



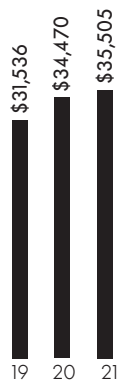
2021 Annual Report

**NORTHROP
GRUMMAN**

Selected Financial Highlights



Sales
(\$ in millions)



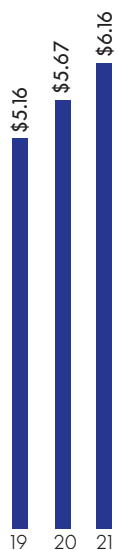
Organic Sales*
(\$ in millions)



Segment Operating
Margin Rate*



Transaction-Adjusted
EPS*



Cash Dividends
Declared
(per Common Share)



Cash Provided by
Operating Activities
(\$ in Millions)

*Non-GAAP financial metric. For more information, including a definition, reconciliation to the most directly comparable GAAP measure and why we believe this measure may be useful to investors, please refer to "Use of Non-GAAP Financial Measures" at the back of this Annual Report.

Dear Shareholders,

In 2021, our company made significant progress executing on our strategy of profitable growth and value creation for shareholders. Driven by our values and culture of inclusion and integrity, our team worked in lock-step with suppliers and partners to support one another and strengthen the communities where we work and live. We demonstrated our ability to deepen our partnerships and provide meaningful solutions to our customers and strong returns to shareholders.

We see a complicated world becoming more complex, as evidenced by the COVID-19 pandemic which has continued to present challenges for our employees and operations. A steady hand in any crisis, our team of 90,000 employees proved what we already knew: we thrive when faced with extraordinary challenges. Our teams led with empathy and flexibility, empowering our workforce while maintaining focus on our important mission. One such example is the James Webb Space Telescope. Launched in December, it stands as a testament to our mission and ability to bring forth world-class solutions regardless of the headwinds. Alongside our NASA partners, we are proud to usher in an exciting era of space observation and expand our understanding of the universe.

As the national security environment evolves, one thing remains clear: increasingly sophisticated threats call for an equally sophisticated portfolio. Northrop Grumman has demonstrated an ability to bring integrated solutions to a more complicated world in 2021 and beyond.

2021 Performance

We delivered another year of solid operating performance in 2021 and positioned our business for continued growth in 2022 and beyond. Our annual sales totaled \$35.7 billion, with industry-leading organic sales* growth of 3%. Operating margin rate was 15.8% and our segment operating margin rate* was 11.8%, an increase of 40 basis points compared to 2020. Diluted EPS was \$43.54 and we grew our transaction adjusted EPS* by 8%.

Regarding capital deployment, we returned a record \$4.7 billion to shareholders through dividends and share repurchases. Our balance sheet remained strong. We retired over \$2.2 billion of debt which increased our credit ratings.



Above all, our commitment to innovate and invest across our business never wavered. Capital expenditures in 2021 totaled \$1.4 billion, and Research and Development expenditures were \$1.1 billion. A thoughtful balance of R&D and capital expenditures will continue to position Northrop Grumman well for future growth in support of many of our customers' highest priority missions.

Our company's portfolio and capabilities are in line with our customer's national security priorities: Space, Advanced Weapons, Strategic Deterrence and Mission Systems. Space had 24% organic sales* growth, made possible by our diverse set of capabilities and talented team. The rapid progression of our Ground Based Strategic Deterrent program, in combination with our development of the B-21 Raider, strengthens our country's mission of deterrence and security. Advanced Weapons, including the Advanced Anti-Radiation Guided Missile and multiple Hypersonic programs grew as we achieved critical program milestones in 2021. Additionally, our broad set of Mission System Solutions saw continued growth in 2021. Breakthrough technologies including the mission-critical C4ISR, as well as cyber capabilities, connect and protect our forces.

Technology unlocks agility and ingenuity. Moving with speed, our digital transformation continues to enhance customer responsiveness to today's evolving threat environment.

Our Strong, Sustainable Culture

Our culture defines us. Diversity of thought and experience enables fresh thinking, innovation and problem-solving. Guided by our values of integrity and transparency, our team is encouraged to explore new ways to bring forth our vision for a safer, more inclusive world.

Our environmental, social and governance (ESG) record reflects our deep commitment to strengthen the communities we serve, including:

- DiversityInc named us one of their Top 50 Companies for Diversity for the 12th year in a row
- We were named as one of Equileap's top 25 companies on the S&P 500 for gender equality
- MSCI ESG Rating of AA
- For the sixth consecutive year, we were included in the Dow Jones Sustainability Index for North America, and included in the World Index for the first time
- We maintained our leadership score in CDP's 2021 climate change program for the 10th consecutive year

Reducing our environmental footprint and strengthening our commitment to sustainability remains critical to our long-term business goals. It is more than a point of pride, it's a matter of national security. We have achieved a 44% reduction in greenhouse gas emissions since 2010, exceeding our long-term goal. We have also made great strides in reducing our potable water use and solid waste diversion. These actions and more resulted in our Company scoring in the 96th percentile on the S&P Global Corporate Sustainability Index. For more information regarding our commitments in ESG, please consult the 2021 Northrop Grumman Sustainability report.

Guided by our mission, our purpose is to make the world a safer place for our communities, customers and shareholders. I remain inspired by the entire Northrop Grumman team.

Confident in our ability to take full advantage of our portfolio and potential, we look toward 2022 with confidence. People in support of freedom and democracy are facing some of the largest risks we've seen in generations. While the challenges ahead of us are great, our resolve is greater.

Sincerely,

A handwritten signature in black ink that reads "Kathy Warden". The signature is written in a cursive style with a large, stylized initial "K".

Kathy Warden

Chair, Chief Executive Officer and President

* This metric is a non-GAAP financial measure. For more information, including a definition, reconciliation to the most directly comparable GAAP measure and why we believe this measure may be useful to investors, please see "Use of Non-GAAP Financial Measures" at the back of this Annual Report.

