NORTHROP GRUMMAN CORP /DE/
Form 10-K
January 30, 2017
UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

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x ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2016
or
o TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the transition period from to Commission file number 1-16411
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 Number)
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	Name of each exchange on which registered
Common Stock, $1 par value	New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act:
None
Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.
Yes x No o

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act.
Yes o No x
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 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 x No o
Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files).
Yes x No o
Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant’s knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. x
Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of “large accelerated filer,” “accelerated filer” and “smaller reporting company” in Rule 12b-2 of the Exchange Act.
Large accelerated filer x Accelerated filer o Non-accelerated filer o Smaller reporting company o

(Do not check if a smaller reporting company)

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

As of June 30, 2016, the aggregate market value of the common stock (based upon the closing price of the stock on the New York Stock Exchange) of the registrant held by non-affiliates was approximately $39.5 billion.

As of January 26, 2017, 174,599,406 shares of common stock were outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of Northrop Grumman Corporation’s Proxy Statement to be filed with the Securities and Exchange Commission pursuant to Regulation 14A for the 2017 Annual Meeting of Stockholders are incorporated by reference in Part III of this Form 10-K.

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PART I
Item 1. Business
HISTORY AND ORGANIZATION
History
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 products, systems and solutions for applications that range from undersea to outer space and into cyberspace. We provide products, systems and solutions in autonomous systems; cyber; command, control, communications and computers, intelligence, surveillance, and reconnaissance (C4ISR); 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. For a discussion of risks associated with our operations, see “Risk Factors.”
The company originally was formed in Hawthorne, California in 1939, as Northrop Aircraft Incorporated and was reincorporated in Delaware in 1985, as Northrop Corporation. Northrop Aircraft Incorporated was a principal developer of flying wing technology, including the B-2 Spirit bomber. The company developed into one of the largest defense contractors in the world through a series of acquisitions, as well as organic growth. In 1994, we acquired Grumman Corporation (Grumman), after which time the company was renamed Northrop Grumman Corporation. Grumman was a premier military aircraft systems integrator and builder of the Lunar Module that first delivered humans to the surface of the moon. In 1996, we acquired the defense and electronics businesses of Westinghouse Electric Corporation, a world leader in the development and production of sophisticated radar and other electronic systems for the nation’s defense, civil aviation, and other U.S. and international applications. In 2001, we acquired Litton Industries, a global electronics and information technology company, and one of the nation's leading full service shipbuilders. Also in 2001, we acquired Newport News Shipbuilding, a leading designer and builder of nuclear-powered aircraft carriers and submarines. In 2002, we acquired TRW Inc., a leading developer of military and civil space systems and payloads, as well as a leading global integrator of complex, mission-enabling systems and services. In 2011, we completed the spin-off to our shareholders of Huntington Ingalls Industries, Inc. (HII). HII operates our former Shipbuilding business, comprised largely of a part of Litton Industries and Newport News Shipbuilding.
Organization
From time to time, we acquire or dispose of businesses and realign contracts, programs or businesses among and within our operating segments. Internal realignments are typically designed to leverage existing capabilities more fully and to enhance development and delivery of products and services. The operating results for all periods presented have been revised to reflect any such changes made through December 31, 2016. We are currently aligned in three operating sectors, which also comprise our reportable segments: Aerospace Systems, Mission Systems and Technology Services. See Note 3 to our consolidated financial statements for further information.
AEROSPACE SYSTEMS
Aerospace Systems, headquartered in Redondo Beach, California, is a leader in the design, development, integration and production of manned aircraft, autonomous systems, spacecraft, high-energy laser systems, microelectronics and other systems/subsystems. Aerospace Systems' customers, primarily the DoD and other U.S. Government agencies, use these systems in mission areas including intelligence, surveillance and reconnaissance (ISR), strike operations, communications, earth observation, space science and space exploration. The sector is reported in three business areas, which reflect our core capabilities: Autonomous Systems, Manned Aircraft and Space.
Autonomous Systems - designs, develops, manufactures, and integrates ISR autonomous systems for tactical and strategic missions. Key ISR programs include the Global Hawk system, a proven high-altitude long-endurance system providing near real-time high resolution imagery of large geographical areas; the Triton system providing real-time ISR over vast ocean and coastal regions; the North Atlantic Treaty Organization (NATO) Alliance Ground

Surveillance (AGS) system for multinational theater operations; the Fire Scout system providing situational awareness and precision targeting support; and the Navy Unmanned Combat Air System demonstrating an unmanned combat air vehicle for carrier-based operations.

Manned Aircraft - designs, develops, manufactures, and integrates airborne C4ISR, long-range strike aircraft systems, tactical aircraft systems and directed energy systems. Key airborne C4ISR programs include the E-2D Advanced Hawkeye and Joint Surveillance Target Attack Radar System (JSTARS). Key long-range strike aircraft programs include the B-21 Raider long-range strike bomber and modernization and sustainment services for the B-2 Spirit bomber. Tactical aircraft includes the design, development, manufacture and integration of F-35 Lightning II center fuselage and F/A-18 Super Hornet aft fuselage sections. Directed energy involves the design, development, and integration of laser weapon systems for air, ground, and sea platforms, and production of the Airborne Laser Mine Detection System for the U.S. Navy and international rotary wing customers.

Space - designs, develops, manufactures, and integrates spacecraft systems, subsystems, sensors and communications payloads in support of space C4ISR and science. Key programs include the James Webb Space Telescope, a large infrared telescope being built for the National Aeronautics and Space Administration that will be deployed in space to study the origins of the universe; Advanced Extremely High Frequency payloads providing survivable, protected communications to U.S. forces; Space-Based Infrared System payloads providing data for missile surveillance, missile defense, technical intelligence and battlespace characterization; and restricted programs.

MISSION SYSTEMS

Mission Systems, headquartered in Linthicum, Maryland, is a leader in advanced end-to-end mission solutions and multifunction systems for DoD, intelligence community, international, federal civil and commercial customers. Major products and services include C4ISR systems; radar, electro-optical/infrared (EO/IR) and acoustic sensors; electronic warfare systems; cyber solutions; space systems; intelligence processing systems; air and missile defense (AMD) integration; navigation; and shipboard missile and encapsulated payload launch systems. The sector is reported in three business areas, which reflect our core capabilities: Sensors and Processing, Cyber and ISR, and Advanced Capabilities.

Sensors and Processing - delivers products, systems and services that support ground-based and airborne fixed and rotary wing platforms with radar, electronic warfare, communications, command and control (C2), Signals Intelligence (SIGINT), and situational awareness mission systems. Competencies include targeting, surveillance, air defense, and early warning & control radar systems; EO/IR and radio frequency (RF) self-protection, targeting and surveillance systems; electronic attack and electronic support systems; net-enabled battle management; communications and intelligence systems; digitized cockpits; and multi-sensor processing. Key programs include the Airborne Early Warning & Control (AEW&C) and air-to-ground sensors; Battlefield Airborne Communications Node (BACN); F-35 fire control radar, Distributed Aperture System (DAS), and the Communications, Navigation and Identification (CNI) integrated avionics system; Ground/Air Task Oriented Radar (G/ATOR); Large Aircraft Infrared Countermeasures (LAIRCM); Common Infrared Countermeasures (CIRCM); Scalable Agile Beam Radar (SABR); and the UH-60V Black Hawk integrated mission equipment package.

Cyber and ISR - delivers products, systems and services that support full-spectrum cyber solutions, space-based payload and exploitation systems, space-based C2 and processing systems, and enterprise integration of multi-intelligence mission data across all domains. Competencies include cyber mission management; large-scale cyber solutions for national security applications; missile warning and defense systems; weather and satellite communications; ground software systems; and geospatial intelligence and data fusion, specializing in the collection, processing, and exploitation of data. Key programs include exploitation and cyber programs; operational services to the United States Computer Emergency Readiness Team (US-CERT); worldwide IT coverage and support services through the Solutions for the Information Technology Enterprise (SITE); the Enterprise Application Development Integration and Sustainment (EADIS) program; and restricted programs.

Advanced Capabilities - provides integration and interoperability of net-enabled battle management, sensors, targeting and surveillance systems; air and missile defense C2; and global battlespace awareness. It also delivers products, systems and services that support maritime platforms and embedded Global Positioning Systems (GPS) for a range of platforms including ships, aircraft, spacecraft and weapons. Competencies include advanced AMD integration with land, air and space assets; shipboard missile and encapsulated payload launch systems; unmanned maritime vehicles and high-resolution undersea sensors; and inertial navigation systems. Key programs include the Integrated Air and Missile Defense Battle Command System (IBCS); the Missile Defense Agency Joint National Integration Center Research and Development Contract (JRDC); Ground-based Midcourse Defense (GMD) system; Surface Electronic

Warfare Improvement Program (SEWIP) Block III; and Trident and Virginia-Class payload launch systems.

TECHNOLOGY SERVICES

Technology Services, headquartered in Herndon, Virginia, is a leading provider of logistics solutions supporting the full life cycle of platforms and systems for global defense and federal-civil customers. We deliver innovative, technology-driven solutions and services to enable cost-effective improvements for customer mission effectiveness. We provide a full spectrum of offerings including software and system sustainment, modernization of platforms and associated subsystems, advanced training solutions, and integrated logistics support. The sector is reported in three business areas, which reflect our core capabilities: Global Logistics and Modernization; Advanced Defense Services; and System Modernization and Services.

Global Logistics and Modernization - provides global logistics support, sustainment, operations and modernization for more than 60 air, sea and ground systems and weapon system components. Competencies include aircraft, electronics and software sustainment and engineering; electronic warfare/attack and avionics/electronics subsystems modernization; supply chain management; deployed logistics support for manned and unmanned weapon systems; field services, on-going maintenance and technical assistance; and delivering rapid response in support of global customers. Portfolio capabilities are exhibited through: integration, delivery and global support of unmanned special mission aircraft solutions for platforms such as the MQ-5B Hunter, Global Hawk and Triton; subsystem and component-level depot repair for products such as AAQ-24, APN-241, and ALQ-135; missile sustainment and modernization solutions for products including the Intercontinental Ballistic Missile Minuteman III; and weapon systems sustainment, refurbishment, overhaul, modernization and contractor logistics support for several unique low-density/high-demand platforms, including the B-2 Spirit bomber, KC-10, JSTARS, KC-30A and UK Airborne Warning and Control System.

Advanced Defense Services - provides advanced defense and security services, including cyber; network operations and security; system and software modernization; land forces sustainment; and training to strengthen the national security of the U.S. and its allies. Key programs include the Marine Corps Network Operations and Security Center, which provides network defense services for the U.S. Marine Corps including analysis of network traffic, identification of malicious and unauthorized activity, and response to intrusion incidents; Ministry of the National Guard Training Support, through our interest in a joint venture for which we consolidate the financial results, which provides equipment fielding, training and maintenance, simulator training and operations, tactical exercise development, logistics and operations support and English language training to the Ministry of the National Guard in Saudi Arabia; the Enterprise Military Housing program, the software application used for the management of government housing; and the Mission Command Training Program, the Army's leadership and staff training exercise program at the tactical and operational level.

System Modernization and Services - provides full life cycle information systems modernization and sustainment, primarily in support of civil government agencies. Key capabilities reside in areas of analytics, mission information processing, cyber and secure networking, and software development. In support of the modernization of civil agency mission critical and mission enabling information systems, extensive system and software development capabilities allow this unit to offer fraud detection and compliance services, data analysis and decision support tools, and software system sustainment services. This business provides services to U.S. Government healthcare agencies, including benefits systems administration, fraud prevention and payment modernization. To strengthen national security and federal law enforcement, we provide information sharing and analysis solutions as well as engineer sophisticated enterprise-wide solutions to design, build and manage resilient and secure IT infrastructures. Our capabilities provide proactive network monitoring and desktop optimization to control and reduce overall operating costs.

