2018	**Change**	**2019**	2018	**Change**
Sales	**$ 3,458**	$ 3,282	**5 %**	**$ 10,344**	$ 9,899	**4 %**
Operating income	**324**	376	**(14)%**	**1,067**	1,074	**(1)%**
Operating margin rate	***9.4%***	*11.5%*		***10.3%***	*10.8%*	

Sales

Current Quarter

Third quarter 2019 sales increased 5 percent, due to higher sales in all three business areas. Manned aircraft sales reflect higher volume on the E-2 program and a higher rate of F-35 production activity, partially offset by lower B-2 sales. Space sales reflect higher volume on Next Generation Overhead Persistent Infrared (Next Gen OPIR) programs. Autonomous Systems sales increased due to higher volume on multiple programs, including Global Hawk, partially offset by lower NATO AGS volume as that program nears completion.

Year to Date

Year to date 2019 sales increased 4 percent due in large part to higher volume on restricted programs. Manned Aircraft sales reflect a higher rate of F-35 production activity and higher volume on the E-2 program. Space sales reflect higher volume on Next Gen OPIR programs. Autonomous Systems sales include lower NATO AGS volume as that program nears completion.

Operating Income

Current Quarter

Third quarter 2019 operating income declined to $324 million and operating margin rate decreased to 9.4 percent principally due to lower net favorable EAC adjustments. This reflects the timing of favorable adjustments as well as unfavorable adjustments for the B-2 Defensive Management System Modernization program and delays in production for certain commercial space components.

Year to Date
Year to date 2019 operating income decreased $7 million, or 1 percent, due to a lower operating margin rate, which more than offset higher sales. Operating margin rate decreased to 10.3 percent from 10.8 percent, primarily due to lower net favorable EAC adjustments on Manned Aircraft and Space programs.

INNOVATION SYSTEMS	Three Months Ended September 30		%	Nine Months Ended September 30		%
$ in millions	**2019**	2018	**Change**	**2019**	2018	**Change**
Sales	**$ 1,584**	$ 1,415	**12%**	**$ 4,520**	$ 1,815	**NM**
Operating income	**164**	161	**2%**	**500**	200	**NM**
Operating margin rate	***10.4%***	*11.4%*		***11.1%***	*11.0%*	

The sales and operating income above reflect the operating results of Innovation Systems subsequent to the Merger date. In our year to date comparative discussion below, we reference pro forma sales prepared in accordance with Article 11 of Regulation S-X and computed as if Orbital ATK had been included in our results in the year prior to the Merger, or as of January 1, 2017. Refer to Note 2 to the financial statements for additional supplemental consolidated pro forma financial information. This pro forma financial information should not be considered indicative of the results that would have actually occurred if the Merger had been consummated on January 1, 2017, nor are they indicative of future results.

Sales
Current Quarter
Third quarter 2019 sales increased 12 percent due to higher sales in all three business areas. Space Systems sales reflect higher volume on national security satellite systems. Defense Systems sales increased primarily due to higher volume on precision munitions and armament products, as well as tactical missiles and subsystems, including the Advanced Anti-Radiation Guided Missile-Extended Range (AARGM-ER) program. Flight Systems sales reflect higher volume on military and commercial aerospace structures.

Year to Date
Year to date 2019 sales increased $403 million, or 10 percent, compared with year to date 2018 pro forma sales of $4.1 billion due to higher sales in all three business areas. Flight Systems sales reflect higher volume on military aerospace structures and launch vehicles, principally Ground-based Midcourse Defense. Defense Systems sales increased primarily due to higher volume on tactical missiles and subsystems, including AARGM-ER, and precision munitions and armament products. Space Systems sales reflect higher volume on national security satellite systems.

Operating Income
Current Quarter
Third quarter 2019 operating income increased 2 percent primarily due to higher sales, partially offset by a lower operating margin rate of 10.4 percent. The prior period operating margin rate reflects favorable indirect rate performance and recovery of an insurance claim.

Year to Date
Year to date 2019 operating income totaled $500 million and operating margin rate was 11.1 percent. Year to date results benefited from the timing of favorable negotiations on certain commercial contracts.

MISSION SYSTEMS	Three Months Ended September 30		%	Nine Months Ended September 30		%
$ in millions	**2019**	2018	**Change**	**2019**	2018	**Change**
Sales	**$ 3,029**	$ 2,911	**4 %**	**$ 9,043**	$ 8,668	**4%**
Operating income	**398**	399	**— %**	**1,189**	1,122	**6%**
Operating margin rate	***13.1%***	*13.7%*		***13.1%***	*12.9%*	

Sales
Current Quarter
Third quarter 2019 sales increased 4 percent due to higher sales in all three business areas. Advanced Capabilities sales increased primarily due to higher volume on marine systems. Cyber and ISR sales reflect higher volume on space and restricted programs. Sensors and Processing sales increased principally due to higher volume on airborne radar and electronic warfare programs, partially offset by lower volume from targeting pods.

Year to Date
Year to date 2019 sales increased 4 percent due to higher sales in all three business areas. Sensors and Processing sales increased principally due to higher volume on airborne radar and restricted programs, partially offset by lower volume on communications programs. Cyber and ISR sales increased principally due to higher volume on space and restricted programs. Advanced Capabilities sales increased principally due to higher volume on restricted programs and marine systems, partially offset by lower missile defense volume, primarily related to the JRDC program.

Operating Income
Current Quarter
Third quarter 2019 operating income was comparable to the prior year and operating margin rate was 13.1 percent compared with 13.7 percent in the prior year period. The primary driver of the margin rate change was a higher level of indirect rate benefits in the third quarter of 2018. Third quarter 2019 results reflect continued strong performance at Sensors and Processing, improved performance at Advanced Capabilities, and lower performance on Cyber and ISR programs.

Year to Date
Year to date 2019 operating income increased 6 percent due to higher sales and a higher operating margin rate. Operating margin rate increased to 13.1 percent primarily due to improved performance on Advanced Capabilities and Sensors and Processing programs, partially offset by lower performance on Cyber and ISR programs.