Elected Officers (As of March 1, 2022)

Kathy J. Warden

Chair, Chief Executive Officer and President

Ann M. Addison

Corporate Vice President and Chief Human Resources Officer

Matthew F. Bromberg

Corporate Vice President, Global Operations

Mark A. Caylor

Corporate Vice President and President, Mission Systems

Sheila C. Cheston

Corporate Vice President and General Counsel

Todd B. Ernst

Corporate Vice President and Treasurer, Vice President Investor Relations

Michael A. Hardesty

Corporate Vice President, Controller and Chief Accounting Officer

Thomas H. Jones

Corporate Vice President and President, Aeronautics Systems

Lesley A. Kalan

Corporate Vice President and Chief Strategy and Development Officer

David F. Keffer

Corporate Vice President and Chief Financial Officer

Jennifer C. McGarey

Corporate Vice President and Secretary

David T. Perry

Corporate Vice President and Chief Global Business Officer

Mary D. Petryszyn

Corporate Vice President and President, Defense Systems

Lucy C. Ryan

Corporate Vice President, Communications

Thomas L. Wilson

Corporate Vice President and President, Space Systems

Board of Directors (As of March 1, 2022)

Kathy J. Warden

Chair, Chief Executive Officer and President, Northrop Grumman Corporation

David P. Abney^{2 4}

Former Executive Chairman and Chief Executive Officer, United Parcel Service (a package delivery and supply chain management company)

Marianne C. Brown^{1 3}

Former Chief Operating Officer, Global Financial Solutions, Fidelity National Information Services, Inc. (financial services technology solutions provider)

Donald E. Felsing^{2 3}

Lead Independent Director, Northrop Grumman Corporation; Former Chairman and Chief Executive Officer, Sempra Energy (energy services company)

Ann M. Fudge^{1 3}

Former Chairman and Chief Executive Officer, Young & Rubicam Brands (marketing communications company)

William H. Hernandez^{1† 4}

Former Senior Vice President and Chief Financial Officer, PPG Industries, Inc. (chemical and industrial products manufacturer)

Madeleine A. Kleiner^{2 3†}

Former Executive Vice President and General Counsel, Hilton Hotels Corporation (hotel and resort company)

Karl J. Krapek^{2 3}

Former President and Chief Operating Officer, United Technologies Corporation (aerospace and building systems company)

Graham N. Robinson^{1 4}

Senior Vice President, Stanley Bland & Decker, and President, STANLEY Industrial (manufacturer of tools and hardware)

Gary Roughead^{2 4†}

Admiral, United States Navy (Ret.) and Former Chief of Naval Operations

Thomas M. Schoewe^{2† 4}

Former Executive Vice President and Chief Financial Officer, Wal-Mart Stores, Inc. (operator of retail stores)

James S. Turley^{1 3}

Former Chairman and Chief Executive Officer, Ernst & Young (a professional services organization)

Mark A. Welsh^{1 4}

Dean, Bush School of Government and Public Service, Texas A&M University; General, United States Air Force (Ret.) and Former Chief of Staff, United States Air Force

- 1 Member of Audit and Risk Committee
 - 2 Member of Compensation Committee
 - 3 Member of Governance Committee
 - 4 Member of Policy Committee
- † Committee Chair

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION**

Washington, D.C. 20549

FORM 10-K

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

For the fiscal year ended December 31, 2021
or

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

For the transition period from _____ to _____ Commission file number 1-16411

NORTHROP GRUMMAN CORPORATION

(Exact name of registrant as specified in its charter)

Delaware

(State or other jurisdiction of
incorporation or organization)

**2980 Fairview Park Drive
Falls Church, Virginia**

(Address of principal executive offices)

80-0640649

(I.R.S. Employer
Identification Number)

22042

(Zip code)

(703) 280-2900

(Registrant's telephone number, including area code)

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

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

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

No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act

Yes

No

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

No

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

Yes

No

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

Large Accelerated Filer

Accelerated Filer

Smaller Reporting Company

Non-accelerated Filer

Emerging Growth Company

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

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report.

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

Yes

No

As of June 30, 2021, 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 \$58.2 billion.

As of January 24, 2022, 156,101,934 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 2022 Annual Meeting of Shareholders are incorporated by reference in Part III of this Form 10-K.

NORTHROP GRUMMAN CORPORATION

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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 aerospace and defense company. We deliver a broad range of products, services and solutions to U.S. and international customers, and principally to the U.S. Department of Defense (DoD) and intelligence community. Our broad portfolio is aligned to support national security priorities and our solutions equip our customers with capabilities they need to connect, protect and advance humanity.

The company is a leading provider of space systems, advanced aircraft, missile defense, advanced weapons and long-range fires capabilities, mission systems, networking and communications, strategic deterrence systems, and breakthrough technologies, such as artificial intelligence, advanced computing and cyber. We are focused on competing and winning programs that enable continued growth, performing on our commitments and affordably delivering capability our customers need. With the investments we've made in advanced technologies, combined with our talented workforce and digital transformation capabilities, Northrop Grumman is well positioned to meet our customers' needs today and in the future. For a discussion of risks associated with our operations, see “Risk Factors.”

The company originally was formed in 1939 in Hawthorne, California as Northrop Aircraft Incorporated and was reincorporated in Delaware in 1985, as Northrop Corporation. Northrop Corporation 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, including the following:

- 1994 - Acquired Grumman Corporation, a premier military aircraft systems integrator. The combined company was renamed Northrop Grumman Corporation;
- 1996 - Acquired the defense and electronics businesses of Westinghouse Electric Corporation, developer of sophisticated radar and other electronics systems;
- 2001 - Acquired Litton Industries, Inc., a global electronics and information technology company and full service shipbuilder;
- 2001 - Acquired Newport News Shipbuilding Inc., designer and builder of nuclear-powered aircraft carriers and submarines;
- 2002 - Acquired TRW Inc., developer of military and civil space systems and payloads, and integrator of complex, mission-enabling systems and services;
- 2011 - Completed the spin-off of Huntington Ingalls Industries, Inc., operator of our former shipbuilding business, comprised largely of a part of Litton Industries and Newport News Shipbuilding;
- 2018 - Acquired Orbital ATK, Inc. (OATK), developer and producer of satellites and other space systems, launch vehicles and missile products; and
- 2021 - Completed the sale of our IT and mission support services business (the “IT services divestiture”) to Veritas Capital.