SELECTED FINANCIAL DATA AND SEGMENT OPERATING RESULTS

For a more complete understanding of our business, see “Selected Financial Data.” For a more complete understanding of our segment financial information, see “Segment Operating Results” in Management's Discussion and Analysis of Financial Condition and Results of Operations (MD&A) and Note 3 to the consolidated financial statements.

CUSTOMER CONCENTRATION

Our largest customer is the U.S. Government. Sales to the U.S. Government accounted for 84 percent, 83 percent and 84 percent of sales during the years ended December 31, 2016, 2015 and 2014, respectively. For further information on sales by customer category, see Note 1 to the consolidated financial statements. No single program accounted for more than ten percent of total sales during any period presented. See “Risk Factors” for further discussion regarding risks related to customer concentration.

COMPETITIVE CONDITIONS

We compete with many companies in the defense, intelligence and federal markets. BAE Systems, Boeing, Booz Allen Hamilton, General Dynamics, Harris, L3 Technologies, Leidos, Leonardo, Lockheed Martin, Raytheon and

Thales are some of our primary competitors. Key characteristics of our industry include long operating cycles and intense competition, which is evident through the number of bid protests (competitor protests of U.S. Government procurement awards) and the number of competitors bidding on program opportunities.

It is common in the defense industry for work on major programs to be shared among a number of companies. A company competing to be a prime contractor may, upon ultimate award of the contract to another competitor, become a subcontractor to the ultimate prime contracting company. It is not unusual to compete for a contract award with a peer company and, simultaneously, perform as a supplier to or a customer of that same competitor on other contracts, or vice versa.

SEASONALITY

No material portion of our business is considered to be seasonal.

BACKLOG

At December 31, 2016, total backlog was $45.3 billion, compared with $35.9 billion at the end of 2015. For further information, see “Backlog” in MD&A.

RESEARCH AND DEVELOPMENT

See Note 1 to the consolidated financial statements.

INTELLECTUAL PROPERTY

We routinely apply for and own a number of U.S. and foreign patents related to the products and services we provide. We also develop and protect intellectual property as trade secrets. In addition to owning a large portfolio of proprietary intellectual property, we license some intellectual property rights to third parties and we license or otherwise obtain access to intellectual property from third parties. The U.S. Government typically holds licenses to patents developed in the performance of U.S. Government contracts and may use or authorize others to use the inventions covered by these patents for certain purposes. See “Risk Factors” for further discussion regarding risks related to intellectual property.

RAW MATERIALS

We have not experienced significant delays in the supply or availability of raw materials, nor have we experienced a significant price increase for raw materials. See “Risk Factors” for further discussion regarding risks related to raw materials.

EMPLOYEE RELATIONS

We believe that we maintain good relations with our approximately 67,000 employees. Approximately 2,500 are covered by 11 collective agreements in the U.S., of which we negotiated four renewals in 2016 and expect to negotiate one renewal in 2017. See “Risk Factors” for further discussion regarding risks related to employee relations.

REGULATORY MATTERS

Government Contract Security Restrictions

Certain classified programs with the U.S. Government are prohibited by the customer from being publicly discussed and are therefore generally referred to as “restricted” in this Annual Report on Form 10-K. The consolidated financial statements and financial information in this Annual Report on Form 10-K reflect the operating results of our entire company, including restricted programs.

Contracts

We generate the majority of our business from long-term contracts with the U.S. Government for development, production and support activities. Unless otherwise specified in a contract, allowable and allocable costs are billed to contracts with the U.S. Government pursuant to the Federal Acquisition Regulation (FAR) and U.S. Government Cost Accounting Standards (CAS). Examples of costs incurred by us and not billed to the U.S. Government in accordance with the FAR and CAS include, but are not limited to, certain legal costs, charitable donations, advertising costs, interest expense and unallowable employee compensation and benefits costs.

We monitor our contracts on a regular basis for compliance with our policies and procedures and applicable government regulations and laws to enhance compliance and consistent application for contracts with similar terms and conditions. In addition, costs incurred and allocated to contracts with the U.S. Government are routinely audited by the Defense Contract Audit Agency (DCAA).

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Our long-term contracts typically fall into one of two broad categories:
Cost-type contracts – Cost-type contracts include cost plus fixed fee, cost plus award fee and cost plus incentive fee contracts. Cost-type contracts provide generally for reimbursement of a contractor's allowable costs incurred plus fee. As a result, cost-type contracts have less financial risk associated with unanticipated cost growth but generally lower profit margins than fixed-price contracts. Cost-type contracts typically require that the contractor use its best efforts to accomplish the scope of the work within some specified time and stated dollar limitation. Fees on cost-type contracts can be fixed in terms of dollar value or percentage of costs. Award and incentive fees are generally based on performance criteria such as cost, schedule, quality and/or technical performance. Award fees are determined and earned based on customer evaluation of the company's performance against contractual criteria, and are intended to provide motivation for excellence in contract performance. Incentive fees are generally based on cost and provide for an initially negotiated fee to be adjusted later, typically using a formula to measure performance against the associated criteria, based on the relationship of total allowable costs to total target costs. Award and incentive fees that can reasonably be estimated and are deemed reasonably assured are recorded over the performance period of the contract.
Fixed-price contracts – Firm fixed-price contracts include a specified scope of work for a price that is a pre-determined, negotiated amount and not generally subject to adjustment regardless of costs incurred by the contractor, absent changes in scope by the customer. As a result, fixed-price contracts have more financial risk associated with unanticipated cost growth, but generally provide the opportunity for higher profit margins than cost-type contracts. Certain fixed-price incentive fee contracts provide for reimbursement of the contractor's allowable costs plus a fee up to a cost ceiling amount, typically through a cost-sharing ratio that affects profitability. These types of fixed-price incentive fee contracts effectively become firm fixed-price contracts once the cost-share ceiling is reached. Time-and-materials contracts are considered fixed-price contracts as they specify a fixed hourly rate for each labor hour charged.
Profit margins on our contracts may vary materially depending on, among other things, the contract type, contract phase (e.g., development, low rate production or mature production), negotiated fee arrangements, achievement of performance objectives, and cost, schedule and technical performance.
See Note 1 to the consolidated financial statements and "Risk Factors."
The following table summarizes sales for the year ended December 31, 2016, recognized by contract type and customer category:

($ in millions)	U.S. Government[(1)]	International[(2)]	Other Customers[(3)]	Total	Percentage of Total Sales
Cost-type contracts	$ 12,665	$ 698	$ 106	$13,469	55 %
Fixed-price contracts	7,908	2,507	624	11,039	45 %
Total sales	$ 20,573	$ 3,205	$ 730	$24,508	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, direct sales with governments outside the U.S. and commercial sales outside the U.S.
(3) Sales to Other Customers include sales to U.S. state and local governments and commercial sales in the U.S.

Environmental

Our operations are subject to and affected by federal, state, local and foreign laws and regulations relating to protection of the environment. In 2010, we established goals for the reduction of greenhouse gas emissions and implementation of best management practices for water use and solid waste; those goals were achieved as of December 31, 2014. In 2015, we announced our 2020 environmental sustainability goals: to reduce absolute greenhouse gas emissions by 30 percent from 2010 levels; to reduce potable water use by 20 percent from 2014 levels; and to achieve a 70 percent solid waste diversion rate (from landfills).

We have incurred and expect to continue to incur capital and operating costs to comply with applicable environmental laws and regulations and to achieve our environmental sustainability commitments. See “Risk Factors” and Notes 1 and 11 to the consolidated financial statements.

EXECUTIVE OFFICERS

See "Directors, Executive Officers and Corporate Governance" for information about our executive officers.

AVAILABLE INFORMATION

Our principal executive offices are located at 2980 Fairview Park Drive, Falls Church, Virginia 22042. Our telephone number is (703) 280-2900 and our home page is www.northropgrumman.com.

Our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and proxy statement for the annual shareholders’ meeting, as well as any amendments to those reports, are available free of charge through our website as soon as reasonably practicable after we file them with the SEC. You can learn more about us by reviewing our SEC filings on the investor relations page of our website.

The SEC also maintains a website at www.sec.gov that contains reports, proxy statements and other information about SEC registrants, including Northrop Grumman Corporation.

References to our website and the SEC’s website in this report are provided as a convenience and do not constitute, and should not be viewed as, incorporation by reference of the information contained on, or available through, such websites. Such information should not be considered a part of this report, unless otherwise expressly incorporated by reference in this report.

Item 1A. Risk Factors

Our consolidated financial position, results of operations and cash flows are subject to various risks, many of which are not exclusively within our control, that may cause actual performance to differ materially from historical or projected future performance. We encourage you to consider carefully the risk factors described below in evaluating the information contained in this report as the outcome of one or more of these risks could have a material adverse effect on our financial position, results of operations and/or cash flows.

We depend heavily on a single customer, the U.S. Government, for a substantial portion of our business. Changes in this customer’s priorities and spending could have a material adverse effect on our financial position, results of operations and/or cash flows.

Our primary customer is the U.S. Government, from which we derived 84 percent, 83 percent and 84 percent of our sales during the years ended December 31, 2016, 2015 and 2014, respectively; we have a number of large programs and opportunities with the U.S. Air Force, in particular. The U.S. Government has been implementing significant reductions in government spending and other significant program changes. We cannot predict the impact on existing, follow-on, replacement or future programs from potential changes in priorities due to changes in defense spending levels, the threat environment, military strategy and planning and/or changes in social, economic or political priorities.

The U.S. Government generally has the ability to terminate contracts, in whole or in part, for its convenience or for default based on performance. In the event of termination for the U.S. Government’s convenience, contractors are generally protected by provisions covering reimbursement for costs incurred on the contracts and profit on those costs up to the amount authorized under the contract, but not the anticipated profit that would have been earned had the contract been completed. Termination by the U.S. Government of a contract due to default could require us to pay for re-procurement costs in excess of the original contract price, net of the value of work accepted from the original contract, as well as other damages. Termination of a contract due to our default could have a material adverse effect on our reputation, our ability to compete for other contracts and our financial position, results of operations and/or cash flows.

The U.S. Government also has the ability to stop work under a contract for a limited period of time for its convenience. It is possible that the U.S. Government could invoke this ability across a limited or broad number of contracts. In the event of a stop work order, contractors are typically protected by provisions covering reimbursement for costs incurred on the contract to date and for costs associated with the temporary stoppage of work on the contract plus a reasonable fee. However, such temporary stoppages and delays could introduce inefficiencies and result in financial and other damages for which we may not be able to negotiate full recovery from the U.S. Government. They could also ultimately result in termination of a contract (or contracts) for convenience or reduced future orders.

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A significant shift in government priorities to programs in which we do not participate and/or reductions in funding for or the termination of programs in which we do participate, unless offset by other programs and opportunities, could have a material adverse effect on our financial position, results of operations and/or cash flows.

Significant delays or reductions in appropriations for our programs and U.S. Government funding more broadly may negatively impact our business and programs and could have a material adverse effect on our financial position, results of operations and/or cash flows.

U.S. Government programs are subject to annual congressional budget authorization and appropriation processes. For many programs, Congress appropriates funds on a fiscal year basis even though the program performance period may extend over several years. Consequently, programs are often partially funded initially and additional funds are committed only as Congress makes further appropriations. If we incur costs in excess of funds obligated on a contract, we may be at risk for reimbursement of those costs unless and until additional funds are obligated to the contract. We cannot predict the extent to which total funding and/or funding for individual programs will be included, increased or reduced as part of the annual budget process ultimately approved by Congress and the President or in separate supplemental appropriations or continuing resolutions, as applicable. Laws and plans adopted by the U.S. Government relating to, along with pressures on and uncertainty surrounding the federal budget, potential changes in priorities and defense spending levels, sequestration, the appropriations process, use of continuing resolutions (with restrictions, e.g., on new starts) and the permissible federal debt limit, could adversely affect the funding for individual programs and delay purchasing or payment decisions by our customers. In the event government funding for our significant programs becomes unavailable, or is reduced or delayed, or planned orders are reduced, our contract or subcontract under such programs may be terminated or adjusted by the U.S. Government or the prime contractor.