TECHNOLOGY SERVICES	Three Months Ended September 30		%	Nine Months Ended September 30		%
$ in millions	**2019**	2018	**Change**	**2019**	2018	**Change**
Sales	**$ 1,067**	$ 1,040	**3%**	**$ 3,088**	$ 3,232	**(4)%**
Operating income	**136**	111	**23%**	**351**	328	**7 %**
Operating margin rate	***12.7%***	*10.7%*		***11.4%***	*10.1%*	

Sales
Current Quarter
Third quarter 2019 sales increased 3 percent due to higher sales in both business areas. Global Logistics and Modernization sales increased primarily due to higher sales on electronic systems sustainment programs, partially offset by lower volume on autonomous systems support programs. Global Services sales increased principally due to higher volume on defense services programs and a civil program, partially offset by the completion of a state and local services contract in 2018.

Year to Date
Year to date 2019 sales decreased 4 percent primarily due to program completions across the sector. Global Services sales declined principally due to the completions in 2018 of a state and local services contract and of certain defense services contracts, largely the JRDC program, partially offset by higher volume on a civil program. Global Logistics and Modernization sales declined primarily due to the completion in 2018 of a manned aircraft sustainment program, KC-10, partially offset by higher volume on electronic systems sustainment programs.

Operating Income
Current Quarter
Third quarter 2019 operating income increased 23 percent and operating margin rate increased to 12.7 percent due to improved performance in both business areas, including a favorable adjustment on a Global Logistics and Modernization sustainment program.

Year to Date
Year to date 2019 operating income increased 7 percent and operating margin rate increased to 11.4 percent due to improved performance in both business areas, including a favorable adjustment on a Global Logistics and Modernization sustainment program.

PRODUCT AND SERVICE ANALYSIS

The following table presents product and service sales and operating costs and expenses by segment:

	Three Months Ended September 30				Nine Months Ended September 30			
$ in millions	**2019**		2018		**2019**		2018	
Segment Information:	**Sales**	**Operating Costs and Expenses**	Sales	Operating Costs and Expenses	**Sales**	**Operating Costs and Expenses**	Sales	Operating Costs and Expenses
Aerospace Systems								
Product	**$ 2,956**	**$ 2,691**	$ 2,775	$ 2,457	**$ 8,783**	**$ 7,915**	$ 8,339	$ 7,436
Service	**502**	**443**	507	449	**1,561**	**1,362**	1,560	1,389
Innovation Systems								
Product	**1,451**	**1,304**	1,246	1,101	**4,019**	**3,577**	1,600	1,418
Service	**133**	**116**	169	153	**501**	**443**	215	197
Mission Systems								
Product	**1,887**	**1,625**	1,818	1,582	**5,631**	**4,826**	5,349	4,624
Service	**1,142**	**1,006**	1,093	930	**3,412**	**3,028**	3,319	2,922
Technology Services								
Product	**143**	**131**	132	119	**406**	**373**	356	325
Service	**924**	**800**	908	810	**2,682**	**2,364**	2,876	2,579
Segment Totals								
Total Product	**$ 6,437**	**$ 5,751**	$ 5,971	$ 5,259	**$ 18,839**	**$ 16,691**	$ 15,644	$ 13,803
Total Service	**2,701**	**2,365**	2,677	2,342	**8,156**	**7,197**	7,970	7,087
Intersegment eliminations	**(663)**	**(581)**	(563)	(495)	**(1,875)**	**(1,653)**	(1,675)	(1,471)
Total segment[(1)]	**$ 8,475**	**$ 7,535**	$ 8,085	$ 7,106	**$ 25,120**	**$ 22,235**	$ 21,939	$ 19,419

[(1)] A reconciliation of segment operating income to total operating income is included in “Segment Operating Results.”

Product Sales and Costs

Current Quarter

Third quarter 2019 product sales increased $466 million, or 8 percent. The increase was primarily due to higher product sales in all three business areas at Innovation Systems and higher volume on restricted, E-2 and Next Gen OPIR programs at Aerospace Systems.

Third quarter 2019 product costs increased $492 million, or 9 percent, consistent with the higher product sales described above and reflects a lower product margin at Aerospace Systems.

Year to Date

Year to date 2019 product sales increased $3.2 billion, or 20 percent. The increase was primarily due to a full nine months of product sales from Innovation Systems and higher volume on restricted, E-2 and F-35 programs at Aerospace Systems.

Year to date 2019 product costs increased $2.9 billion, or 21 percent, consistent with the higher product sales described above and reflects a lower product margin at Aerospace Systems.

Service Sales and Costs

Current Quarter

Third quarter 2019 service sales increased $24 million, or 1 percent. The increase was primarily due to higher service sales at Mission Systems.

Third quarter 2019 service costs increased $23 million, or 1 percent, consistent with the higher service sales described above.

Year to Date

Year to date 2019 service sales increased $186 million, or 2 percent. The increase was primarily driven by a full nine months of service sales from Innovation Systems and higher service sales at Mission Systems, partially offset by lower service sales at Technology Services principally due to several program completions.

Year to date 2019 service costs increased $110 million, or 2 percent, consistent with the higher service sales described above.

BACKLOG

Backlog represents the future sales we expect to recognize on firm orders received by the company and is equivalent to the company's remaining performance obligations at the end of each period. It comprises both funded backlog (firm orders for which funding is authorized and appropriated) and unfunded backlog. Unexercised contract options and indefinite delivery indefinite quantity (IDIQ) contracts are not included in backlog until the time the option or IDIQ task order is exercised or awarded. Backlog is converted into sales as costs are incurred or deliveries are made.

Backlog consisted of the following as of September 30, 2019 and December 31, 2018:

	September 30, 2019			December 31, 2018	
$ in millions	**Funded**	**Unfunded**	**Total Backlog**	Total Backlog	% Change in 2019
Aerospace Systems	**$ 12,310**	**$ 21,601**	**$ 33,911**	$ 26,440	**28 %**
Innovation Systems	**5,835**	**3,758**	**9,593**	8,207	**17 %**
Mission Systems	**10,952**	**7,112**	**18,064**	15,408	**17 %**
Technology Services	**2,862**	**574**	**3,436**	3,445	**— %**
Total backlog	**$ 31,959**	**$ 33,045**	**$ 65,004**	$ 53,500	**22 %**

New Awards

Third quarter and year to date 2019 net awards totaled $10.1 billion and $35.9 billion, respectively, and backlog increased to $65.0 billion as of September 30, 2019. Significant new awards in the third quarter include $1.4 billion to deliver an additional nine E-2D Advanced Hawkeye aircraft and related equipment to Japan, $608 million for space restricted programs, $504 million for the F-35 program, $481 million for the Triton program and $312 million for targets and countermeasures used to test the Ballistic Missile Defense System.