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 efficient development and delivery of products and services. At December 31, 2021, the company was aligned in four operating sectors, which also comprise our reportable segments: Aeronautics Systems, Defense Systems, Mission Systems and Space Systems.

AERONAUTICS SYSTEMS

Aeronautics Systems is a leader in the design, development, production, integration, sustainment and modernization of advanced aircraft systems for the U.S. Air Force, the U.S. Navy, other U.S. government agencies, and international customers. These aircraft systems support four mission areas: strike; air dominance; battle management

NORTHROP GRUMMAN CORPORATION

and control; and intelligence, surveillance and reconnaissance (ISR). Aeronautics Systems is reported in two business areas: Autonomous Systems and Manned Aircraft.

Autonomous Systems – provides unmanned autonomous aircraft systems, including high-altitude long-endurance (HALE) strategic ISR systems and vertical take-off and landing (VTOL) tactical ISR systems. Key programs include:

- MQ-4C Triton, which provides wide area strategic ISR over vast ocean and coastal regions for maritime domain awareness to the U.S. Navy and Australia;
- RQ-4 Global Hawk, which provides high resolution imagery of land masses for theater awareness and strategic ISR to the U.S. Air Force, Japan, and the Republic of Korea;
- North Atlantic Treaty Organization (NATO) Alliance Ground Surveillance (AGS), a Global Hawk variant, for strategic ISR missions conducted in multinational theater operations; and
- MQ-8B and MQ-8C Fire Scout, ship-based, VTOL tactical ISR systems that provide situational awareness and precision targeting for the U.S. Navy.

Manned Aircraft – provides strategic long-range strike aircraft, tactical fighter and air dominance aircraft, and airborne battle management and command and control systems. Key programs include:

- Development and production of the U.S. Air Force B-21 Raider long-range strike bomber, as well as modernization and sustainment services for the B-2 Spirit bomber;
- Fuselage production for the F/A-18 Super Hornet and the F-35 Lighting II Joint Strike Fighter for use by U.S. and international forces;
- E-2D Advanced Hawkeye battle management aircraft production for the U.S. Navy, Japan, and France; and
- E-8C Joint Surveillance Target Attack Radar System (JSTARS) aircraft sustainment and modernization for the U.S. Air Force.

DEFENSE SYSTEMS

Defense Systems is a leader in the design, development, production, integration, sustainment and modernization of weapon and mission systems for U.S. military and civilian agency customers, and a broad range of international customers. Major products and services include integrated battle management systems, weapons systems and aircraft and mission systems sustainment and modernization. The sector is reported in two business areas: Battle Management & Missile Systems, and Mission Readiness.

Battle Management & Missile Systems – designs, develops and integrates multi-domain command and control (C2) and weapons systems, including munitions and missiles. The business provides integration and interoperability of net-enabled battle management, sensors, targeting and surveillance systems – a backbone architecture for Joint All-Domain Command and Control (JADC2) capable of integrating sensors and shooters, as well as air and missile defense C2 systems. It also develops and produces precision strike weapons; advanced propulsion, including high speed air-breathing and hypersonic systems; and high-performance gun systems and precision munitions. Competencies include system and software development; integration of weapon systems; tactical missile and component development and production; and production of advanced fuzes, munitions and defense electronics. Key programs include:

- Integrated Air and Missile Defense Battle Command System (IBCS) for the U.S. Army and Poland, which is a system that integrates sensors and effectors to deliver among the most advanced C2 systems for joint and coalition forces;
- Counter Rocket, Artillery and Mortar (C-RAM), a set of systems used to detect and destroy incoming threats;
- U.S. Navy's Advanced Anti-Radiation Guided Missile (AARGM), a medium-range, air-to-surface missile, and its extended range variant, AARGM-ER;
- Guided Multiple Launch Rocket System (GMLRS) propulsion and warhead subsystems for a surface-to-surface system used to defeat targets using indirect precision fires up to 70-plus kilometers;
- Precision Guidance Kit (PGK), replaces conventional fuzes for artillery and mortar munitions and transforms them into Global Positioning System enabled precision guided weapons; and

NORTHROP GRUMMAN CORPORATION

- U.S. Army's Mission Command Training Program (MCTP), providing the design, development and support to train and exercise senior Army Commanders on modern warfighting operations.

Mission Readiness – provides full life cycle service and support for software, weapons systems and aircraft, and logistics support, sustainment, operations and modernization for air, sea and ground systems. It also supports critical warfighter training for complex missions in a realistic virtual environment. Competencies include aircraft, electronics and embedded software sustainment; digital engineering and extended reality training for platform logistics; and maintenance. Key programs include:

- Global system sustainment and operations support for the F-35, B-2, E-8C JSTARS surveillance aircraft, P-3 Orion, KC-30A multi-role tanker, C-27J transport, Global Hawk and Triton programs;
- Special Electronics Mission Aircraft (SEMA) intelligence, surveillance and reconnaissance support;
- AAQ-24 sensor sustainment and repair for U.S. military customers; and
- APN-241 radar sustainment, repair and production for U.S. military and foreign military sales (FMS) customers.