On November 2, 2015, the President signed the Bipartisan Budget Act of 2015 (the Budget Act). The Budget Act raised the statutory limit on the amount of permissible federal debt (the debt ceiling) until March 2017 and raised the sequester caps imposed by the Budget Control Act of 2011 (the Budget Control Act) by $80 billion, split equally between defense and non-defense discretionary spending in FY 2016 and FY 2017 ($50 billion in FY 2016 and $30 billion in FY 2017).

If the debt ceiling is breached, we may be required to continue to perform for some period of time on certain of our U.S. Government contracts even if the U.S. Government is unable to make timely payments. Unforeseen circumstances could cause an extended debt ceiling breach and have significant near and long-term consequences for our company, our employees, our suppliers and the defense industry.

On December 18, 2015, Congress passed and the President signed the Consolidated Appropriations Act of 2016, which provided funding for the U.S. Government for FY 2016, providing $1.1 trillion in discretionary funding for federal agencies through September 2016. The President signed a continuing resolution in September 2016, which was extended in December 2016, and provides funding for the U.S. Government at FY 2016 levels through April 28, 2017. The budget environment, including sequestration as currently mandated, and uncertainty surrounding the appropriations processes, remain significant long-term risks. Considerable uncertainty exists regarding how future budget and program decisions will unfold, including the defense spending priorities of the incoming Administration and Congress, what challenges budget reductions (required by the Budget Control Act and otherwise) will present for the defense industry and whether an annual appropriations bill will be enacted for FY 2017. If an annual appropriations bill is not enacted for FY 2017 or beyond, the U.S. Government may continue to operate under a continuing resolution, restricting new contract or program starts and we may face a government shutdown of unknown duration. Adverse consequences from operating under a continuing resolution may be greater as the company has a higher percentage of development programs. We believe continued budget pressures would have serious negative consequences for the security of our country, the defense industrial base, including Northrop Grumman, and the customers, employees, suppliers, investors, and communities that rely on companies in the defense industrial base. It is likely budget and program decisions made in this environment would have long-term implications for our company and the entire defense industry.

Long-term funding for certain programs in which we participate may be reduced, delayed or cancelled. In addition, budget cuts globally could adversely affect the viability of our subcontractors and suppliers, and our employee base. While we believe that our business is well-positioned in areas that the DoD and other customers have indicated are areas of focus for future defense spending, the long-term impact of the Budget Control Act, other defense spending cuts, the debt ceiling and the ongoing fiscal debates remain uncertain.

Significant delays or reductions in appropriations; long-term funding under a continuing resolution; an extended debt ceiling breach or government shutdown; and/or future budget and program decisions, among other items, may negatively impact our business and programs and could have a material adverse effect on our financial position, results of operations and/or cash flows.

We are subject to various investigations, claims, disputes and litigation that could ultimately be resolved against us.

The size, nature and complexity of our business make us susceptible to investigations, claims, disputes and litigation, particularly those involving governments. We are and may become subject to investigations, claims, disputes and administrative, civil or criminal litigation globally and across a broad array of matters, including, but not limited to, government contracts, false claims, products liability, fraud, environmental, shareholder derivative actions, intellectual property, tax, export/import, anti-corruption, labor, health and safety, employee benefits and plans, including plan administration, and improper payments. These matters could divert financial and management resources; result in fines, penalties, compensatory, treble or other damages or non-monetary relief; and otherwise disrupt our business. Government regulations also provide that certain allegations against a contractor may lead to suspension or debarment from government contracts or suspension of export privileges for the company or one or more of its components. Suspension or debarment could have a material adverse effect on the company because of our reliance on government contracts and export authorizations. An investigation, claim, dispute or litigation, even if not substantiated or fully indemnified or insured, could also negatively impact our reputation among our customers and the public, and make it more difficult for us to compete effectively or obtain adequate insurance in the future. Investigations, claims, disputes or litigation could have a material adverse effect on our financial position, results of operations and/or cash flows.

Our international business exposes us to additional risks.

Sales to customers outside the U.S. are an increasingly important component of our strategy. Our international business (including joint ventures) is subject to numerous political and economic factors, legal requirements, cross-cultural considerations and other risks associated with doing business globally. These risks differ in some respects from those associated with our U.S. business and our exposure to such risks may increase if our international business continues to grow as we anticipate.

Our international business is subject to both U.S. and foreign laws and regulations, including, without limitation, regulations relating to import-export controls, technology transfer restrictions, repatriation of earnings, data privacy and protection, investment, exchange rates and controls, the Foreign Corrupt Practices Act (FCPA) and other anti-corruption laws, the anti-boycott provisions of the U.S. Export Administration Act, labor and employment, works councils and other labor groups, taxes, environment, security restrictions and intellectual property. Failure by us, our employees, affiliates, partners or others with whom we work to comply with these laws and regulations could result in administrative, civil or criminal liabilities, including suspension or debarment from government contracts or suspension of our export privileges. Our customers outside of the U.S. generally have the ability to terminate contracts for default based on performance. Termination of a contract due to default could have a material adverse effect on our reputation, our ability to compete for other contracts and our financial position, results of operations and/or cash flows. We also are subject to various non-U.S. procurement and other laws applicable to our industry. New regulations and requirements, or changes to existing ones in the various countries in which we operate can significantly increase our costs and risks of doing business internationally.

Changes in regulations, political leadership and environment, or security risks may dramatically affect our ability to conduct or continue to conduct business in international markets. Our international business may also be impacted by changes in foreign national policies and priorities, which may be influenced by changes in the threat environment, geopolitical uncertainties, government budgets, and economic and political factors more generally, any of which could impact funding for programs or delay purchasing decisions or customer payments. We also could be affected by the legal, regulatory and economic impacts of Britain’s exit from the European Union, the impact of which is not known at this time. Global economic conditions and fluctuations in foreign currency exchange rates could further impact our business. For example, the tightening of credit in financial markets outside of the U.S. could adversely affect the ability of our customers and suppliers to obtain financing and could result in a decrease in or cancellation of orders for our products and services or impact the ability of our customers to make payments.

Our contracts with non-U.S. customers may also include terms and reflect legal requirements that create additional risks. They may include industrial cooperation agreements requiring specific in-country purchases, investments, manufacturing agreements or other financial obligations, known as offset obligations, and provide for significant penalties if we fail to meet such requirements. Our ability to sell products outside the U.S. could be adversely affected if we are unable to design our products for export on a cost effective basis or to obtain and retain all necessary export licenses and authorizations on a timely basis. We face risks related to our products that are approved for export, but may be subject to the U.S. Government changing or cancelling the export license after the product is ordered. Our ability to conduct business outside of the U.S. also depends on our ability to attract and retain sufficient qualified personnel with the skills and/or security clearances in the markets in which we do business.

The products and services we provide internationally, including those provided by subcontractors and joint ventures in which we have an interest, are sometimes in countries with unstable governments, economic or fiscal challenges, military or political conflicts and/or developing legal systems. This may increase the risk to our employees, subcontractors or other third parties, and/or increase the risk of a wide range of liabilities, as well as loss of property or damage to our products.

The occurrence and impact of these factors is difficult to predict, but one or more of them could have a material adverse effect on our financial position, results of operations and/or cash flows.

Our reputation, our ability to do business and our financial position, results of operations and/or cash flows may be impacted by the improper conduct of employees, agents, subcontractors, suppliers, business partners or joint ventures in which we participate.

We have implemented policies, procedures, training and other compliance controls, and have negotiated terms designed to prevent misconduct by employees, agents or others working on our behalf or with us that would violate the applicable laws of the jurisdictions in which we operate, including laws governing improper payments to government officials, the protection of export controlled or classified information, cost accounting and billing, competition and data privacy. However, we cannot ensure that we will prevent all such misconduct committed by our employees, agents, subcontractors, suppliers, business partners or others working on our behalf or with us, and this risk of improper conduct may increase as we expand globally. In the ordinary course of our business we form and are members of joint ventures. We may be unable to prevent misconduct or other violations of applicable laws by these joint ventures (including their officers, directors and employees) or our partners. Improper actions by those with whom or through whom we do business (including our employees, agents, subcontractors, suppliers, business partners and joint ventures) could subject us to administrative, civil or criminal investigations and monetary and non-monetary penalties, including suspension and debarment, which could negatively impact our reputation and ability to conduct business and could have a material adverse effect on our financial position, results of operations and/or cash flows.

We use estimates when accounting for contracts. Contract cost growth or changes in estimated contract revenues and costs could affect our profitability and our overall financial position.

Contract accounting requires judgment relative to assessing risks, estimating contract revenues and costs, and making assumptions regarding performance. Due to the size and nature of many of our contracts, the estimation of total revenues and costs at completion is complex and subject to many variables. Incentives, awards and/or penalties related to performance on contracts are considered in estimating revenue and profit rates when there is sufficient information to assess anticipated performance. Suppliers’ expected performance is also assessed and considered in estimating costs and profitability.

Our operating income can be adversely affected when we experience increased estimated contract costs. Reasons for increased estimated contract costs may include: design issues; changes in estimates of the nature and complexity of the work to be performed, including technical or quality issues or requests to perform additional work at the direction of the customer; production challenges, including those resulting from the availability and timeliness of customer funding, unavailability or reduced productivity of qualified and timely cleared labor or the effect of any delays in performance; the availability, performance, quality or financial strength of significant subcontractors; supplier issues, including the costs, timeliness and availability of materials and components; the effect of any changes in laws or regulations; actions deemed necessary for long-term customer satisfaction; and natural disasters or environmental matters. We may file requests for equitable adjustment or claims to seek recovery in whole or in part for our increased costs.

Our risk varies with the type of contract. Due to their nature, fixed-price contracts inherently tend to have more risk than cost type contracts. In 2016, approximately half of our sales were derived from fixed-price contracts. We typically enter into fixed-price contracts where costs can be more reasonably estimated based on actual experience, such as for mature production programs. In addition, our contracts contain provisions relating to cost controls and audit rights. If the terms specified in our contracts are not met, our profitability may be reduced and we may incur a loss. Our fixed-priced contracts may include fixed-price development work. This type of work is inherently more uncertain as to future events than production contracts, and, as a result, there is typically more variability in estimates of the costs to complete the development stage. As work progresses through the development stage into production, the risks associated with estimating the total costs of the contract are typically reduced. While management uses its best judgment to estimate costs associated with fixed-price development contracts, future events could result in either upward or downward adjustments to those estimates. Under cost type contracts, allowable costs incurred by the contractor are generally subject to reimbursement plus a fee. We often enter into cost type contracts for development programs with complex design and technical challenges. These cost type programs typically have award or incentive fees that are subject to uncertainty and may be earned over extended periods or towards the end of the contract. In these cases, the associated financial risks are primarily in recognizing profit, which ultimately may not be earned, or program cancellation if cost, schedule, or technical performance issues arise.

Because of the significance of the judgment and estimation processes described above, it is possible that materially different amounts could be obtained if different assumptions were used or if the underlying circumstances were to change. Changes in underlying assumptions, circumstances or estimates, and the failure to prevail on claims for equitable adjustments could have a material adverse effect upon the profitability of one or more of the affected contracts and on our overall financial position, results of operations and/or cash flows. See “Critical Accounting Policies, Estimates and Judgments” in MD&A.

Our earnings and profitability depend, in part, on subcontractor and supplier performance and financial viability as well as raw material and component availability and pricing.

We rely on other companies to provide raw materials and major components and subsystems for our products and to produce hardware elements and sub-assemblies, provide software and intellectual property, and perform some of the services we provide to our customers, and to do so in compliance with all applicable laws and regulations. Disruptions or performance problems caused by our subcontractors and suppliers, or a misalignment between our contractual obligations to our customers and our agreement with our subcontractors and suppliers, could have an adverse effect on our ability to meet our commitments to customers.