LIQUIDITY AND CAPITAL RESOURCES

We endeavor to ensure the most efficient conversion of operating income into cash for deployment in our business and to maximize shareholder value through cash deployment activities. In addition to our cash position, we use various financial measures to assist in capital deployment decision-making, including cash provided by operating activities and free cash flow, a non-GAAP measure described in more detail below.

Cash and cash equivalents and cash generated from operating activities, supplemented by borrowings under credit facilities, commercial paper and/or in the capital markets, if needed, are expected to be sufficient to fund our operations for at least the next 12 months.

Operating Cash Flow

The table below summarizes key components of cash flow provided by operating activities:

	Nine Months Ended September 30		%
$ in millions	**2019**	2018	**Change**
Net earnings	**$ 2,657**	$ 2,873	**(8)%**
Non-cash items[(1)]	**1,041**	891	**17 %**
Changes in assets and liabilities:			
Trade working capital	**(1,392)**	(1,400)	**(1)%**
Retiree benefits	**(422)**	(847)	**(50)%**
Other, net	**(51)**	(67)	**(24)%**
Net cash provided by operating activities	**$ 1,833**	$ 1,450	**26 %**

(1) Includes depreciation and amortization, non-cash lease expense, stock based compensation expense and deferred income taxes.

Year to date 2019 cash provided by operating activities increased $383 million principally due to a $250 million voluntary pre-tax pension contribution ($163 million after-tax) made in the third quarter of 2018 and improved trade working capital.

Free Cash Flow

Free cash flow, as reconciled in the table below, is a non-GAAP measure defined as net cash provided by operating activities less capital expenditures, and may not be defined and calculated by other companies in the same manner. We use free cash flow as a key factor in our planning for, and consideration of, acquisitions, the payment of dividends and stock repurchases. This non-GAAP measure may be useful to investors and other users of our financial statements as a supplemental measure of our cash performance, but should not be considered in isolation, as a measure of residual cash flow available for discretionary purposes, or as an alternative to operating cash flows presented in accordance with GAAP.

The table below reconciles net cash provided by operating activities to free cash flow:

	Nine Months Ended September 30		%
$ in millions	**2019**	2018	**Change**
Net cash provided by operating activities	**$ 1,833**	$ 1,450	**26%**
Less: capital expenditures	**(793)**	(786)	**1%**
Free cash flow	**$ 1,040**	$ 664	**57%**

Year to date 2019 free cash flow increased $376 million principally due to the increase in net cash provided by operating activities.

Investing Cash Flow

Year to date 2019 net cash used in investing activities decreased to $785 million from $8.4 billion principally due to $7.7 billion paid in 2018 for the acquisition of Orbital ATK, net of cash acquired.

Financing Cash Flow

Year to date 2019 net cash used in financing activities decreased to $1.5 billion from $3.0 billion principally due to lower debt and credit facility repayments of $2.0 billion, partially offset by increased share repurchases and lower net borrowings on commercial paper.

Credit Facilities, Commercial Paper and Financial Arrangements - See Note 7 to the financial statements for further information on our credit facilities, commercial paper and our use of standby letters of credit and guarantees.

Share Repurchases - See Note 3 to the financial statements for further information on our share repurchase programs.

Long-term Debt - See Note 5 to the financial statements for further information.

NORTHROP GRUMMAN CORPORATION

CRITICAL ACCOUNTING POLICIES, ESTIMATES AND JUDGMENTS

There have been no material changes to our critical accounting policies, estimates or judgments from those discussed in our 2018 Annual Report on Form 10-K.

ACCOUNTING STANDARDS UPDATES

See Note 1 to our financial statements for further information on accounting standards updates.

FORWARD-LOOKING STATEMENTS AND PROJECTIONS

This Form 10-Q and the information we are incorporating by reference contain statements that constitute “forward-looking statements” within the meaning of the Private Securities Litigation Reform Act of 1995. Words such as “will,” “expect,” “anticipate,” “intend,” “may,” “could,” “should,” “plan,” “project,” “forecast,” “believe,” “estimate,” “outlook,” “trends,” “goals” and similar expressions generally identify these forward-looking statements. Forward-looking statements include, among other things, statements relating to our future financial condition, results of operations and/or cash flows. Forward-looking statements are based upon assumptions, expectations, plans and projections that we believe to be reasonable when made, but which may change over time. These statements are not guarantees of future performance and inherently involve a wide range of risks and uncertainties that are difficult to predict. Specific risks that could cause actual results to differ materially from those expressed or implied in these forward-looking statements include, but are not limited to, those identified and discussed more fully in the section entitled “Risk Factors” in our 2018 Annual Report on Form 10-K and from time to time in our other filings with the Securities and Exchange Commission (SEC). They include:

- our dependence on the U.S. government for a substantial portion of our business
- significant delays or reductions in appropriations for our programs and U.S. government funding more broadly
- investigations, claims, disputes, enforcement actions and/or litigation
- the use of estimates when accounting for our contracts and the effect of contract cost growth and/or changes in estimated contract revenues and costs
- our exposure to additional risks as a result of our international business, including risks related to geopolitical and economic factors, laws and regulations
- the improper conduct of employees, agents, subcontractors, suppliers, business partners or joint ventures in which we participate and the impact on our reputation, our ability to do business, and our financial position, results of operations and/or cash flows
- cyber and other security threats or disruptions faced by us, our customers or our suppliers and other partners
- the performance and financial viability of our subcontractors and suppliers and the availability and pricing of raw materials, chemicals and components
- changes in procurement and other laws, regulations and practices applicable to our industry, findings by the U.S. government as to our compliance with such laws and regulations, and changes in our customers’ business practices globally
- increased competition within our markets and bid protests
- the ability to maintain a qualified workforce
- our ability to meet performance obligations under our contracts, including obligations that are technologically complex, require certain manufacturing expertise or are dependent on factors not wholly within our control
- environmental matters, including unforeseen environmental costs and government and third party claims
- natural disasters
- the adequacy and availability of our insurance coverage, customer indemnifications or other liability protections
- products and services we provide related to hazardous and high risk operations, including the production and use of such products, which subject us to various environmental, regulatory, financial, reputational and other risks

- the future investment performance of plan assets, changes in actuarial assumptions associated with our pension and other postretirement benefit plans and legislative or other regulatory actions impacting our pension, postretirement and health and welfare plans
- our ability successfully to integrate the Orbital ATK business and realize fully the anticipated benefits of the acquisition, without adverse consequences
- our ability to exploit or protect intellectual property rights
- our ability to develop new products and technologies and maintain technologies, facilities, and equipment to win new competitions and meet the needs of our customers
- changes in business conditions that could impact business investments and/or recorded goodwill or the value of other long-lived assets
- unanticipated changes in our tax provisions or exposure to additional tax liabilities, including qualification of the Alliant Techsystems Inc. spin-off of Vista Outdoor Inc. as a tax-free transaction

You are urged to consider the limitations on, and risks associated with, forward-looking statements and not unduly rely on the accuracy of forward-looking statements. These forward-looking statements speak only as of the date this report is first filed or, in the case of any document incorporated by reference, the date of that document. We undertake no obligation to publicly update or revise any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by applicable law.