MISSION SYSTEMS

Mission Systems is a leader in advanced mission solutions and multifunction systems, primarily for the U.S. defense and intelligence community, and international customers. Major products and services include cyber; command, control, communications and computers, intelligence, surveillance and reconnaissance (C4ISR) systems; radar, electro-optical/infrared (EO/IR) and acoustic sensors; electronic warfare systems; advanced communications and network systems; cyber solutions; intelligence processing systems; navigation; and maritime power, propulsion and payload launch systems. The sector is reported in four business areas: Airborne Multifunction Sensors; Maritime/Land Systems & Sensors; Navigation, Targeting & Survivability; and Networked Information Solutions.

Airborne Multifunction Sensors – delivers products, systems and services that support airborne platforms with multi-function radio frequency (RF) and EO/IR systems; radar, electronic warfare and situational awareness mission systems; and high altitude ISR sensors. Competencies include fire control, surveillance and early warning and control radar systems; electronic attack and electronic support systems; and multi-sensor processing. Key unrestricted programs include:

- Airborne Early Warning & Control (AEW&C). The center piece of the E-7 AEW&C aircraft is the Multi-role Electronically Scanned Array (MESA) radar which enables 360 degree long range advanced air moving target indicator (AMTI) capabilities for Battle Management, Command and Control, and Maritime Surveillance;
- F-35 fire control radar and Distributed Aperture System (DAS), which provides 360 degree field of view tracking, identifying, missile warning and night vision capabilities;
- LONGBOW Fire Control Radar (FCR), which provides fire control radar capabilities for the global AH-64 helicopter fleet; and
- Scalable Agile Beam Radar (SABR), an active electronically scanned array fire control radar system for F-16 aircraft.

Maritime/Land Systems & Sensors – delivers products, systems and services that enable maritime and ground platform mission capabilities via sensors, targeting and surveillance systems; electronic warfare systems; mission module integration; power, propulsion and control systems; and missile launchers. Competencies include ground and maritime radar systems; nuclear ship propulsion and power generation systems; shipboard missile and encapsulated payload launch systems; integrated bridge systems; unmanned maritime vehicles; high-resolution undersea sensors; deep-sea packaging; and mission integration. Key unrestricted programs include:

- Surface Electronic Warfare Improvement Program (SEWIP) Block III, which protects surface ships from anti-ship missiles, provides early detection, signal analysis and threat warning;
- Ground/Air Task Oriented Radar (G/ATOR), a mobile multi-mode active electronically scanned array;
- Littoral Combat Ship Mission Module Integration, which provides engineering design, support and production of mission modules for U.S. Navy littoral combat ships;

NORTHROP GRUMMAN CORPORATION

- DDG Modernization, which is comprised of several subsystems to support modernization of Arleigh Burke-class guided missile destroyers including Integrated Bridge and Navigation Systems (IBNS) and ship control systems; and
- Offshore Patrol Cutter (OPC), the integrator for C5ISR systems on the U.S. Coast Guard OPC including integrated bridge, navigation, command and control, computing network, machinery and propulsion control.

Navigation, Targeting & Survivability – delivers products, systems and services that support aircraft platforms with targeting, self-protection and situational awareness mission systems; and provides embedded navigation and positioning sensors for a range of platforms including ships, aircraft, spacecraft and weapons. Competencies include EO/IR and RF self-protection; targeting and surveillance systems; digitized cockpits; and inertial navigation systems. Key unrestricted programs include:

- LITENING Advanced Targeting Pod, an electro-optical infrared sensor system for targeting and surveillance that enables aircrews to detect, acquire, identify and track targets at long ranges;
- Large Aircraft and Common Infrared Countermeasures (LAIRCM, DoN LAIRCM, CIRCM) systems, which protect large aircraft as well as rotary wing and medium fixed wing aircraft from infrared missiles using advanced laser technology;
- APR-39 DV(2) and EV(2) Radar Warning Receiver programs, which produce a digital radar warning receiver for the U.S. Army, Navy and Marines;
- AC/MC 130J Radio Frequency Countermeasures system, which provides superior situational awareness and better enables aircraft survivability in operationally relevant environments;
- Embedded Global Positioning System (GPS) / Inertial Navigation Systems-Modernization (EGI-M) program, which provides state-of-the-art airborne navigation capabilities with an open architecture that enables rapid responses to future threats; and
- UH-60V Black Hawk integrated mission equipment package, which modernizes the U.S. Army's Black Hawk helicopters with a glass cockpit, including an integrated computational system, visual display system and control display units, extending the life and mission capabilities of the UH-60 platform.

Networked Information Solutions - delivers products, systems and services in the areas of advanced communications and network systems, full spectrum cyber solutions, secure processing, transformational computing, advanced technology development, and Signals Intelligence (SIGINT) mission systems. Competencies include software defined radios and network gateways, communications and counter-communications systems; cyber mission management; large scale cyber solutions for national security applications; cyber survivability; ground software systems; and SIGINT sensors and processing. Key unrestricted programs include:

- Battlefield Airborne Communications Node (BACN), one of the first airborne gateway systems that allows platforms to communicate and securely share data;
- F-35 Communications, Navigation and Identification (CNI) integrated avionics system, which provides secure communications and interoperability capabilities;
- Joint Counter Radio-Controlled Improvised Explosive Device Electronic Warfare (JCREW), a software-programmable jammer that provides protection from improvised explosive devices (IEDs);
- Exploitation and cyber programs, which provide cyber and intelligence domain support through unique intelligence and cyber capabilities, and;
- Airborne Signals Intelligence Payload (ASIP), which delivers key signals intelligence capabilities to the warfighter by detecting, identifying, and locating radar and other types of electronic and modern communication signals.

SPACE SYSTEMS

Space Systems is a leader in delivering end-to-end mission solutions through the design, development, integration, production and operation of space, missile defense, launch and strategic missile systems for national security, civil government, commercial and international customers. Major products include satellites and payloads; ground systems; missile defense systems and interceptors; launch vehicles and related propulsion systems; and strategic missiles. The sector is reported in two business areas: Launch & Strategic Missiles, and Space.