Our ability to perform our obligations on time could be adversely affected if one or more of our subcontractors or suppliers were unable to provide the agreed-upon products or materials or perform the agreed-upon services in a timely, compliant and cost-effective manner or otherwise to meet the requirements of the contract. Changes in economic conditions, including changes in defense budgets or credit availability, or other changes impacting a subcontractor or supplier (including changes in ownership or operations) could adversely affect the financial stability of our subcontractors and suppliers and/or their ability to perform. The inability of our suppliers to perform, or their inability to perform adequately, could also result in the need for us to transition to alternate suppliers, which could result in significant incremental cost and delay or the need for us to provide other resources to support our existing suppliers.

In connection with our U.S. Government contracts, we are required to procure certain materials, components and parts from supply sources approved by the customer. We also are facing increased and changing regulatory requirements, many of which apply to our subcontractors and suppliers. In some cases, there may be only one supplier for certain components. If a sole source supplier cannot meet our needs or is otherwise unavailable, we may be unable to find a suitable alternative.

Our procurement practices are intended to reduce the likelihood of our procurement of counterfeit, unauthorized or otherwise non-compliant parts or materials. We rely on our subcontractors and suppliers to comply with applicable laws and regulations, including regarding the parts or materials we procure from them; in some circumstances, we rely on certifications provided by our subcontractors and suppliers regarding their compliance. We also rely on our subcontractors and suppliers effectively to mitigate the risk of cyber and security threats or other disruptions with respect to the products and components they deliver to us and the information entrusted to them by us or our customers.

If we are unable to procure or experience significant delays in subcontractor or supplier deliveries of needed materials, components, intellectual property or parts; if our subcontractors or suppliers do not comply with all applicable laws and regulations; if the certifications we receive from them are inaccurate; or if what we receive is counterfeit or otherwise improper, it could have a material adverse effect on our financial position, results of operations and/or cash flows.

Our business could be negatively impacted by cyber and other security threats or disruptions.

As a defense contractor, we face various cyber and other security threats, including attempts to gain unauthorized access to sensitive information and networks; insider threats; threats to the safety of our directors, officers and employees; threats to the security of our facilities, infrastructure and supply chain; and threats from terrorist acts or other acts of aggression. Our customers and partners (including our supply chain and joint ventures) face similar threats. Although we utilize various procedures and controls to monitor and mitigate the risk of these threats, there can be no assurance that these procedures and controls will be sufficient. These threats could lead to losses of sensitive information or capabilities; harm to personnel, infrastructure or products; financial liabilities and damage to our reputation.

Cyber threats are evolving and include, but are not limited to, malicious software, destructive malware, attempts to gain unauthorized access to data, disruption or denial of service attacks, and other electronic security breaches that could lead to disruptions in mission critical systems, unauthorized release of confidential, personal or otherwise protected information (ours or that of our employees, customers or partners), and corruption of data, networks or systems. In addition, we could be impacted by cyber threats or other disruptions or vulnerabilities found in products we use or in our partners’ or customers’ systems that are used in connection with our business. These events, if not prevented or effectively mitigated, could damage our reputation, require remedial actions and lead to loss of business, regulatory actions, potential liability and other financial losses.

We provide systems, products and services to various customers (government and commercial) who also face cyber threats. Our systems, products and services may themselves be subject to cyber threats and/or they may not be able to detect or deter threats, or effectively to mitigate resulting losses. These losses could adversely affect our customers and our company.

The impact of these factors is difficult to predict, but one or more of them could result in the loss of information or capabilities, harm to individuals or property, damage to our reputation, loss of business, contractual or regulatory actions and potential liabilities, any one of which could have a material adverse effect on our financial position, results of operations and/or cash flows.

As a U.S. Government contractor, we and our partners are subject to various procurement and other laws and regulations applicable to our industry and we could be adversely affected by changes in such laws and regulations or any negative findings by the U.S. Government as to our compliance with them. We also may be adversely affected by changes in our customers' business practices globally.

U.S. Government contractors (including their subcontractors and others with whom they do business) must comply with many significant procurement regulations and other specific legal requirements. These regulations and other requirements, although often customary in government contracts, increase our performance and compliance costs and risks and are regularly evolving. New laws, regulations or procurement requirements or changes to current ones (including, for example, regulations related to cybersecurity, recovery of employee compensation costs, counterfeit parts, anti-human trafficking, specialty metals and conflict minerals) can significantly increase our costs and risks and reduce our profitability.

We operate in a highly regulated environment and are routinely audited and reviewed by the U.S. Government and its agencies, such as the Defense Contract Audit Agency (DCAA), Defense Contract Management Agency (DCMA) and the DoD Inspector General. These agencies review performance under our contracts, our cost structure and our compliance with applicable laws, regulations and standards, as well as the adequacy of our systems and processes in meeting government requirements. Costs ultimately found to be unallowable or improperly allocated to a specific contract will not be reimbursed or must be refunded if already reimbursed. If an audit uncovers improper or illegal activities, we may be subject to civil and criminal penalties, sanctions, forfeiture of profits or suspension or debarment. Whether or not illegal activities are alleged, the U.S. Government has the ability to decrease or withhold certain payments when it deems systems subject to its review to be inadequate, with significant financial impact. In addition, we could suffer serious reputational harm if allegations of impropriety were made against us or a business partner.

Our industry has experienced, and we expect it will continue to experience, significant changes to business practices globally as a result of an increased focus on affordability, efficiencies, business systems, recovery of costs and a reprioritization of available defense funds to key areas for future defense spending. As a result of certain of these initiatives, we have experienced and may continue to experience an increased number of audits and/or a lengthened period of time required to close open audits. For example, the thresholds for certain allowable costs in the U.S., including compensation costs, have been significantly reduced; the allowability of other types of costs are being challenged, debated and, in certain cases, modified, all with potentially significant financial costs to the company. In connection with these cost reduction initiatives, the U.S. Government is also pursuing alternatives to shift additional responsibility and performance risks to the contractor. The U.S. Government has been pursuing and may continue to pursue policies that could negatively impact our profitability. Changes in procurement practices favoring incentive-based fee arrangements, different award criteria, non-traditional contract provisions and government contract negotiation offers that indicate what our costs should be also may affect our profitability and predictability.

We (again, including our subcontractors and others with whom we do business) also are subject to and expected to perform in compliance with a vast array of federal laws related to our industry, including but not limited to the Truth in Negotiations Act, the False Claims Act, the Procurement Integrity Act, CAS, FAR, the International Traffic in Arms Regulations promulgated under the Arms Export Control Act, the Close the Contractor Fraud Loophole Act and the FCPA. If we are found to have violated the law, or are found not to have acted responsibly, we may be subject to reductions of the value of contracts; contract modifications or termination; the withholding of payments from our customer; the loss of export privileges; civil and criminal liabilities; the assessment of penalties, fines, or compensatory, treble or other damages; or suspension or debarment.

If we or those with whom we do business do not comply with the laws, regulations and processes to which we are subject or if customer business practices change significantly, including with respect to the thresholds for allowable costs, it could have a material adverse effect on our financial position, results of operations and/or cash flows.

Competition within our markets and bid protests may affect our ability to win new contracts and result in reduced revenues and market share.

We operate in highly competitive markets and our competitors may have more extensive or specialized engineering, manufacturing, or marketing capabilities in some areas or financial capacity, or be willing to accept more risk or lower profitability in competing for contracts. We have seen, and anticipate we will continue to see, increased competition in some of our core markets, especially as a result of budget pressures for many customers, a continued focus on affordability and competition, and our own success in winning business. We are facing increasing competition in the U.S. and outside the U.S. from U.S., foreign and multinational firms. In some instances outside the U.S., foreign companies may receive loans, marketing subsidies and other assistance from their governments that may not be available to U.S. companies and foreign companies may be subject to fewer restrictions on technology transfer. Additionally, some customers, including the DoD, may turn to commercial contractors, rather than traditional defense contractors, for some products and services, or may utilize small business contractors or determine to source work internally rather than hiring a contractor.

We are also seeing a significant number of bid protests from unsuccessful bidders on new program awards. Bid protests could result in contract modifications or the award decision being reversed and loss of the contract award. Even where a bid protest does not result in the loss of an award, the resolution can extend the time until the contract activity can begin, and delay earnings.

If we are unable to continue to compete successfully against our current or future competitors, or prevail in protests, we may experience declines in future revenues and market share, which could, over time, have a material adverse effect on our financial position, results of operations and/or cash flows.

Our ability to win new competitions and meet the needs of our customers depends, in part, on our ability to maintain a qualified workforce.

Our operating results are heavily dependent upon our ability to attract and retain sufficient personnel with requisite skills and/or security clearances. If qualified personnel are scarce or difficult to attract or retain or if we experience a high level of attrition, generally or in particular areas, or if such personnel are unable to obtain security clearances on a timely basis, we could experience higher labor, recruiting or training costs in order to attract and retain necessary employees.

Certain of our employees are covered by collective agreements. We generally have been able to renegotiate renewals to expiring agreements without significant disruption of operating activities. If we experience difficulties with renewals and renegotiations of existing collective agreements or if our employees pursue new collective representation, we could incur additional expenses and may be subject to work stoppages. Any such expenses or delays could adversely affect our programs served by employees who are covered by such agreements or representation.

If we are unable to attract and retain a qualified workforce, we may be unable to maintain our competitive position and our future success could be materially adversely affected.

Many of our contracts contain performance obligations that require innovative design capabilities, are technologically complex, require state-of-the-art manufacturing expertise or are dependent upon factors not wholly within our control. Failure to meet our contractual obligations could adversely affect our profitability, reputation and future prospects.

We design, develop and manufacture technologically advanced and innovative products and services, which are applied by our customers in a variety of environments. Problems and delays in development or delivery, or system failures, as a result of issues with respect to design, technology, intellectual property rights, labor, inability to achieve learning curve assumptions, inability to manage effectively a broad array of programs, manufacturing materials or components could prevent us from meeting requirements and create significant risk and liabilities. Similarly, failures to perform on schedule or otherwise to fulfill our contractual obligations could negatively impact our financial position, reputation and ability to win future business.

In addition, our products cannot be tested and proven in all situations and are otherwise subject to unforeseen problems. Examples of unforeseen problems that could negatively affect revenue, schedule and profitability include loss on launch or flight of spacecraft, loss of aviation platforms, premature failure of products that cannot be accessed for repair or replacement, problems with design, quality and workmanship, country of origin of procured materials, delivery of subcontractor components or services and degradation of product performance. These failures could result, either directly or indirectly, in loss of life or property. Among the factors that may affect revenue and profitability could be inaccurate cost estimates, design issues, human factors, unforeseen costs and expenses not covered by insurance or indemnification from the customer, diversion of management focus in responding to unforeseen problems, loss of follow-on work, and, in the case of certain contracts, repayment to the government customer of contract cost and fee payments we previously received.

Certain contracts, primarily involving space satellite systems, contain provisions that entitle the customer to recover fees in the event of failure of the system upon launch or subsequent deployment for less than a specified period of time. Under such terms, we could be required to forfeit fees previously recognized and/or collected.

If we are unable to meet our obligations, including due to issues regarding the design, development or manufacture of our products or services, or we experience launch, platform or satellite system failures, it could have a material adverse effect on our reputation, our ability to compete for other contracts and our financial position, results of operations and/or cash flows.

Environmental matters, including unforeseen costs associated with compliance and remediation efforts, and government and third party claims, could have a material adverse effect on our reputation and our financial position, results of operations and/or cash flows.