CONTRACTUAL OBLIGATIONS

There have been no material changes to our contractual obligations from those discussed in our 2018 Annual Report on Form 10-K.

Item 3. Quantitative and Qualitative Disclosures About Market Risk

There have been no material changes to our market risks from those discussed in our 2018 Annual Report on Form 10-K.

Item 4. Controls and Procedures

DISCLOSURE CONTROLS AND PROCEDURES

Our principal executive officer (Chief Executive Officer and President) and principal financial officer (Corporate Vice President and Chief Financial Officer) have evaluated the company’s disclosure controls and procedures (as defined in Rule 13a-15(e) and Rule 15d-15(e) of the Securities Exchange Act of 1934 (the Exchange Act)) as of September 30, 2019, and have concluded that these controls and procedures are effective to ensure that information required to be disclosed by us in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC’s rules and forms. These disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed in the reports that we file or submit is accumulated and communicated to management, including the principal executive officer and the principal financial officer, as appropriate to allow timely decisions regarding required disclosure.

CHANGES IN INTERNAL CONTROL OVER FINANCIAL REPORTING

During the three months ended September 30, 2019, no changes occurred in our internal control over financial reporting that materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

PART II. OTHER INFORMATION

Item 1. Legal Proceedings

We have provided information about certain legal proceedings in which we are involved in Notes 6 and 7 to the financial statements.

We are a party to various investigations, lawsuits, arbitration, claims, enforcement actions and other legal proceedings, including government investigations and claims, that arise in the ordinary course of our business. These types of matters could result in administrative, civil or criminal fines, penalties or other sanctions (which terms include judgments or convictions and consent or other voluntary decrees or agreements); compensatory, treble or other damages; non-monetary relief or actions; or other liabilities. Government regulations provide that certain allegations against a contractor may lead to suspension or debarment from future government contracts or suspension of export privileges for the company or one or more of its components. The nature of legal proceedings is such that we cannot assure the outcome of any particular matter. For additional information on pending matters, please see Notes 6 and 7 to the financial statements, and for further information on the risks we face from existing and future investigations, lawsuits, arbitration, claims, enforcement actions and other legal proceedings, please see “Risk Factors” in our 2018 Annual Report on Form 10-K.

Item 1A. Risk Factors

For a discussion of our risk factors, please see the section entitled “Risk Factors” in our 2018 Annual Report on Form 10-K.

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

Purchases of Equity Securities – The table below summarizes our repurchases of common stock during the third quarter of 2019:

Period	Number of Shares Purchased	Average Price Paid per Share[(1)]	Number of Shares Purchased as Part of Publicly Announced Plans or Programs	Approximate Dollar Value of Shares that May Yet Be Purchased under the Plans or Programs ($ in millions)
June 29, 2019 - July 26, 2019	143,800	$ 327.10	143,800	$ 3,801
July 27, 2019 - August 23, 2019	219,700	360.17	219,700	3,722
August 24, 2019 - September 27, 2019	244,200	367.81	244,200	3,632
Total	607,700	$ 355.41	607,700	$ 3,632

(1) Includes commissions paid.

Share repurchases take place from time to time, subject to market conditions and management’s discretion, in the open market and in privately negotiated transactions. The company retires its common stock upon repurchase and, in the periods presented, has not made any purchases of common stock other than in connection with these publicly announced repurchase programs.

See Note 3 to the financial statements for further information on our share repurchase programs.

NORTHROP GRUMMAN CORPORATION

Item 6. Exhibits

2.1	Agreement and Plan of Merger among Titan II, Inc. (formerly Northrop Grumman Corporation), Northrop Grumman Corporation (formerly New P, Inc.) and Titan Merger Sub Inc., dated March 30, 2011 (incorporated by reference to Exhibit 10.1 to Form 8-K filed April 4, 2011, File No. 001-16411)
2.2	Separation and Distribution Agreement dated as of March 29, 2011, among Titan II, Inc. (formerly Northrop Grumman Corporation), Northrop Grumman Corporation (formerly New P, Inc.), Huntington Ingalls Industries, Inc., Northrop Grumman Shipbuilding, Inc. and Northrop Grumman Systems Corporation (incorporated by reference to Exhibit 10.2 to Form 8-K filed April 4, 2011, File No. 001-16411)
2.3	Agreement and Plan of Merger, dated as of September 17, 2017, among Northrop Grumman Corporation, Neptune Merger, Inc. and Orbital ATK, Inc. (incorporated by reference to Exhibit 2.1 to Form 8-K filed September 18, 2017)
2.4	Transaction Agreement, dated as of April 28, 2014, among Alliant Techsystems Inc., Vista Spinco Inc., Vista Merger Sub Inc. and Orbital Sciences Corporation (incorporated by reference to Exhibit 2.1 to Alliant Techsystems Inc. (now known as Northrop Grumman Innovation Systems, Inc.) Form 8-K filed May 2, 2014)
+*10.1	Consultant Agreement between Northrop Grumman Systems Corporation and Wesley G. Bush, dated July 31, 2019
*15	Letter from Independent Registered Public Accounting Firm
*31.1	Certification of Kathy J. Warden pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
*31.2	Certification of Kenneth L. Bedingfield pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
**32.1	Certification of Kathy J. Warden pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
**32.2	Certification of Kenneth L. Bedingfield pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
*101	Northrop Grumman Corporation Quarterly Report on Form 10-Q for the quarter ended September 30, 2019, formatted in XBRL (Extensible Business Reporting Language): (i) the Cover Page, (ii) Condensed Consolidated Statements of Earnings and Comprehensive Income, (iii) Condensed Consolidated Statements of Financial Position, (iv) Condensed Consolidated Statements of Cash Flows, (v) Condensed Consolidated Statements of Changes in Shareholders' Equity, and (vi) Notes to Condensed Consolidated Financial Statements. The instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.
*104	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101)

\+ Management contract or compensatory plan or arrangement

* Filed with this report

** Furnished with this report

NORTHROP GRUMMAN CORPORATION

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.