Launch & Strategic Missiles – designs, develops, manufactures and integrates small- and medium-class space launch vehicles to place satellites into earth orbit; suborbital launch vehicles that place payloads into a variety of high-altitude trajectories; large strategic missile systems; and missile defense systems. Competencies include large strategic missile design, integration, production and sustainment, as well as the production of medium- and large-class rocket propulsion systems for human and cargo launch vehicles, hypersonic boosters and missile defense interceptors. Key programs include:

- Antares rocket, used in the execution of our Commercial Resupply Services (CRS) contracts with the National Aeronautics and Space Administration (NASA);
- Development and production of solid rocket motors for NASA’s Space Launch System (SLS) heavy lift vehicle;
- Missile defense systems, interceptors, targets, mission processing and boosters for the Missile Defense Agency’s (MDA) Next-Generation Interceptor (NGI), Ground-based Midcourse Defense (GMD) system and Ground Based Interceptor (GBI);
- Ground Based Strategic Deterrent (GBSD) Engineering & Manufacturing Development (EMD) program;
- Medium-class solid rocket motors for the U.S. Navy’s Trident II Fleet Ballistic Missile program; and
- Intercontinental Ballistic Missile (ICBM) Ground Subsystem Support Contract (GSSC).

Space – designs, develops, manufactures and integrates spacecraft systems, subsystems, sensors, payloads and ground systems to deliver mission capability to national security, science and environmental, communications, on-orbit servicing, and human-rated space systems for earth orbit and deep-space exploration missions. Much of this business is performed through restricted programs. Key unrestricted programs include:

- Cygnus spacecraft, used in the execution of our CRS contracts with NASA;
- Habitation and Logistics Outpost (HALO) module in support of NASA’s Gateway;
- Advanced Extremely High Frequency (AEHF), Enhanced Polar System (EPS), Evolved Strategic SATCOM (ESS), and Protected Tactical SATCOM (PTS) satellites and payloads providing survivable, protected communications to U.S. forces;
- Next-Generation Overhead Persistent Infrared (Next Gen OPIR) program satellites and payloads providing data for missile defense;
- Space sustainability driven by on orbit servicing vehicles Mission Extension Vehicle (MEV) 1 and 2; and
- James Webb Space Telescope (JWST), a large infrared telescope built for NASA that was launched on December 25, 2021 to study the origins of the universe.

CUSTOMER CONCENTRATION

Our largest customer is the U.S. government. Sales to the U.S. government accounted for 85 percent, 84 percent and 83 percent of sales during the years ended December 31, 2021, 2020 and 2019, respectively. For further information on sales by customer type, contract type and geographic region, see Note 16 to the consolidated financial statements. 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 civil markets. The Boeing Company, General Dynamics, L3Harris Technologies, Lockheed Martin, and Raytheon Technologies 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 competitors bidding on program opportunities and the number of bid protests (competitor protests of U.S. government procurement awards).

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, serve as 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, 2021, total backlog, which is equivalent to the company's remaining performance obligations, was \$76.0 billion as compared with \$81.0 billion at December 31, 2020. In connection with the IT services divestiture, the company reduced backlog by \$1.4 billion during the first quarter of 2021 (\$1.0 billion at Defense Systems, \$0.2 billion at Mission Systems and \$0.2 billion at Space Systems). For further information, see "Backlog" in "Management's Discussion and Analysis of Financial Condition and Results of Operations" (MD&A) and 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 technologies we develop. 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 experienced challenges with access to certain raw materials due to several global events such as microelectronics shortages and COVID-19. Nonetheless, these challenges have not to date led to significant cost increases or schedule delays. See "Risk Factors" for further discussion regarding risks related to raw materials.

HUMAN CAPITAL

Creating a diverse, talented and inclusive workplace is central to our culture, employee engagement, innovation and excellence, and in performing and delivering on our commitments. Our culture is an important factor in our ability to continue attracting and retaining qualified employees, particularly those with security clearances and requisite skills in multiple areas, including science, technology, engineering and math. This focus was a factor in our ability to hire approximately 9,500 new employees in 2021 and as of December 31, 2021, we have approximately 88,000 employees.

Additional information regarding our human capital strategy is available in our Sustainability Report and Proxy Statement, which can be found on our company website. Information on our website, including our Sustainability Report, is not incorporated by reference into this Annual Report.

Our Values and Culture

Our values reflect our priorities and form the bedrock of our culture:

- We do the right thing – we earn trust, act with ethics, integrity and transparency, treat everyone with respect, value diversity and foster safe and inclusive environments.
- We do what we promise – we own the delivery of results, focused on quality.
- We commit to shared success – we work together to focus on the mission and take accountability for the sustainable success of our people, customers, shareholders, suppliers and communities.
- We pioneer – with fierce curiosity, dedication and innovation, we seek to solve the world's most challenging problems.

We believe our values are vital to the continued and future success of the company, and in our ability to attract and retain a diverse workforce. Our values are also integral to our commitment to long-term sustainability, with robust environmental, social and governance (ESG) practices across our company. The company has a Standards of Business Conduct program. All employees are empowered to raise concerns without fear of reprisal. We employ 140 business conduct advisors whose job is to promote values and an ethical culture within the company.

Our annual employee survey gives employees the opportunity to provide feedback on our culture. This survey is managed by a third-party vendor to encourage candor and solicit feedback on many aspects of engagement, including company leadership, culture, inclusion and career development. In 2021, our employee response rate was 82 percent, an indication that our employees believe their feedback is important, and we were named a “High Performing Company” by the third-party vendor based on our strong survey results. Our leaders review the survey feedback and work with their teams to take action based on survey results.

Diversity, Equity and Inclusion

Diversity, equity and inclusion (DE&I) are, and have long been, critical to our culture and our company’s success. Our focus on DE&I enhances engagement and increases innovation and quality, enabling us to deliver better performance for our shareholders, customers, and employees. Diversity is one of the company’s non-financial ESG performance metrics and is reviewed by the Board of Directors. Across our total employee population, as of December 31, 2021, 25 percent are female, 36 percent are people of color, 18 percent are veterans and 9 percent are persons with disabilities. Over the past 10 years, at the vice president level, we have more than doubled the representation of females from 16 percent to 35 percent and increased the representation of people of color by approximately 65 percent, from 11 percent to 18 percent.