Our operations are subject to and affected by a variety of federal, state, local and foreign environmental laws and regulations, including as they may be changed over time. Compliance with environmental laws and regulations requires, and is expected to continue to require, significant operating and capital costs. We may be subject to substantial fines, penalties and criminal sanctions for violations. If we are found to be in violation of the Federal Clean Air Act or the Clean Water Act, the facility or facilities involved in the violation could be placed by the Environmental Protection Agency on a list maintained by the General Services Administration of facilities that generally cannot be used in performing on U.S. Government contracts until the violation is corrected.

We incur, and expect to continue to incur, substantial remediation costs related to the cleanup of pollutants previously released into the environment. Stricter or different enforcement of existing laws and regulations; new laws, regulations or cleanup requirements; discovery of previously unknown or more extensive contamination; imposition of fines, penalties, compensatory or other damages (including natural resource damages); a determination that certain environmental costs are unallowable; rulings on allocation or insurance coverage; and/or the insolvency or other inability or unwillingness of other parties to pay their share of such costs could require us to incur significant additional costs in excess of those anticipated.

We also are and may become a party to various legal proceedings and disputes involving government and private parties (including class actions) relating to alleged impacts from pollutants released into the environment. These matters could result in compensatory or other damages, determinations on allowability or insurance coverage, fines, penalties, and non-monetary relief.

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. We have incurred, and expect to continue to incur, substantial remediation costs related to environmental conditions in Bethpage. We are and may become a party to various legal proceedings and disputes related to remediation and/or alleged environmental impacts in Bethpage, including with federal and state entities, local municipalities and water districts, insurance carriers and class action plaintiffs. These matters could result in fines, penalties, compensatory or other damages (including natural resource damages), determinations on allocation, allowability and coverage, and non-monetary relief.

In addition, government and private parties could seek to hold us responsible for liabilities or obligations related to former operations that have been divested or spun-off (including our former shipbuilding business) and/or for which other parties have agreed to be responsible and/or to indemnify us, directly or indirectly. The indemnity related rights we have may not be sufficient to protect us against such liabilities.

The impact of these factors is difficult to predict, but one or more of them could harm our reputation and business and have a material adverse effect on our financial position, results of operations and/or cash flows.

Our business is subject to disruption caused by natural and/or environmental disasters that could adversely affect our profitability and our overall financial position.

We have significant operations located in regions that may be exposed to earthquakes, damaging storms and other natural disasters. Our business also may be subject to environmental disasters. Our subcontractors and suppliers are also subject to natural and environmental disasters that could affect their ability to deliver or perform under a contract. Although preventative measures may help to mitigate damage, the damage and disruption resulting from natural and environmental disasters may be significant.

Natural and environmental disasters could also disrupt our and our subcontractors' and suppliers' workforce and the critical industrial infrastructure needed for normal business operations.

If insurance or other risk transfer mechanisms are unavailable or insufficient to recover all costs or if we experience a significant disruption to our business due to a natural or environmental disaster, it could have a material adverse effect on our financial position, results of operations and/or cash flows.

Our insurance coverage, customer indemnifications or other liability protections may be unavailable or inadequate to cover all of our significant risks or our insurers may deny coverage of or be unable to pay for material losses we incur, which could adversely affect our profitability and overall financial position.

We endeavor to obtain insurance agreements from financially solid, highly rated counterparties in established markets to cover significant risks and liabilities (including, for example, natural disasters and product liability). Not every risk or liability can be insured, and for risks that are insurable, the policy limits and terms of coverage reasonably obtainable in the market may not be sufficient to cover all actual losses or liabilities incurred. Even if insurance coverage is available, we may not be able to obtain it at a price or on terms acceptable to us. Disputes with insurance carriers, including over policy terms, reservation of rights, the applicability of coverage (including exclusions), compliance with provisions (including notice) and/or the insolvency of one or more of our insurers may significantly affect the amount or timing of recovery.

In some circumstances we may be entitled to certain legal protections or indemnifications from our customers through contractual provisions, laws, regulations or otherwise. However, these protections are not always available, are typically subject to certain terms or limitations, including the availability of funds, and may not be sufficient to cover all losses or liabilities incurred.

If insurance coverage, customer indemnifications and/or other legal protections are not available or are not sufficient to cover our risks or losses, it could have a material adverse effect on our financial position, results of operations and/or cash flows.

We provide products and services related to hazardous and high risk operations, which subjects us to various environmental, regulatory, financial, reputational and other risks.

We provide products and services related to hazardous and high risk operations. Among other such operations, our products and services are used in nuclear-related activities (including nuclear-powered platforms) and used in support of nuclear-related operations of third parties. In addition, certain of our products are provided with space launch services. These activities subject us to various extraordinary risks, including potential liabilities relating to nuclear-related incidents; to the harmful effects on the environment and human health that may result from nuclear-related activities, operations or incidents, as well as the storage, handling and disposal of radioactive materials; and to failed launches of spacecraft. We may be subject to reputational harm and potential liabilities arising out of a nuclear or launch incident, among others, whether or not the cause was within our control. Under some circumstances, the U.S. Government and prime contractors provide for certain indemnification and other protection under certain of our government related contracts, including pursuant to, or in connection with, Public Law 85-804, the Price-Anderson Nuclear Industries Indemnity Act and the Terrorism Risk Insurance Reauthorization Act, for certain risks.

In addition, our customers may otherwise use our products and services in connection with hazardous activities, or in ways that can be unusually hazardous or risky, creating potential liabilities to our customers and/or our company as the provider of such products and services. In the event of an incident, if our customers fail to use our products properly or if our products or services do not operate as intended, we could be subject to reputational harm and potential liabilities.

If there was a nuclear incident or other nuclear-related damages, an incident related to launch activities or an incident or other damages related to or caused by the use of our products and services in connection with hazardous activities or risks, and if indemnification or other protection was not available to cover our losses and liabilities, it could adversely affect our reputation and have a material adverse effect on our financial position, results of operations and/or cash flows.

Pension and medical liabilities and related expenses recorded in our financial statements may fluctuate significantly depending upon future investment performance of plan assets, changes in actuarial assumptions, and legislative or other regulatory actions.

A substantial portion of our current and retired employee population is covered by pension and other post-retirement benefit plans. Defined benefit pension and medical liabilities and related expenses as recorded in our financial statements are primarily dependent upon future investment performance of plan assets and various assumptions, including discount rates applied to future payment obligations, mortality assumptions, estimated long-term rates of return on plan assets, rates of future cost growth and trends for future costs. In addition, funding requirements for benefit obligations of our pension and other post-retirement benefit plans, including Pension Benefit Guaranty Corporation premiums for certain of our defined benefit plans, and our health and welfare plans are subject to legislative and other government regulatory actions.

In accordance with government regulations, pension plan cost recoveries under our U.S. Government contracts may occur in different periods from when those pension costs are recognized for financial statement purposes or when pension funding is made. These timing differences could have a material adverse effect on our cash flows. The cost accounting rules have been revised in order to partially harmonize the measurement and period of assignment of defined benefit pension plan costs allocable to U.S. Government contracts and the minimum required contribution under the Employee Retirement Income Security Act of 1974 (ERISA), as amended by the Pension Protection Act (PPA) of 2006. These rules better align, but do not eliminate, mismatches between ERISA funding requirements and CAS pension costs for U.S. Government CAS covered contracts.

Future investment performance of plan assets and changes in assumptions associated with our pension and other post-retirement benefit plans could have a material adverse effect on our financial position, results of operations and/or cash flows.

Changes in future business conditions could cause business investments and/or recorded goodwill and other long-lived assets to become impaired, resulting in substantial losses and write-downs that would reduce our operating income.

Although we currently have significant excess fair value of our reporting units over their respective carrying values, goodwill accounts for approximately half of our total assets. Market-based inputs to the calculations in our goodwill impairment test, such as weighted average cost of capital and terminal value (based on market comparisons) could change significantly from our current assumptions. We continue to monitor the recoverability of the carrying value of our goodwill and other long-lived assets. Significant write-offs of goodwill or other long-lived assets could have a material adverse effect on our financial condition and/or results of operations.

We may be unable fully to exploit or adequately to protect intellectual property rights, which could materially affect our ability to compete, our reputation and our financial position, results of operations and/or cash flows.

To perform on our contracts and to win new business, we depend on our ability to develop, protect and exploit our intellectual property and also to access the intellectual property of others under reasonable terms. We may not be able adequately to exploit, protect or access intellectual property and the conduct of our customers, competitors and suppliers may make it more difficult for us to do so.

We own many forms of intellectual property, including U.S. and foreign patents, trademarks, copyrights and trade secrets and we license or otherwise obtain access to various intellectual property rights of third parties. The U.S. Government and certain foreign governments hold licenses or other rights to certain intellectual property that we develop in performance of government contracts, and may seek to use or authorize others to use such intellectual property, including in competition with us. Governments have increased certain efforts to assert or obtain more extensive rights in intellectual property, which could decrease our ability to exploit certain of our intellectual property rights and to compete. Governments have also declined at times to make intellectual property of others available to us under acceptable terms.

We also rely significantly upon proprietary technology, information, processes and know-how. We typically seek to protect this information, including by entering into confidentiality agreements with our employees and other parties such as consultants and subcontractors. These agreements and other measures may not provide adequate protection for our trade secrets and other proprietary information. In the event of an infringement of such intellectual property rights, a breach of a confidentiality agreement or divulgence of proprietary information, we may not have adequate legal remedies. In addition, our trade secrets or other proprietary information may otherwise become known or be independently developed by competitors.

In some instances, our ability to seek, win or perform contracts may require us to access and use third party intellectual property. This may require that the government or our customer is willing and able to provide rights to such third party intellectual property, or that we are able to negotiate directly to obtain necessary rights on reasonable terms.

Our intellectual property is subject to challenge, invalidation, misappropriation or circumvention by third parties. Our use of intellectual property licensed or otherwise obtained from third parties is also subject to challenge. Litigation to determine the scope of intellectual property rights, even if ultimately successful, could be costly and could divert management's attention away from other aspects of our business. Moreover, the laws concerning intellectual property rights vary among countries and the protection provided to our intellectual property by foreign laws and courts may not be the same as the remedies available under U.S. law.

If we are unable adequately to exploit our intellectual property rights, to protect our intellectual property rights against infringement or third party claims, or to obtain rights to intellectual property of others, it could have a material adverse effect on our reputation, ability to compete for and perform on contracts, financial position, results of operations and/or cash flows.

Our future success depends, in part, on our ability to develop new products and new technologies and maintain technologies, facilities and equipment to win new competitions and meet the needs of our customers.

Many of the markets in which we operate are characterized by rapidly changing technologies. The product, program and service needs of our customers change and evolve regularly. Our success in the competitive defense industry depends upon our ability to develop technologically advanced, innovative and cost-effective products and services and market these products and services to our customers in the U.S. and internationally. Our success depends on our continued access to assured suppliers of important technologies and components. Our success also depends on our ability to provide the people, technologies, facilities, equipment and financial capacity needed to deliver those products and services with maximum efficiency. If we fail to maintain our competitive position, we could lose a significant amount of future business to our competitors, which would negatively impact our ability to generate favorable financial results and maintain market share.

If we are unable to develop new products and technologies, we may be unable to maintain our competitive position and our future success could be materially adversely affected.

Unanticipated changes in our tax provisions or exposure to additional tax liabilities could affect our profitability and cash flow.

We are subject to income and other taxes in the U.S. and foreign jurisdictions. Changes in applicable U.S. or foreign tax laws and regulations, or their interpretation and application, including the possibility of retroactive effect, could affect our tax expense and profitability. For example, a change in the U.S. corporate tax rate would result in a remeasurement of our net deferred tax assets through the income tax provision because our deferred tax assets are measured at the current statutory tax rate. In addition, the final determination of any tax audits or related litigation could be materially different from our historical income tax provisions and accruals. Changes in our tax provision or an increase in our tax liabilities, whether due to changes in applicable law and regulations, the interpretation or application thereof, changes in the tax rate or a final determination of tax audits or litigation, could have a material adverse effect on our financial position, results of operations and/or cash flows.