NORTHROP GRUMMAN CORPORATION
(Registrant)

By: **/s/ Michael A. Hardesty**

Michael A. Hardesty
Corporate Vice President, Controller and
Chief Accounting Officer
(Principal Accounting Officer)

Date: October 23, 2019

Exhibit 10.1

CONSULTANT AGREEMENT

This agreement for consulting services ("Agreement'") is between Northrop Grumman Systems Corporation, a Delaware corporation whose principal place of business is located at 2980 Fairview Park Drive, Falls Church, VA ("NGSC" or "the Company") and Wesley G. Bush, VA ("Consultant" or "Mr. Bush") (each "a party," collectively "the parties"), dated July 31, 2019.

I. ENGAGEMENT

The Company hereby retains Consultant to provide such advice and participate in such meetings and events for the benefit of the Company and its affiliates, as may be requested by the Company. Consultant's principal point of contact at the Company with respect to the specific nature and scope of the services to be provided during the Consulting Period shall be Northrop Grumman Corporation's ("NGC") Chief Executive Officer or her designee. Consultant shall provide reports of his activities under this Agreement to NGSC at such times and places as NGSC may reasonably require.

II. PLACE OF ENGAGEMENT

Consultant shall perform the services called for under this Agreement in the Commonwealth of Virginia and, on occasion, in such other places as the parties may agree.

III. TERM OF ENGAGEMENT

The initial term of this Agreement shall be for a period of five years commencing on August 1, 2019 and terminating five years thereafter (the "Consulting Period"). This Agreement may be renewed or extended in writing, annually or on such other terms as the parties may agree.

IV. COMPENSATION

A. **Fee.** Consultant agrees to make himself available to perform services for the Company for up to three (3) days per month during the Consulting Period. The Company shall pay Consultant a fixed fee of $16,670 per full or partial month for consulting services performed during the Consulting Period. Any consulting fee due for a calendar month shall be paid by the Company promptly after the end of such month. Consultant acknowledges and agrees that by accepting these consulting payments he is certifying his compliance with the provisions of this Agreement.

B. **<u>Support Services.</u>** Further to enable Consultant to perform such services, the Company shall provide Consultant with information technology (“IT”) support and shall continue to hold and maintain appropriate security clearances for Consultant. The IT support shall include providing Consultant with electronics equipment (including a computer and mobile phone) and a Company telephone number and email account, as well as related support services.

C. **<u>Expenses.</u>** The Company shall reimburse Consultant for all reasonable and appropriate expenses, including first class airfare and accommodations, incurred by Consultant in connection with the rendering of services hereunder. Claims for expenses shall be in accordance with the Company's established policies and procedures and documented pursuant to the procedures applicable to the Company’s officers.

D. **<u>Full Extent Of Compensation</u>.** Unless otherwise specifically stated in writing, this Section IV describes the full extent of compensation Consultant shall receive under this Agreement and Consultant shall not be entitled by virtue of this Agreement to be paid a commission or to participate in any insurance, saving, retirement or other benefit programs, including, without limitation, stock ownership plans offered by NGSC to its employees, nor shall this Agreement in any way modify any other Agreement that Consultant may have with NGSC or any benefit Consultant my receive or be entitled to receive from NGSC or in connection with his prior employment.

E. **<u>Warranty.</u>** Consultant certifies and warrants that in the course of performing services under this Agreement, no payments will be made to government officials or customer representatives that no government official or customer representative has any direct or indirect investment interest or interest in the revenues or profits of Consultant, and that no expenditure for other than lawful purposes will be made.

F. **<u>Exclusion Of Lobbying Costs From Overhead Rates</u>.** NGSC is prohibited from charging directly or indirectly, costs associated with lobbying activities to its contracts with the United States Government. Unallowable costs associated with lobbying activities are defined at Federal Acquisition Regulations (FAR) 31.205-22, effective as of the date of this Agreement. Consultant agrees that in the event that Consultant performs lobbying activities under this Agreement, Consultant shall provide NGSC with a detailed accounting of time expended, individual agency/congressional employees contacted, and NGSC programs discussed in the required activity report.

V. <u>PROTECTION OF INFORMATION</u>

A. **<u>Use and Disclosure to Third Parties Prohibited.</u>** Consultant shall protect any and all confidential, proprietary or otherwise protected information concerning any matter affecting or relating to NGSC or any of its affiliates. Consultant shall not in any way use or disclose any such confidential, proprietary or otherwise protected information other than in performance of this Agreement without the express written consent of NGSC; provided, however, Consultant shall not be held liable under this Agreement for making a confidential disclosure to a government official or an attorney for purposes of investigating or reporting a suspected violation of law or regulation. The terms of this section shall remain in full force and effect after the termination or expiration of this Agreement.

VI. <u>TRADE SECRETS AND THIRD PARTY PROPRIETARY INFORMATION</u>

A. **<u>Ideas Improvements and Inventions.</u>** Any and all ideas, improvements and inventions conceived of, developed, or first reduced to practice in the performance of work hereunder shall become the exclusive property of NGSC and ideas and developments accruing therefrom shall all be fully disclosed to NGSC and shall be the exclusive property of NGSC and may be treated and dealt with by NGSC as such without payment of further consideration than is hereinabove specified. Consultant shall preserve such ideas, improvements and inventions as confidential during the term of the contract and thereafter and will execute all papers and documents necessary to vest title to such ideas, developments, information, data improvements and inventions in NGSC or NGC and to enable NGSC or NGC to apply for and obtain letters patent on such ideas, developments, information, data, improvements and inventions in any and all countries and to assign to NGSC or NGC the entire right, title and interest thereto.

B. **<u>Notes, Memoranda, Reports and Data.</u>** Consultant agrees that the original and all copies of notes, memoranda, reports, findings or other data prepared by Consultant in connection with the services performed hereunder shall become the sole and exclusive property of NGSC.