Talent Acquisition, Management and Development

We execute our Talent Management strategy with the whole employee experience in mind. We utilize an employee experience continuum that focuses on key career milestones and aligns our employee development, engagement and retention efforts with the specific needs of our employees throughout their careers. We believe this holistic approach to talent management results in a better experience for our employees, from recruiting to retirement.

We hold regular talent review discussions to ensure insight into talent at various levels of the organization. Succession plans are refreshed and reviewed to ensure a robust, diverse pipeline of talent and business continuity with a tight linkage to development.

We design our employee development programs to strengthen employee skills aligned to our current and future business needs, encourage knowledge transfer and support career growth and progression. In late 2020, we launched My Learning Experience, a machine learning enabled content aggregator designed to create a unique and personalized learning experience for each employee. We offer our employees online career-specific tools and resources and we also support development opportunities through educational institutions with our Education Assistance Program. Our early-in-career rotation program, Pathways, develops talent pipelines with both depth of skills and breadth of experiences that are critical to the company’s future talent needs. Our technical cohort programs are designed to cultivate technical, domain expertise and collaborative thought leadership for early through advanced career levels.

As our company continues to grow, we rely on an integrated talent acquisition program. The company strategically attracts, identifies, and onboards candidates in support of business needs and priorities. In order to accomplish our goals, we seek talent with different perspectives, skills and experiences; maintain strategic relationships with colleges; offer a robust employee referral program; and partner with numerous diversity organizations, military organizations and our trusted external partners. The company continues to monitor the evolving hiring environment, while applying agile recruiting methods to ensure employees and candidates have an exceptional experience.

Employee Health and Safety

People are our most valuable resource, and we work diligently to protect the health, safety and well-being of our employees, customers, visitors and others at our facilities. During 2021, we have taken, and continue to take, robust actions in response to the COVID-19 pandemic to help protect the health, safety and well-being of our employees and others. See “COVID-19” in MD&A for further discussion.

Health and safety are a core focus in everything we do. Risk and hazard identification, abatement and prevention are key components of Northrop Grumman’s safety program. Everyone has a responsibility to identify workplace hazards and we empower employees to report these hazards without fear of repercussion. We evaluate the effectiveness of our health and safety programs externally, through benchmarking with industry peers and the U.S. Bureau of Labor Statistics. Internally, we determine program effectiveness by conducting trend analyses of our past performance.

Collective Agreements

Approximately 3,900 employees are covered by 15 collective agreements in the U.S., of which we negotiated five renewals in 2021 and expect to negotiate four renewals in 2022.

See “Risk Factors” for further discussion regarding risks related to our workforce and employee relations.

REGULATORY MATTERS

Government Contract Security Restrictions

We are prohibited by the U.S. government from publicly discussing the details of certain classified programs. These programs are generally referred to as “restricted” in this Annual Report. The consolidated financial statements and financial information in this Annual Report 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), which are regulations that govern cost accounting requirements for government contracts. Examples of costs incurred by us and not billed to the U.S. government in accordance with applicable FAR and CAS requirements include, but are not limited to, unallowable employee compensation, charitable donations, interest expense, advertising and certain legal costs.

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

Our long-term contracts typically fall into one of two contract types:

Cost-type contracts – Cost-type contracts include cost plus fixed fee, cost plus award fee and cost plus incentive fee contracts. Cost-type contracts generally provide 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 provide 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 can be variable due to award and incentive fees, which 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. Incentive fees are generally based on cost or schedule and provide for an initially negotiated fee to be adjusted later, based on the relationship of total allowable costs to total target costs or as schedule milestones are met. Award and incentive fees are included in total estimated sales to the extent it is probable that a significant reversal in the amount of cumulative revenue recognized will not occur when the uncertainty associated with the variable consideration is subsequently resolved. We estimate variable consideration as the most likely amount to which we expect to be entitled.

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 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” for further information regarding our contracts and Note 16 to the consolidated financial statements for sales by contract type.

NORTHROP GRUMMAN CORPORATION

The following table summarizes sales for the year ended December 31, 2021, recognized by contract type and customer category:

<i>\$ in millions</i>	U.S. Government ⁽¹⁾	International ⁽²⁾	Other Customers	Total	Percentage of Total Sales
Cost-type contracts	\$ 17,357	\$ 653	\$ 18	\$ 18,028	51 %
Fixed-price contracts	12,977	4,329	333	17,639	49 %
Total sales	\$ 30,334	\$ 4,982	\$ 351	\$ 35,667	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.

Environmental

Our operations are subject to and affected by federal, state, local and foreign laws, regulations and enforcement actions relating to protection of the environment. 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 (away from landfills). In 2021, we measured our performance against these goals and exceeded our greenhouse gas goal by reducing emissions 44 percent and met our potable water reduction goal of 20 percent. We made strong progress in increasing our solid waste diversion from landfills, achieving a 69 percent diversion rate, falling just short of our goal. We were challenged by changes in collection methods and waste haulers at some sites, related, in some cases, to COVID-19. We are continuing our commitment to climate and environmental sustainability and are in the process of finalizing the next generation of goals for 2022 and beyond.

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 12 to the consolidated financial statements for further information regarding environmental matters.

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 U.S. Securities and Exchange Commission (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.