Item 1B. Unresolved Staff Comments

None.

NORTHROP GRUMMAN CORPORATION

FORWARD-LOOKING STATEMENTS AND PROJECTIONS

This Annual Report on Form 10-K and the information we are incorporating by reference contain statements, other than statements of historical fact, that constitute “forward-looking statements” within the meaning of the Private Securities Litigation Reform Act of 1995. Words such as “expect,” “intend,” “may,” “could,” “plan,” “project,” “forecast,” “be “estimate,” “outlook,” “anticipate,” “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 under “Risk Factors” and other important factors disclosed in this report and from time to time in our other filings with the SEC. 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.

Item 2. Properties

At December 31, 2016, we had approximately 34 million square feet of floor space at 442 separate locations, primarily in the U.S., for manufacturing, warehousing, research and testing, administration and various other uses. At December 31, 2016, we leased to third parties approximately 260,000 square feet of our owned and leased facilities.

At December 31, 2016, we had major operations at the following locations:

Aerospace Systems

Azusa, Carson, El Segundo, Manhattan Beach, Mojave, Palmdale, Redondo Beach and San Diego, CA; Melbourne and St. Augustine, FL; Devens, MA; and Moss Point, MS.

Mission Systems

Huntsville, AL; McClellan, Redondo Beach, San Diego, San Jose, Sunnyvale and Woodland Hills, CA; Aurora and Colorado Springs, CO; Apopka, FL; Rolling Meadows, IL; Annapolis, Annapolis Junction, Elkridge, Halethorpe, Linthicum and Sykesville, MD; Bethpage and Williamsville, NY; Beavercreek and Cincinnati, OH; Salt Lake City, UT; and Chantilly, Charlottesville, Fairfax, McLean and Richmond, VA. Locations outside the U.S. include Germany, Italy and the United Kingdom.

Technology Services

Sierra Vista, AZ; Warner Robins, GA; Lake Charles, LA; Baltimore, MD; and Chester and Herndon, VA. Locations outside the U.S. include Australia and France.

Corporate

Falls Church and Lebanon, VA and Irving, TX.

The following is a summary of our floor space at December 31, 2016:

Square feet (in thousands)	Owned	Leased	U.S. Government Owned/Leased	Total
Aerospace Systems	6,756	6,610	2,019	15,385
Mission Systems	8,783	5,583	—	14,366
Technology Services	414	2,845	1	3,260
Corporate	657	444	—	1,101
Total	16,610	15,482	2,020	34,112

We maintain our properties in good operating condition and believe that the productive capacity of our properties is adequate to meet current contractual requirements and those for the foreseeable future.

Item 3. Legal Proceedings

We have provided information about certain legal proceedings in which we are involved in Note 10 to the consolidated financial statements.

We are a party to various investigations, lawsuits, claims 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 fines; penalties; compensatory, treble or other damages; or non-monetary relief. Government regulations also 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. Suspension or debarment could have a material adverse effect on the company because of our reliance on government contracts and authorizations. The nature of legal proceedings is such that we cannot assure the outcome of any particular matter. However, based on information available to us to date and other than as noted in Note 10 to the consolidated financial statements, we do not believe that the outcome of any matter currently pending against the company is likely to have a material adverse effect on the company's consolidated financial position as of December 31, 2016, its annual results of operations and/or cash flows. For further information on the risks we face from existing and future investigations, lawsuits, claims and other legal proceedings, please see “Risk Factors.”

Item 4. Mine Safety Disclosures

No information is required in response to this item.

NORTHROP GRUMMAN CORPORATION

PART II

Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities

COMMON STOCK

We have 800,000,000 shares authorized at a $1 par value per share, of which 175,068,263 shares and 181,303,083 shares were issued and outstanding as of December 31, 2016 and 2015, respectively.

PREFERRED STOCK

We have 10,000,000 shares authorized at a $1 par value per share, of which no shares were issued and outstanding as of December 31, 2016 and 2015.

MARKET INFORMATION

Our common stock is listed on the New York Stock Exchange and trades under the symbol NOC.

The following table sets forth, for the periods indicated, the intraday high and low prices of our common stock as reported in the consolidated reporting system for the New York Stock Exchange Composite Transactions.

	2016	2015
	Low - High	Low - High
First Quarter	$175.00 - $200.78	$141.58 - $172.30
Second Quarter	198.75 - 223.42	152.44 - 166.55
Third Quarter	206.69 - 224.12	152.31 - 176.83
Fourth Quarter	212.02 - 253.80	168.26 - 193.99

HOLDERS

The approximate number of common stockholders was 24,427 as of January 26, 2017.

DIVIDENDS

Quarterly dividends per common share for the most recent two years are as follows:

	2016	2015
First Quarter	$0.80	$0.70
Second Quarter	0.90	0.80
Third Quarter	0.90	0.80
Fourth Quarter	0.90	0.80
Total	$3.50	$3.10

NORTHROP GRUMMAN CORPORATION

PURCHASES OF EQUITY SECURITIES BY THE ISSUER AND AFFILIATED PURCHASERS

The table below summarizes our repurchases of common stock during the three months ended December 31, 2016:

Period	Total Number of Shares Purchased	Average Price Paid per Share[1]	Total 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)
October 1, 2016 - October 28, 2016	662,750	$ 217.46	662,750	$ 2,970
October 29, 2016 - November 25, 2016	464,130	237.83	464,130	2,860
November 26, 2016 - December 31, 2016	592,600	237.65	592,600	2,719
Total	1,719,480	$ 229.92	1,719,480	$ 2,719

(1) Includes commissions paid.

Share repurchases take place from time to time, subject to market conditions and management's discretion, in the open market or 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 2 to the consolidated financial statements for further information on our share repurchase programs.

NORTHROP GRUMMAN CORPORATION

STOCK PERFORMANCE GRAPH
Comparison of Cumulative Five Year Total Return
Among Northrop Grumman Corporation, the S&P 500 Index,
and the S&P Aerospace & Defense Index

(1) Assumes $100 invested at the close of business on December 31, 2011, in Northrop Grumman Corporation common stock, Standard & Poor’s (S&P) 500 Index and the S&P Aerospace & Defense Index.
(2) The cumulative total return assumes reinvestment of dividends.
(3) The S&P Aerospace & Defense Index is comprised of Arconic, Inc., The Boeing Company, General Dynamics Corporation, L3 Technologies, Inc., Lockheed Martin Corporation, Northrop Grumman Corporation, Raytheon Company, Rockwell Collins, Inc., Textron, Inc., TransDigm Group and United Technologies Corporation.
(4) The total return is weighted according to market capitalization of each company at the beginning of each year.
(5) This graph is not deemed to be filed with the U.S. Securities and Exchange Commission (SEC) or subject to the liabilities of Section 18 of the Securities and Exchange Act of 1934 (the Exchange Act), and should not be deemed to be incorporated by reference into any of our prior or subsequent filings under the Securities Act of 1933 or the Exchange Act.

Item 6. Selected Financial Data

The data presented in the following table is derived from the audited consolidated financial statements and other information.

NORTHROP GRUMMAN CORPORATION

SELECTED FINANCIAL DATA

	Year Ended December 31				
$ in millions, except per share amounts	2016	2015	2014	2013	2012
Sales					
U.S. Government[(1)]	$20,573	$19,458	$20,085	$21,278	$22,268
International[(2)]	3,205	3,339	3,045	2,493	2,085
Other Customers[(3)]	730	729	849	890	865
Total sales	24,508	23,526	23,979	24,661	25,218
Operating income	3,193	3,076	3,196	3,123	3,130
Net earnings	2,200	1,990	2,069	1,952	1,978
Basic earnings per share	$12.30	$10.51	$9.91	$8.50	$7.96
Diluted earnings per share	12.19	10.39	9.75	8.35	7.81
Cash dividends declared per common share	3.50	3.10	2.71	2.38	2.15
Year-End Financial Position					
Total assets[(4)]	$25,614	$24,424	$26,545	$26,351	$26,527
Notes payable to banks and long-term debt[(4)]	7,070	6,496	5,901	5,900	3,919
Other long-term obligations[(5)]	7,667	7,059	7,520	4,018	7,043
Financial Metrics					
Net cash provided by operating activities	$2,813	$2,162	$2,593	$2,483	$2,640
Free cash flow[(6)]	1,893	1,691	2,032	2,119	2,309
Other Information					
Company-sponsored research and development expenses	$705	$712	$569	$507	$520
Total backlog	45,339	35,923	38,199	37,033	40,809
Square footage at year-end (in thousands)	34,112	34,392	34,264	34,500	35,053
Number of employees at year-end	67,000	65,000	64,300	65,300	68,100

(1) Sales to the United States (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, direct sales with governments outside the U.S. and commercial sales outside the U.S.

(3) Sales to Other Customers include sales to U.S. state and local governments and commercial sales in the U.S.

(4) Prior year amounts have been reclassified to conform to current year presentation due to our adoption of Accounting Standards Update 2015-03, Interest - Imputation of Interest (Subtopic 835-30): Simplifying the Presentation of Debt Issuance Costs. As a result, we now present capitalized debt issuance costs as a reduction in the carrying amount of long-term debt. This change resulted in a reclassification of other non-current assets to long-term debt, which reduced our previously reported total assets and total liabilities as of each period end date.

(5) Other long-term obligations include pension and other post-retirement benefit plan liabilities, deferred compensation, unrecognized tax benefits, environmental liabilities and other long-term obligations.

(6) Free cash flow 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, stock repurchases, and the payment of dividends. This 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 results presented in accordance with accounting principles generally accepted in the United States of America (“U.S. GAAP” or “FAS”). See “Liquidity and Capital Resources” – “Free Cash Flow” in Management's Discussion and Analysis of Financial Conditions and Results of Operations (MD&A) for more information on this measure, including a reconciliation of free cash flow to net cash provided by operating activities.

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations

OVERVIEW

Global Security and Economic Environment

The U.S. and its allies face a global security environment of heightened tensions and instability, threats from state and non-state actors as well as terrorist organizations, emerging nuclear tensions and diverse regional security concerns. Global threats persist across all domains, from undersea to space to cyber. The market for defense products, services and solutions globally continues to be driven by these complex and evolving security challenges, considered in the broader context of political and socioeconomic priorities.

Global economic growth is expected to remain in the low single digits in 2017, reflecting the impact of and uncertainty surrounding geopolitical tensions globally and financial market volatility. The global economy may also be affected by Britain's exit from the European Union, the impact of which is not known at this time. Global economic conditions could impact customer purchasing decisions.

U.S. Political and Economic Environment

In the U.S., there is an uncertain political environment with a new Administration and a new Congress. The U.S. continues to face substantial fiscal and economic challenges, which affect funding for its discretionary and non-discretionary budgets. Part I of the Budget Control Act of 2011 (Budget Control Act) provided for a reduction in planned defense budgets by at least $487 billion over a ten year period. Part II mandated substantial additional reductions, through a process known as "sequestration," which took effect in March 2013.

On November 2, 2015, the President signed the Bipartisan Budget Act of 2015 (the Budget Act). The Budget Act raised the debt ceiling until March 2017 and raised the sequester caps imposed by the Budget Control Act by $80 billion, split equally between defense and non-defense discretionary spending in the Government's FY 2016 and FY 2017 ($50 billion in FY 2016 and $30 billion in FY 2017). Sequestration spending caps under the Budget Control Act could reduce defense spending again in FY 2018.

On December 18, 2015, Congress passed and the President signed the Consolidated Appropriations Act of 2016, which provided funding for the U.S. Government for FY 2016, providing $1.1 trillion in discretionary funding for federal agencies through September 2016. The FY 2016 DoD budget was approximately $580 billion (including $58 billion for Overseas Contingency Operations (OCO)), which represented an approximately four percent increase relative to DoD funding for FY 2015.