C. **<u>Disclosure of Confidential or Proprietary lnformation of Third Parties Prohibited</u>.** Consultant will not disclose to NGSC or its affiliates or induce NGSC or its affiliates to use any secret process, trade secret, or other confidential or proprietary knowledge or information belonging to others, including but not limited to the United States. Such information includes but is not limited to information relating to bids, offers, technical proposals, responses to requests for procurement, rankings of competitors and other similar procurement sensitive information.

D. **<u>Non-Public Information</u>.** Consultant's duties under this Agreement may involve access to material information that is not publicly available about Northrop Grumman Corporation. Consultant acknowledges that the securities laws of the United States impose certain restrictions upon the use of material non-public information and he agrees to abide by such laws and regulations with respect to his and his family's transactions in Northrop Grumman stock and also with respect to his communication of such material, non-public information to others.

VII. PRESERVATION OF TRADE NAMES, TRADEMARKS AND PATENT RIGHTS

All trade names, trademarks and patent rights of NGSC and NGC pertaining to products of NGSC and/or its affiliates, including the names "Northrop," "Grumman" and "Northrop Grumman Corporation" shall remain the sole property of NGC, and Consultant agrees to do all things necessary to protect and preserve such trade names, trademarks and patent rights from claims by other persons or entities.

VIII. COOPERATION WITH NGSC

During and after the expiration of this Agreement, Consultant shall fully cooperate with the Company in regard to any matter, dispute or controversy in which the Company or an affiliate is involved, or may become involved and of which Consultant may have knowledge. To the extent such cooperation requires significant time and expenses, the Company shall provide for reasonable compensation and reimbursement.

IX. INDEPENDENT CONTRACTOR

Consultant shall render all services hereunder during the Consulting Period as an independent contractor and shall not hold himself out as an agent of the Company. Nothing herein shall be construed to create or confer upon Consultant the right during the Consulting Period to make contracts or commitments for or on behalf of the Company.

X. TAXES

Consultant shall provide all services contemplated by this Agreement as a non-employee of the Company and the Company shall withhold (or not withhold, as applicable) income and employment taxes on such basis. Consultant shall pay all taxes which are imposed on him with respect to the compensation paid hereunder (including, without limitation, all taxes that may be due if the classification contemplated by the preceding paragraph is erroneous or if the Company is required to revise such classification).

XI. OBSERVANCE OF APPLICABLE LAWS AND REGULATIONS

A. United States Laws. Consultant shall comply with and act in accordance with all things necessary for NGSC to comply with all applicable United States laws and regulations of the United States Government, including but not limited to the requirements of the Foreign Corrupt Practices Act, 15 U.S.C. Section 78 dd-1 et seq., the Federal Acquisition Regulation, 48 CFR section 1.101 et seq.("FAR"), the International Traffic in Arms Regulations, 22 CFR Parts 120 through 130 and applicable regulations; the Byrd Amendment (31 U.S.C. Section 1352) and applicable regulations; the Office of Federal Procurement Policy Act (41 U.S.C. Section 423) and applicable regulations; and the DoD Joint Ethics Regulation (DoD 5500.7-R). No part of any compensation or fee paid by NGSC will be used directly or indirectly to make any kickbacks to any person or entity, or to make payments, gratuities, emoluments or to confer any other benefit to an official of any government or any political party. Consultant shall not seek, nor relay to NGSC or its affiliates, any classified, proprietary or source selection information not generally available to the public. Consultant shall also comply with and act in accordance with all things necessary for NGSC and its affiliates to comply with provisions of contracts between agencies of the United States Government or their contractors and NGSC and its affiliates that relate either to patent rights or the safeguarding of information pertaining to the security of the United States. This Agreement or sections thereof may be disclosed to the United States Government as reasonably required by law.

B. No Selling Agency Employed. Consultant further represents and warrants that no person or selling agency has been or will be employed or retained to solicit or secure any contract, including, but not limited to a United States Government contract, upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Consultant for the purpose of receiving business. In the event of a breach or violation of this warranty, NGSC shall have the right to annul this Agreement without liability or in its discretion to deduct from the fee or consideration, or otherwise recover the full amount of such commission, percentage, brokerage or contingent fee.

C. State and Local Laws And Regulations. Consultant shall comply with and act in accordance with all things necessary for Consultant and NGSC each to comply with all laws and regulations of the Commonwealth of Virginia and any other state or locality in which services hereunder are or may be rendered.

D. Foreign Laws and Regulations. Consultant shall comply with and act in accordance with all things necessary for Consultant and NGSC and its affiliates each to comply with all applicable laws and regulations outside the United States.

E. <u>Maintenance Of Time And Expense Records</u>. Consultant shall maintain appropriate time and expense records pertaining to the services performed under this Agreement. Said records shall be subject to examination and audit by NGSC and the United States Government until notified by NGSC in writing that the records no longer need to be maintained.

F. <u>Certification</u>. This Agreement is made in material reliance upon the representations and warranties made by Consultant. The effectiveness of this Agreement is contingent upon and will not commence until receipt by NGSC of the certifications set forth in Attachments A and D hereto. In the event that NGSC has reason to believe that these certifications are incorrect, NGSC may treat this Agreement as being null and void or may terminate this Agreement pursuant to Section XVI.

G. <u>Standards of Business Conduct.</u> Consultant hereby acknowledges that he has received a copy of the Northrop Grumman Standards of Business Conduct and Northrop Grumman policies and agrees to conduct his activities for or on behalf of NGSC or its affiliates in full accordance therewith as a condition of this Agreement.

XII. <u>ASSIGNMENT OF RIGHTS</u>

This Agreement and the rights, benefits, duties and obligations contained herein may not be assigned or otherwise transferred in any manner to third parties without the express written approval of NGSC. Any such assignment or transfer without prior approval of NGSC will be null, void and without effect.

XIII. <u>MODIFICATION</u>

No waiver or modification of this Agreement or of any covenant, condition, or limitation herein shall be valid and enforceable unless such waiver or modification is in writing and agreed by both parties.

XIV. <u>USE OR EMPLOYMENT OF THIRD PARTIES</u>

Consultant shall not utilize or employ any third party, individual or entity, in connection with Consultant's performance of services under this Agreement without the express written approval of NGSC.

XV. <u>CONFLICTS OF INTEREST</u>

No business or legal conflicts of interest shall exist between services performed or to be performed by Consultant on behalf of NGSC and by Consultant on behalf of any other entity. The identity of Consultant's directorships, other employment and clients shall be fully disclosed in Attachment C and promptly updated.