Industry and Economic Risks

- ***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 85 percent of our sales in 2021; we have a number of large programs with the U.S. Department of the Air Force, in particular. The U.S. government has the ability to delay, modify or cancel ongoing competitions, procurements and programs, as well as to change its future acquisition strategy. We cannot predict the impact on existing, follow-on, replacement or future programs from potential changes in the threat environment, defense spending levels, government priorities, political leadership, procurement practices and strategy, military strategy and planning; or broader changes in social, economic or political demands and 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 convenience, contractors are generally protected by provisions covering reimbursement for costs incurred and profit on those costs up to the amount authorized under the contract, but not the anticipated profit that would have been earned. In the event of termination due to default, contractors may be required 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 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. The U.S. government has invoked and 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 to date and for costs associated with the temporary stoppage of work plus a reasonable fee. However, such temporary stoppages often introduce inefficiencies and result in financial and other damages for which contractors may not be able to negotiate full recovery. In some cases, they have also ultimately resulted and could result in termination of a contract for convenience or reduced future orders.

A significant shift in government priorities, programs or acquisition strategies 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 can 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 an annual fiscal year basis even though the program performance period may extend over several years. Programs are often partially funded initially and additional funds are committed only as Congress makes further appropriations. When we incur costs in excess of funds obligated on a contract, we are generally at risk for reimbursement of those costs unless and until additional funds are obligated to the contract. We cannot predict the extent to which funding for individual programs will be included, increased or reduced as part of the annual appropriations ultimately approved or in separate supplemental appropriations or continuing resolutions. Laws and plans adopted by the U.S. government relating to, along with pressures on the federal budget, potential changes in priorities and defense spending levels, the appropriations process, use of continuing resolutions (with restrictions, e.g., on new starts) and the federal debt limit, have adversely affected and 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 for such programs has at times been, and in the future may be, terminated or adjusted by the government or prime contractor.

The U.S. continues to face an uncertain and changing political environment and substantial fiscal and economic challenges, which affect funding. The budget environment and uncertainty surrounding the appropriations processes

and the debt ceiling, remain significant short and long-term risks. See “Overview – U.S. Political and Economic Environment” in MD&A. Considerable uncertainty exists regarding how future budget and program decisions will unfold, including the defense spending priorities. If annual appropriations bills are not timely enacted, the U.S. government may continue to operate under a continuing resolution, restricting new contract or program starts, presenting resource allocation challenges and placing limitations on some planned program budgets, and we may face a government shutdown of unknown duration. If a prolonged government shutdown of the DoD were to occur, it could result in program cancellations, disruptions and/or stop work orders and could limit the U.S. government’s ability to progress programs and make timely payments, and our ability to perform on our U.S. government contracts and successfully compete for new work. If the statutory debt limit is not increased adequately, we could be obligated to work without receiving timely payments.

Future funding for certain programs in which we participate may be reduced, delayed or cancelled. In addition, budget cuts globally could continue to adversely affect the viability of our subcontractors and suppliers, and our employee base. While we believe that our business is well-positioned in areas for future defense spending, changing priorities, budget pressures, defense spending cuts, challenges in the appropriations process, the debt ceiling and ongoing fiscal debates remain uncertain.

Significant delays or reductions in appropriations for our current and future programs; 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 use estimates when accounting for contracts. Contract cost growth or changes in estimated contract revenues and costs can affect our profitability and our overall financial position.***

Contract accounting requires judgment relative to assessing risks, estimating contract revenues and costs, and 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 considered.

Our operating income can be adversely affected when estimated contract costs increase. Reasons for increased estimated contract costs include: design issues; changes in estimates of the nature and complexity of the work, including technical or quality issues or requests for additional work; production challenges, including those resulting from the timeliness of customer funding, unavailability or reduced productivity of qualified and timely cleared labor; the availability, performance, and quality of significant subcontractors; supplier issues, including the costs, timeliness and availability of materials and components; changes in laws or regulations; actions necessary for long-term customer satisfaction; and natural disasters or environmental matters. We have filed and may file requests for equitable adjustment or claims to seek recovery in whole or in part for our increased costs and aim to protect against these risks through contract terms and conditions when practical, but the government may disagree with our requests and may not have funding to cover them.

Our risk varies with the type of contract. Due to their nature, fixed-price contracts inherently tend to have more financial risk than cost-type contracts, including as a result of inflationary pressures, labor shortages, and increased labor rates. In 2021, approximately half of our sales were derived from fixed-price contracts. We have typically looked to fixed-price contracts where costs can be more reasonably estimated based on actual experience, such as for production programs. However, our customers may also seek fixed-price contracts for development programs, where the risks are greater. In addition, our contracts contain provisions relating to cost controls and audit rights. If we do not achieve our estimates or meet terms specified in our contracts, our profitability has at times been and may be reduced, and we have incurred and may incur losses.

Certain of our fixed-price contracts include or may include fixed-price development work. This work is inherently more uncertain, and, as a result, there is typically more variability in estimates of the costs to complete the development stage. As work progresses into production, the risks associated with estimating the total costs are typically reduced. While management uses its best judgment to estimate costs associated with fixed-price development contracts, future events could result in adjustments.

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 uncertain 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. We also face additional financial risk due to the number of contract solicitations requiring the contractor to bid on cost-type development work and related fixed-price production lots and/or options in one submission, or cost-type development work requiring the contractor to provide certain items to the customer at the contractor's expense or at little or no fee.

We also face the risk that contracts do not or will not enable full recovery of costs incurred as a result of or related to the COVID-19 pandemic.

Because of the significance of management's judgments and the estimation processes, 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 on the profitability of one or more of our contracts and on our overall financial position, results of operations and/or cash flows. See "Critical Accounting Policies, Estimates and Judgments" in MD&A.

- ***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 financial capacity, more extensive or specialized engineering, manufacturing, or marketing capabilities in some areas, 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, including new entrants. We are also facing increasing competition for, and more limited access to various critical products, services and other supplies, including related to scarcity of resources, and mergers and acquisitions. In some instances outside the U.S., foreign companies may receive loans, 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. Some customers, including the DoD, are turning to commercial contractors, rather than traditional defense contractors, for some products and services, and continue to utilize small business contractors or determine to source work internally. In addition, our success in competing and remaining cost-competitive depends, in part, on our ability successfully to adopt and integrate new digital manufacturing and operating technologies into our products and services.