On February 9, 2016, the President delivered his FY 2017 budget to Congress. The FY 2017 budget reflected the FY 2017 spending caps established in the Budget Act and requested $583 billion for the DoD's annual budget, including $59 billion for OCO. The President signed a continuing resolution in September 2016, which was extended in December 2016 and provides funding for the U.S. Government at FY 2016 levels through April 28, 2017.

The federal budget and debt ceiling are expected to continue to be the subject of considerable debate, which could have a significant impact on defense spending broadly and the company's programs in particular. Additionally, both the incoming Administration and the new Congress have offered plans to reform the federal income tax code, along with other significant policy initiatives, some of which could have an impact on the company.

For further information on the risks we face from the current political and economic environment, see "Risk Factors."

Operating Performance Assessment and Reporting

We manage and assess our business based on our performance on contracts and programs (typically large contracts or two or more closely-related contracts). We recognize sales from our portfolio of long-term contracts primarily using the cost-to-cost method of percentage of completion accounting, but in some cases we utilize the units-of-delivery method of percentage of completion accounting. As a result, sales tend to fluctuate in concert with costs incurred and units delivered across our large portfolio of contracts. Due to Federal Acquisition Regulation (FAR) rules that govern our U.S. Government business and related Cost Accounting Standards (CAS), most types of costs are allocable to U.S. Government contracts. As such, we do not focus on individual cost groupings (such as manufacturing, engineering and design labor costs, subcontractor costs, material costs, overhead costs and general and administrative (G&A) costs), as much as we do on total contract cost, which is the key driver of our sales and operating income.

In evaluating our 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 three segments before distinguishing between products and services. Changes in sales are generally described in terms of volume, deliveries or other indicators of sales activity. Changes in margins are generally described in terms of performance and contract mix. For purposes of this discussion, volume generally refers to increases or decreases in sales or cost from production/service activity levels or delivery rates. Performance generally refers to non-volume related changes in profitability. Contract mix refers to changes in the ratio of contract type, lifecycle, customer or other non-performance impacts on contract profitability.

CONSOLIDATED OPERATING RESULTS

Selected financial highlights are presented in the table below:

	Year Ended December 31			% Change in	
$ in millions, except per share amounts	2016	2015	2014	2016	2015
Sales	$24,508	$23,526	$23,979	4 %	(2)%
Operating costs and expenses	21,315	20,450	20,783	4 %	(2)%
Operating income	3,193	3,076	3,196	4 %	(4)%
Operating margin rate	13.0 %	13.1 %	13.3 %		
Federal and foreign income tax expense	723	800	868	(10)%	(8)%
Effective income tax rate	24.7 %	28.7 %	29.6 %		
Net earnings	2,200	1,990	2,069	11 %	(4)%
Diluted earnings per share	12.19	10.39	9.75	17 %	7 %

Sales

2016 – Sales increased $982 million, or 4 percent, as compared with 2015, primarily due to higher sales at Aerospace Systems and Mission Systems.

2015 – Sales decreased $453 million, or 2 percent, as compared with 2014, primarily due to lower sales on U.S. Government contracts across the company, partially offset by an increase in international sales at Aerospace Systems.

See “Revenue Recognition” in Note 1 to the consolidated financial statements for further information on sales by customer category.

See “Segment Operating Results” for further information by segment and “Product and Service Analysis” for product and service detail.

Operating Costs and Expenses and Operating Margin Rate

Operating costs and expenses primarily include labor, material, subcontractor and overhead costs, and are generally allocated to contracts as incurred. Operating margin rate is defined as operating income as a percentage of sales. In accordance with industry practice and the regulations that govern cost accounting requirements for government contracts, most general management and corporate expenses incurred at the segment and corporate locations are considered allowable and allocable costs. Allowable and allocable G&A costs, including independent research and development (IR&D) and bid and proposal costs, are allocated on a systematic basis to contracts in progress.

Operating costs and expenses comprise the following:

	Year Ended December 31			% Change in	
$ in millions	2016	2015	2014	2016	2015
Product costs	$11,002	$10,333	$10,431	6%	(1)%
Service costs	7,729	7,551	7,947	2%	(5)%
G&A	2,584	2,566	2,405	1%	7 %
Operating costs and expenses	$21,315	$20,450	$20,783	4%	(2)%
Operating costs and expenses as a % of sales	87.0 %	86.9 %	86.7 %		

G&A as a % of sales	10.5 %	10.9 %	10.0 %

2016 – Operating costs and expenses as a percentage of sales increased slightly in 2016 as compared with 2015, which reduced our operating margin rate to 13.0 percent from 13.1 percent in the prior year period. The decrease in operating margin rate was driven by lower segment margin rates, as described in “Segment Operating Results,” and a $32 million decrease in our net FAS/CAS pension adjustment, partially offset by a $137 million reduction in unallocated corporate expenses, as described in Note 3 to the consolidated financial statements.

2015 – Operating costs and expenses as a percentage of sales increased in 2015 as compared with 2014, which reduced our operating margin rate to 13.1 percent from 13.3 percent in the prior year period. The decrease in operating margin rate was driven by $179 million of lower segment operating income, as described in “Segment Operating Results,” and $21 million in higher unallocated corporate expenses, partially offset by a $79 million increase in our net FAS/CAS pension adjustment, as described in Note 3 to the consolidated financial statements.

2016 – G&A as a percentage of sales decreased to 10.5 percent in 2016 from 10.9 percent in 2015, principally due to higher sales volume.

2015 – G&A as a percentage of sales increased to 10.9 percent in 2015 from 10.0 percent in 2014, principally due to an increase in IR&D as we continue to invest in future business opportunities.

For further information regarding product and service sales and costs, see the “Product and Service Analysis” section that follows “Segment Operating Results.”

Operating Income

We define operating income as sales less operating costs and expenses, which includes G&A.

2016 – Operating income increased $117 million, or 4 percent, as compared with 2015, primarily due to a $137 million reduction in unallocated corporate expenses and higher sales volume, partially offset by a $32 million decrease in our net FAS/CAS pension adjustment and lower segment margin rates.

2015 – Operating income decreased $120 million, or 4 percent, as compared with 2014, primarily due to the lower sales volume described above and the absence in 2015 of a $75 million benefit realized in 2014 in connection with agreements reached with the U.S. Government to settle certain claims relating to use of the company's intellectual property and a terminated program.

Federal and Foreign Income Taxes

2016 – Our effective tax rate for 2016 was 24.7 percent, as compared with 28.7 percent in 2015. The lower rate is principally due to $85 million of excess tax benefits related to employee share-based payment transactions recognized in 2016 resulting from the adoption of ASU No. 2016-09, as described in Note 1 to the consolidated financial statements, a $40 million benefit recognized in connection with resolution of the Internal Revenue Service (IRS) examination of the company’s 2007-2011 tax returns and a $33 million benefit recognized in connection with the repatriation of earnings from certain of our foreign subsidiaries described in Note 6 to the consolidated financial statements. These benefits were partially offset by a $58 million decrease in research credits, which were principally a result of credits recorded in 2015 that were claimed on our prior year tax returns. While discrete tax benefits in each year have reduced our effective tax rate below the statutory rate, these items are not indicative of a longer-term trend. On an ongoing basis (excluding impacts associated with ASU No. 2016-09 and assuming no changes in federal tax legislation), we expect an effective tax rate of approximately 30 percent due principally to recurring tax benefits associated with the manufacturing deduction and research credits.

2015 – Our effective tax rate for 2015 was 28.7 percent, as compared with 29.6 percent in 2014. This reduction was driven by a $76 million increase in research credits primarily resulting from credits claimed on our prior year tax returns, partially offset by a $51 million benefit recorded in 2014 for the partial resolution of the IRS examination of our 2007-2009 tax returns.

Net Earnings

2016 – Net earnings for 2016 increased $210 million, or 11 percent, as compared with 2015, primarily due to the higher operating income and lower effective tax rate discussed above.

2015 – Net earnings for 2015 decreased $79 million, or 4 percent, as compared with 2014, primarily due to lower operating income and higher interest expense, partially offset by the lower effective tax rate described above.

Diluted Earnings Per Share

2016 – Diluted earnings per share for 2016 increased $1.80, or 17 percent, as compared with 2015. The increase is primarily due to the 11 percent increase in net earnings discussed above and a 6 percent reduction in weighted-average shares outstanding resulting from shares repurchased during 2015 and 2016.

2015 – Diluted earnings per share for 2015 increased $0.64, or 7 percent, as compared with 2014. The increase is primarily due to a 10 percent reduction in weighted-average diluted shares outstanding resulting from shares repurchased in 2014 and 2015, partially offset by the 4 percent decline in net earnings discussed above.

SEGMENT OPERATING RESULTS

Basis of Presentation

At December 31, 2016, the company was aligned in three operating sectors, which are also our reportable segments: Aerospace Systems, Mission Systems, and Technology Services. Effective January 1, 2016, the company streamlined our sectors from four to three as described in Note 3 to the consolidated financial statements. For a more complete description of each segment's products and services, see "Business."

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

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

This section discusses segment sales, operating income and operating margin rates. A reconciliation of segment operating income to total operating income is provided below.

Segment Operating Income and Margin Rate

Segment operating income, as reconciled in the Reconciliation of Segment Operating Income to Total Operating Income table below, is a non-GAAP measure that reflects total earnings from our three segments including allocated pension expense recognized under CAS, and excluding unallocated corporate items and FAS pension expense. This measure may be useful to investors and other users of our financial statements as a supplemental measure in evaluating the financial performance and operational trends of our sectors.

	Year Ended December 31			% Change in	
$ in millions	2016	2015	2014	2016	2015
Segment operating income	$2,935	$2,920	$3,099	1%	(6)%
Segment operating margin rate	12.0 %	12.4 %	12.9 %		

2016 - Segment operating income for 2016 increased $15 million, or 1 percent, as compared with 2015 as a result of higher sales volume, which more than offset the lower segment operating margin rate. Segment operating margin rate decreased to 12.0 percent from 12.4 percent in 2015 principally due to a lower segment margin rate at Aerospace Systems.

2015 - Segment operating income for 2015 decreased $179 million, or 6 percent, as compared with 2014 and segment operating margin rate decreased to 12.4 percent from 12.9 percent in 2014. The decrease in segment operating income was principally due to lower sales volume and the absence in 2015 of the $75 million in settlements described above and a benefit of approximately $45 million from lower 2014 CAS costs due to passage of the Highway and Transportation Funding Act of 2014 (HATFA). The absence in 2015 of the noted settlements and HATFA benefits was the primary driver of the lower 2015 operating margin rate.

NORTHROP GRUMMAN CORPORATION

Reconciliation of Segment Operating Income to Total Operating Income - The table below reconciles segment operating income to total operating income by including the impact of net FAS/CAS pension adjustments, as well as unallocated corporate expenses (certain corporate-level expenses, which are not considered allowable or allocable under applicable CAS or the FAR). See Note 3 to the consolidated financial statements for further information on the net FAS/CAS pension adjustment and unallocated corporate expenses.