XVI. EXCLUSIVITY OF CONSULTING ARRANGEMENT

During the term of this Agreement, Consultant shall not directly or indirectly engage in any activities designed to deprive or which may have the effect of depriving NGSC or its affiliates of the good will of customers or potential customers of its products and services. Further, Consultant shall not, during the term of this Agreement, and for a period of twelve (12) months after expiration or termination of this Agreement, represent, act as representative for, or market or sell, directly or indirectly, products competing with NGSC's or its affiliates' products and services.

XVII. TERMINATION

A. Termination upon Notice. Either party may terminate this Agreement upon 10 days written notice to the other party.

B. Violation of Term or Condition. In the event of a violation or what the Company reasonably believes to be an imminent violation by Consultant of any term or condition, express or implied, of this Agreement or of any federal or state law or regulation pertaining to or arising from Consultant's performance of services under this Agreement, NGSC may, in its discretion, terminate this Agreement immediately, without notice and in such event. Consultant shall only be entitled to compensation up to the time of such violation.

C. Bankruptcy; Death. In the event Consultant dies or is adjudicated a bankrupt or petitions for relief under bankruptcy, reorganization, receivership, liquidation, compromise or other arrangement or attempts to make an assignment for the benefit of creditors, this Agreement shall be deemed terminated automatically, without requirement of notice, without further liability or obligation to the Company.

XVIII. SEVERABILITY OF PROVISIONS

All provisions contained herein are severable and in the event any of them are held to be invalid by any competent court, this Agreement shall be interpreted as if such invalid provision was not contained herein.

XIX. AVAILABILITY OF EQUITABLE REMEDIES

Consultant understands and agrees that any breach or evasion of any of the terms of this Agreement will result in immediate and irreparable injury to NGSC and will entitle NGSC to all legal and equitable remedies including, without limitation, injunction or specific performance.

XX. GOVERNING LAW

This Agreement and the performance hereunder shall be governed by and construed in accordance with the laws of the Commonwealth of Virginia (excluding any conflicts of laws provisions) which shall be the exclusive applicable law.

XXI. SETTLEMENT OF DISPUTES

A. NGSC and Consultant hereby consent to the resolution by arbitration of all disputes, issues, claims or controversies arising out of or in connection with this Agreement, that NGSC may have against Consultant, or that Consultant may have against NGSC, or against its officers, directors, employees or agents acting in their capacity as such; provided however, that in order to comply with the requirements of section 8116 of P.L.111-118 (the "Franken Amendment") and its implementing regulations, Consultant is not required to arbitrate any claim under Title VII of the Civil Rights Act of 1964 or any tort related to or arising out of sexual assault or harassment, including assault and battery, intentional infliction of emotional distress, false imprisonment, or negligent hiring, supervision, or retention, regardless of when that claim arises or has arisen. Consultant may, but is not required to, request arbitration of such claims. Each party's promise to resolve all such claims, issues, or disputes by arbitration, except as noted above, in accordance with this Agreement rather than through the courts, is consideration for the other party's like promise. It is further agreed that the decision of an arbitrator on any issue, dispute, claim or controversy submitted for arbitration, shall be final and binding upon the NGSC and Consultant and that judgment may be entered on the award of the arbitrator in any court having proper jurisdiction.

B. Except as otherwise provided herein or by mutual agreement of the parties, any arbitration shall be administered in accordance with the then-current Model Arbitration Procedures of the American Arbitration Association (AAA) before an arbitrator who is licensed to practice law in the state in which the arbitration is convened. The arbitration shall be held in Fairfax County. VA or at any other location mutually agreed upon by the parties.

C. The parties shall act reasonably and in good faith to agree upon the arbitrator.

D. In reaching his or her decision, the arbitrator shall have no authority to change or modify any lawful NGSC or NGC policy, rule or regulation or this Agreement.

XXII. NOTICE

Any notice to be given hereunder shall be in writing, mailed by certified or registered mail with return receipt requested addressed to NGSC:

Northrop Grumman Systems Corporation
2980 Fairview Park Drive
Falls Church. VA 22042
Attn.: General Counsel

or to Consultant:

Wesley G. Bush
903 Turkey Run Road
McLean VA 22101

or to such other address as may have been furnished prior to the date of mailing either by NGSC or Consultant in writing.

XXIII. COMPLETE AGREEMENT

This Agreement constitutes the entire agreement of the parties with respect to the engagement of Consultant by NGSC. The parties stipulate and agree that neither of them has made any representation with respect to this Agreement except that such representations are specifically set forth herein. The parties acknowledge that any other payments or representations that may have been made are of no effect and that neither party has relied on such payments or representations in connection with this Agreement nor the performance of services contemplated herein.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be entered into and executed as set forth below.

NORTHROP GRUMMAN SYSTEMS CORPORATION

____

CONSULTANT

____

Wesley G. Bush

ATTACHMENT A <u>CERTIFICATION</u>
Wesley G. Bush

The undersigned. Wesley G. Bush ("Consultant"), hereby certifies, represents and warrants the following:

1. In past dealings with Northrop Grumman Corporation ('"NGSC") or other clients, Consultant has complied with all applicable laws, rules and regulations.

2. In performing the services under this Agreement, Consultant will comply with all applicable laws, rules and regulations.

3. There have been no kickbacks or other payments made, either directly or indirectly to or by Mr. Bush or to or by any member of his family.

4. No kickbacks or other payments will be made either directly or indirectly to or by Mr. Bush or to or by any member of his family.

5. Consultant has not used and will not use any part of the compensation paid by NGSC to make payments, gratuities, emoluments or to confer any other benefit to an official of any government, or any political party, or official of any political party on behalf of NGSC or an affiliate. This does not include personal political contributions permitted by law.

6. No person or selling agency has been or will be employed or retained to solicit or secure any contract, including but not limited to, a United States government contract, upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial selling agencies maintained by the Consultant for the purpose of receiving business.

7. No classified, proprietary, source selection or procurement sensitive information has been or will be improperly solicited on behalf of or conveyed to NGSC or its affiliates.

8. Consultant has not improperly influenced or attempted to influence and will not influence or attempt to influence any United States government official or employee in connection with the award, extension, continuation, renewal, amendment or modification of a federal contract or otherwise engage in "non-exempt services" within the meaning of the Byrd Amendment, 31 U.S.C. Section 1352.