	Year Ended December 31			% Change in	
$ in millions	2016	2015	2014	2016	2015
Segment operating income	$2,935	$2,920	$3,099	1 %	(6)%
CAS pension expense	847	703	384	20 %	83 %
Less: FAS pension expense	(531)	(355)	(115)	50 %	209 %
Net FAS/CAS pension adjustment	316	348	269	(9)%	29 %
Unallocated corporate expenses	(53)	(190)	(169)	(72)%	12 %
Other	(5)	(2)	(3)	150 %	(33)%
Total operating income	$3,193	$3,076	$3,196	4 %	(4)%

Net 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:

	Year Ended December 31		
$ in millions	2016	2015	2014
Favorable EAC adjustments	$765	$924	$922
Unfavorable EAC adjustments	(271)	(344)	(258)
Net EAC adjustments	$494	$580	$664

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

	Year Ended December 31		
$ in millions	2016	2015	2014
Aerospace Systems	$263	$352	$359
Mission Systems	191	169	295
Technology Services	69	68	32
Eliminations	(29)	(9)	(22)
Net EAC adjustments	$494	$580	$664

AEROSPACE SYSTEMS

	Year Ended December 31			% Change in	
$ in millions	2016	2015	2014	2016	2015
Sales	$10,828	$9,940	$9,910	9%	—%
Operating income	1,236	1,205	1,285	3%	(6)%
Operating margin rate	11.4 %	12.1 %	13.0 %		

2016 - Aerospace Systems sales for 2016 increased $888 million, or 9 percent, as compared with 2015. The increase was due to higher volume on Manned Aircraft and Autonomous Systems programs. Manned Aircraft sales increased primarily due to higher restricted volume, increased F-35 deliveries and production ramp-up on the E-2D program. These increases were partially offset by lower B-2 volume and fewer F/A-18 deliveries. Autonomous Systems sales increased primarily due to higher volume on the Triton and Global Hawk programs, partially offset by ramp-down of the NATO Alliance Ground Surveillance (AGS) program. Space sales include higher volume on restricted programs, partially offset by lower volume on the Advanced Extremely High Frequency (AEHF) program.

Operating income for 2016 increased $31 million, or 3 percent, and includes a gain of $45 million associated with the sale of a property. Higher sales volume and improved performance on Space and Autonomous Systems programs were more than offset by lower margins on Manned Aircraft programs, principally due to changes in contract mix and the timing of risk reductions. Operating margin rate decreased to 11.4 percent from 12.1 percent primarily due to the lower margins on Manned Aircraft programs, partially offset by improved performance on Space and Autonomous Systems programs.

2015 - Aerospace Systems sales for 2015 were comparable to the prior year. Sales in 2014 included the $75 million in settlements described above. Excluding the settlements, sales for 2015 increased $105 million, or 1 percent, as compared to 2014. The increase is primarily due to higher volume on Autonomous Systems and Space programs, partially offset by lower volume on Manned Aircraft programs. Autonomous Systems sales reflect higher volume on a number of programs, including Global Hawk, partially offset by lower volume on the Fire Scout and NATO AGS programs. Sales in Manned Aircraft declined principally due to fewer F/A-18 deliveries, as that program ramps down, and lower volume on restricted programs, partially offset by the transition to full rate production on the E-2D program and increased deliveries on the F-35 program. Space sales include higher volume on restricted programs, partially offset by lower volume on the AEHF program.

Operating income for 2015 decreased $80 million, or 6 percent, and operating margin rate decreased to 12.1 percent from 13.0 percent. Lower operating income and margin rate in 2015 were primarily due to the benefits recognized in 2014 associated with the settlements described above.

MISSION SYSTEMS

	Year Ended December 31			% Change in	
$ in millions	2016	2015	2014	2016	2015
Sales	$10,928	$10,674	$11,001	2%	(3)%
Operating income	1,445	1,410	1,557	2%	(9)%
Operating margin rate	13.2 %	13.2 %	14.2 %		

2016 - Mission Systems sales for 2016 increased $254 million, or 2 percent, as compared with 2015 due to higher volume on Sensors and Processing and Advanced Capabilities programs, partially offset by lower volume on Cyber and ISR programs. Sensors and Processing sales increased primarily due to higher volume on communications programs, including the Joint Counter Radio-Controlled Improvised Explosive Device Electronic Warfare program; increased restricted volume and ramp-up on the G/ATOR program. These increases were partially offset by lower volume on international programs. Advanced Capabilities sales increased primarily due to higher volume on restricted, maritime systems and marine systems programs. Cyber and ISR sales reflect lower volume on space programs.

Operating income for 2016 increased $35 million, or 2 percent, due to the higher sales volume described above and a $21 million gain associated with the sale of a commercial cyber security product business, partially offset by a $49 million forward loss provision recorded on an Advanced Capabilities program principally due to cost growth for changes impacting fixed-price options, which may not be fully recovered through additional contract value. Operating margin rate for 2016 was consistent with the same period in 2015 and reflects improved performance on Sensors and Processing programs, partially offset by lower margins on Advanced Capabilities programs.

2015 - Mission Systems sales for 2015 decreased $327 million, or 3 percent, as compared with 2014. The decrease was due to lower volume across the sector. Advanced Capabilities sales decreased primarily due to the impact of in-theater force reductions, lower volume on the Consolidated Afloat Network and Enterprise Services program and completion of the Ground Combat Vehicle contract. These decreases were partially offset by higher volume on marine systems and missile defense programs. The decrease in Cyber and ISR sales is primarily due to lower volume on restricted programs, partially offset by higher volume on cyber solutions programs. Sensors and Processing sales decreased primarily due to ramp-down on an international program and lower volume on the LITENING program.

These decreases were partially offset by ramp-up on the G/ATOR program and higher volume on fixed wing avionics and C4ISR programs.

Operating income for 2015 decreased $147 million, or 9 percent. Operating margin rate decreased to 13.2 percent from 14.2 percent. Operating income and margin rate for 2015 decreased primarily due to business mix changes, which resulted in lower volume for mature fixed-price production programs and higher volume for cost-type development programs, as well as less favorable performance on Sensors and Processing and Advanced Capabilities programs.

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TECHNOLOGY SERVICES

	Year Ended December 31			% Change in	
$ in millions	2016	2015	2014	2016	2015
Sales	$4,825	$4,819	$4,902	—%	(2)%
Operating income	512	514	461	—%	11 %
Operating margin rate	10.6 %	10.7 %	9.4 %		

2016 - Technology Services sales for 2016 were slightly higher than the prior year and reflect higher volume on System Modernization and Services programs, partially offset by lower volume on Advanced Defense Services and Global Logistics and Modernization programs. System Modernization and Services sales increased primarily due to higher volume on U.S. Government health programs. Advanced Defense Services sales declined primarily due to the completion of several programs in 2015, partially offset by higher volume on the Saudi Arabian Ministry of National Guard Training Support program (through our interest in a joint venture for which we consolidate the financial results). Global Logistics and Modernization sales decreased principally due to lower volume on the Intercontinental Ballistic Missile (ICBM) program, partially offset by higher volume on the KC-10 program. The increase in KC-10 volume is not indicative of a longer-term trend as we expect KC-10 sales will be winding down in 2017 as our contract nears completion.

Operating income and margin rate for 2016 were comparable to the prior year.

2015 - Technology Services sales for 2015 decreased $83 million, or 2 percent, as compared with 2014. The decrease is principally due to lower volume on Global Logistics and Modernization and System Modernization and Services programs. The decrease in Global Logistics and Modernization is mainly due to ramp-down activities on the ICBM program, partially offset by higher volume on intercompany restricted work. System Modernization and Services sales reflect lower volume across a number of programs, partially offset by higher volume on the Total Information Processing Support Services and Social Security Administration IT Support Services programs.

Operating income for 2015 increased $53 million, or 11 percent, and operating margin rate increased to 10.7 percent from 9.4 percent. The increase in operating income and margin rate in 2015 reflects improved performance, partially offset by the decline in sales volume described above and lower income from an unconsolidated joint venture than in the prior year period.

PRODUCT AND SERVICE ANALYSIS

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

	Year Ended December 31					
$ in millions	2016		2015		2014	
Segment Information:	Sales	Operating Costs and Expenses	Sales	Operating Costs and Expenses	Sales	Operating Costs and Expenses
Aerospace Systems						
Product	$8,868	$ 7,837	$7,976	$7,025	$7,970	$6,906
Service	1,960	1,755	1,964	1,710	1,940	1,719
Mission Systems						
Product	6,471	5,588	6,448	5,532	6,505	5,478
Service	4,457	3,895	4,226	3,732	4,496	3,966
Technology Services						
Product	320	292	358	339	329	356
Service	4,505	4,021	4,461	3,966	4,573	4,085

Segment Totals						
Total Product	$15,659	$13,717	$14,782	$12,896	$14,804	$12,740
Total Service	10,922	9,671	10,651	9,408	11,009	9,770
Intersegment eliminations	(2,073)	(1,815)	(1,907)	(1,698)	(1,834)	(1,630)
Total Segment[1]	$24,508	$ 21,573	$23,526	$20,606	$23,979	$20,880

(1) A reconciliation of segment operating income to total operating income, is included in "Segment Operating Results."

Product Sales and Costs

2016 - Product sales for 2016 increased $877 million, or 6 percent, as compared with 2015. The increase was primarily driven by higher product sales at Aerospace Systems due to higher restricted volume, increased F-35 deliveries and production ramp-up on the E-2D program.

Product costs for 2016 increased $821 million, or 6 percent, as compared to 2015, consistent with the change in product sales described above.

2015 - Product sales for 2015 were comparable with 2014. Sales in 2014 included the $75 million in settlements at Aerospace Systems as described above and sales in 2015 reflect lower product sales at Mission Systems and higher product sales at Technology Services. The decrease at Mission Systems was primarily due to ramp-down on an international program and lower product sales on certain Cyber and ISR programs, partially offset by higher F-35 volume. The increase at Technology Services was primarily due to higher volume on intercompany restricted work.

Product costs for 2015 increased $156 million, or 1 percent, as compared to 2014. The increase was primarily due to higher product costs at Aerospace Systems and Mission Systems due to lower performance and changes in business mix.

Service Sales and Costs

2016 - Service sales for 2016 increased $271 million, or 3 percent, as compared with 2015. The increase was primarily driven by higher volume on several Cyber and ISR and Sensors and Processing service programs at Mission Systems.

Service costs for 2016 increased $263 million, or 3 percent, as compared with 2015, consistent with the change in service sales described above and reflects higher service margins at Mission Systems, partially offset by lower service margins at Aerospace Systems.

2015 - Service sales for 2015 decreased $358 million, or 3 percent, as compared with 2014. The decrease was primarily due to lower service sales at Mission Systems and Technology Services. The decrease at Mission Systems was primarily due to lower volume on certain Advanced Capabilities and unmanned aircraft systems programs, including the impact of in-theater force reductions. The decrease at Technology Services was primarily due to lower service sales on certain SMS programs.

Service costs for 2015 decreased $362 million, or 4 percent, as compared with 2014, consistent with the change in service sales described above.

BACKLOG

Total backlog includes 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. For multi-year service contracts with non-U.S. Government customers having no stated contract values, backlog includes only the amounts committed by the customer. Backlog is converted into sales as costs are incurred or deliveries are made.

Backlog consisted of the following at December 31, 2016 and 2015:

	2016			2015	
$ in millions	Funded	Unfunded	Total Backlog	Total Backlog	% Change in 2016
Aerospace Systems	$9,419	$ 17,891	$27,310	$18,014	52 %
Mission Systems	9,301	4,414	13,715	13,254	3 %
Technology Services	3,446	868	4,314	4,655	(7)%
Total backlog	$22,166	$ 23,173	$45,339	$35,923	26 %

Approximately $18.2 billion of the $45.3 billion total backlog at December 31, 2016 is expected to be converted into sales in 2017.

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.

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As of December 31, 2016, we had cash and cash equivalents of $2.5 billion, of which $182 million was held outside of the U.S. by foreign subsidiaries. Cash and cash equivalents and cash generated from operating activities, supplemented by borrowings under credit facilities and/or in the capital markets, if needed, are expected to be sufficient to fund our operations for at least the next 12 months. Capital expenditure commitments were $657 million at December 31, 2016, and are expected to be paid with cash on hand.

Operating Cash Flow

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

	Year Ended December 31		
$ in millions	2016	2015	2014
Net earnings	$2,200	$1,990	$2,069
Non-cash items[1]	585	1,035	731
Changes in assets and liabilities:			
Trade working capital	(240)	(564)	(121)
Retiree benefits	393	(263)	(17)
Other, net	(125)	(36)	(69)
Net cash provided by operating activities	$		