9. Consultant has not utilized or employed and will not utilize or employ any third party, individual or entity, in connection with the performance of services on behalf of NGSC, except for administrative support (as subsequently identified) and as follows: None

10. No business or legal conflicts of interest exist between services performed or to be performed by Consultant on behalf of NGSC and by Consultant on behalf of any other client, the identities of which Consultant has fully disclosed to NGSC.

I declare under penalty of perjury that the foregoing certificate is true and correct.

____

Wesley G. Bush

ATTACHMENT B

INVOICES

Each month Consultant shall submit an invoice clearly identifying the Agreement, specifying the time period covered, any days worked in excess of three (3) days in that month, and the fees and expenses claimed for that time period for which Consultant desires to be paid and enclosing the original receipts for all claimed expenses. NGSC shall pay Consultant's invoice within 45 days of receipt provided the invoice meets all of the requirements of this Attachment B. Each invoice must include the following certification:

> "The undersigned certifies that the payment requested herein is correct and just, and that payment has not been received. The undersigned certifies that this invoice does not include any charges for services not authorized by the Agreement and, specifically, that no services have been performed involving the influence or attempt to influence any Federal agency officer or employee, any Member of Congress, officer or employee of Congress, or employee of a Member of Congress, in connection with any Federal action as defined in the Byrd Amendment (including the awarding, extension. continuation. renewal. amendment, or modification of any Federal contract)."

Unless your services are fully described and accurately recorded in this fashion, your fees will not be paid by NGSC. You are not authorized to engage in any activity covered by the Byrd Amendment (31 U.S.C. Section 1352), but if you do so you must clearly identify it in your invoice. Any and all liability arising from an erroneous representation shall be borne solely by you.

ATTACHMENT C

DIRECTORSHIPS AND EMPLOYMENT

Name of Company	**Responsibilities/Duties**
Dow	Director
General Motors	Director
Cisco	Director
Conservation International	Director
Inova Health Systems	Trustee
MIT Corporation	Term Member
Darden Foundation	Trustee
Capital CoLab	Board Member
Golden Paws Foundation	Director

ATTACHMENT D

CONSULTANT CERTIFICATE REGARDING NORTHROP GRUMMAN CORPORATION STANDARDS OF BUSINESS CONDUCT

Wesley G. Bush

I, Wesley G. Bush. do hereby certify that I am familiar with and will act in full accordance with Northrop Grumman Corporation's "Standards of Business Conduct" and all applicable corporate policies.

____
Wesley G. Bush

EXHIBIT 15

LETTER FROM INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

Northrop Grumman Corporation
2980 Fairview Park Drive
Falls Church, Virginia 22042

We have reviewed, in accordance with the standards of the Public Company Accounting Oversight Board (United States), the unaudited interim financial information of Northrop Grumman Corporation and subsidiaries for the periods ended September 30, 2019, and 2018, as indicated in our report dated October 23, 2019; because we did not perform an audit, we expressed no opinion on that information.

We are aware that our report referred to above, which is included in your Quarterly Report on Form 10-Q for the quarter ended September 30, 2019, is incorporated by reference in Registration Statement Nos. 033-59815, 033-59853, 333-67266, 333-100179, 333-107734, 333-121104, 333-125120, 333-127317, and 333-175798 on Form S-8; and Registration Statement No. 333-217087 on Form S-3.

We also are aware that the aforementioned report, pursuant to Rule 436(c) under the Securities Act of 1933, is not considered a part of the Registration Statement prepared or certified by an accountant or a report prepared or certified by an accountant within the meaning of Sections 7 and 11 of that Act.

/s/ Deloitte & Touche LLP
McLean, Virginia
October 23, 2019

NORTHROP GRUMMAN CORPORATION

EXHIBIT 31.1

CERTIFICATION PURSUANT TO
SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Kathy J. Warden, certify that:

1. I have reviewed this report on Form 10-Q of Northrop Grumman Corporation (“company”);
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the company as of, and for, the periods presented in this report;
4. The company's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the company and have:
    a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the company, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
    b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
    c) Evaluated the effectiveness of the company's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
    d) Disclosed in this report any change in the company's internal control over financial reporting that occurred during the company's most recent fiscal quarter (the company's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the company's internal control over financial reporting; and
5. The company's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the company's auditors and the audit committee of the company's board of directors (or persons performing the equivalent functions):
    a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the company's ability to record, process, summarize and report financial information; and
    b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the company's internal control over financial reporting.

Date: October 23, 2019

/s/ Kathy J. Warden

Kathy J. Warden
Chairman, Chief Executive Officer and President

NORTHROP GRUMMAN CORPORATION

EXHIBIT 31.2

CERTIFICATION PURSUANT TO
SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Kenneth L. Bedingfield, certify that:

1. I have reviewed this report on Form 10-Q of Northrop Grumman Corporation (“company”);
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the company as of, and for, the periods presented in this report;
4. The company's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the company and have:
   a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the company, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
   b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
   c) Evaluated the effectiveness of the company's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
   d) Disclosed in this report any change in the company's internal control over financial reporting that occurred during the company's most recent fiscal quarter (the company's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the company's internal control over financial reporting; and
5. The company's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the company's auditors and the audit committee of the company's board of directors (or persons performing the equivalent functions):
   a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the company's ability to record, process, summarize and report financial information; and
   b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the company's internal control over financial reporting.

Date: October 23, 2019

/s/ Kenneth L. Bedingfield

Kenneth L. Bedingfield
Corporate Vice President and Chief Financial Officer

NORTHROP GRUMMAN CORPORATION

EXHIBIT 32.1

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

In connection with the Quarterly Report of Northrop Grumman Corporation (the “company”) on Form 10-Q for the period ended September 30, 2019, as filed with the Securities and Exchange Commission on the date hereof (the “Report”), I, Kathy J. Warden, Chairman, Chief Executive Officer and President of the company, certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that:

(1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the company.

Date: October 23, 2019

/s/ Kathy J. Warden

Kathy J. Warden

Chairman, Chief Executive Officer and President

NORTHROP GRUMMAN CORPORATION

EXHIBIT 32.2

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

In connection with the Quarterly Report of Northrop Grumman Corporation (the “company”) on Form 10-Q for the period ended September 30, 2019, as filed with the Securities and Exchange Commission on the date hereof (the “Report”), I, Kenneth L. Bedingfield, Corporate Vice President and Chief Financial Officer of the company, certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that:

(1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the company.

Date: October 23, 2019

/s/ Kenneth L. Bedingfield

Kenneth L. Bedingfield
Corporate Vice President and Chief Financial Officer