Bid protests can 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, or to prevail against other attempts to interfere with our ability to obtain and retain awards, we may experience declines in future revenues and market share, which could have a material adverse effect on our financial position, results of operations and/or cash flows.

Legal and Regulatory Risks

- ***We are subject to various investigations, claims, disputes, enforcement actions, litigation, and other legal proceedings that could ultimately be resolved against us.***

The size, nature and complexity of our business make us susceptible to investigations, claims, disputes, enforcement actions, prosecutions, litigation and other legal proceedings, particularly those involving governments, which have at times been, and may continue to be, increasingly aggressive. We are and may become subject to investigations, claims, disputes, enforcement actions and administrative, civil or criminal litigation, arbitration or other legal proceedings globally and across a broad array of matters, including, but not limited to, government contracts, commercial transactions, false claims, false statements, antitrust, compliance with government orders, mischarging, contract performance, fraud, procurement integrity, securities laws and requirements, products liability, warranties, hazardous materials, personal injury claims, environmental, shareholder derivative actions, acquisitions and divestitures, intellectual property, tax, corporate law and obligations, employees, export/import, anti-corruption, debt and equity, labor, health and safety, the COVID-19 pandemic and the company's response to it, accidents, launch failures and employee benefits and plans, including plan administration, improper payments, and issues related to privacy and security (cyber and physical), as well as matters relating to the Orbital ATK Federal Trade Commission (FTC) decision and order. See Note 11 to the consolidated financial statements for information regarding the Orbital

ATK FTC decision and order and subsequent interactions with FTC staff. These matters can divert financial and management resources; result in administrative, civil or criminal fines, penalties or other sanctions (including judgments, convictions, consent or other voluntary decrees or agreements), compensatory, treble or other damages, non-monetary relief, or other liabilities; and otherwise harm our business and our ability to obtain and retain awards. Certain allegations against a contractor may lead to suspension or debarment from government contracts or suspension of export/import privileges for the company or one or more of its components. Suspension or debarment or criminal resolutions in particular could have a material adverse effect on the company because of our reliance on government contracts and export authorizations. An investigation, claim, dispute, enforcement action or litigation, even if pending or not ultimately substantiated or if fully indemnified or insured, can also negatively impact our reputation among our customers and the public, and make it substantially more difficult for us to compete effectively for business, obtain and retain awards, ensure funding for our programs or obtain adequate insurance in the future. Investigations, claims, disputes, enforcement actions, litigation or other legal proceedings could have a material adverse effect on our financial position, results of operations and/or cash flows.

- ***The improper conduct of employees, agents, subcontractors, suppliers, business partners or joint ventures in which we participate can impact our reputation, our ability to do business and our financial position, results of operations and/or cash flows.***

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, false claims, procurement integrity, cost accounting and billing, competition, information security and data privacy, or the terms of our contracts. 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. We have in the past experienced and may in the future experience such misconduct, despite a vigorous compliance program and strong culture. This risk of improper conduct may increase as we continue to expand globally, with greater opportunities and demands to do more business with local and new partners. At the same time, law enforcement agencies are continuing to focus on combating global corruption and other misconduct. In the ordinary course of our business we form and are members of joint ventures (with that term used throughout to refer to joint efforts or business arrangements of any type). Notwithstanding our robust process, we are unable to prevent any and all misconduct or violations of applicable laws by these joint ventures (including their officers, directors and employees) or our partners. Improper actions by our employees or those with whom or through whom we do business subjects us to risk of administrative, civil or criminal investigations and enforcement actions; monetary and non-monetary penalties; liabilities; and the loss of privileges and other sanctions, 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.

- ***As a U.S. government contractor, we and our partners are subject to various procurement and other laws, regulations and contract terms applicable to our industry, as well as those more broadly applicable, and we could be adversely affected by changes in such laws, regulations or terms, 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, as well as ones more broadly applicable. These regulations and other requirements, although sometimes customary in government contracting, increase our performance and compliance costs and risks, and are regularly evolving. These costs are not always fully recoverable. New laws, regulations or procurement requirements or changes to current ones (including, for example, related to cybersecurity, information protection, cost accounting, COVID-19, recovery of employee compensation costs, counterfeit parts, pensions, anti-human trafficking, and use of certain non-US equipment) 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 DCAA, Defense Contract Management Agency (DCMA) and the DoD Inspector General. These agencies review performance under our contracts, our cost structure and accounting, and our compliance with applicable laws, regulations, terms and standards, as well as the adequacy of our systems 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. When an audit uncovers improper or illegal activities, we are subject to possible 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 to be inadequate, with significant financial impact, regardless of the ultimate outcome. In addition, we risk serious reputational harm in situations involving allegations of impropriety made against us or our business partners.

Our industry has experienced, and we expect it will continue to experience, significant changes to business practices globally, largely as a result of an increased focus on affordability, efficiencies, business systems, recovery of costs and a reprioritization of available defense funds. We have experienced and may continue to experience an increased number of audits and challenges to our claims and our government accounting business systems for current and past years, as well as a lengthened period of time required to close open audits, an increased number of broad requests for information and an increased risk of withholding of payments. 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, including certain costs related to environmental remediation and pensions, and certain assumptions used by the company to determine pension expense, are being challenged, debated and, in certain cases, modified, all with potentially significant financial costs to the company. 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, among others, have affected and may in the future 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, state and local laws, regulations, contract terms and requirements related to our industry, our products and the businesses we operate, as well as those more broadly applicable to industry, such as securities laws. These laws and regulations include, but are not limited to, the Truthful Cost or Pricing Data Act, False Claims Act, Procurement Integrity Act, Federal Communications Commission Act, CAS, FAR, International Traffic in Arms Regulations promulgated under the Arms Export Control Act, Export Administration Regulations promulgated under the Export Control Reform Act, international sanctions, Close the Contractor Fraud Loophole Act and the Foreign Corrupt Practices Act (FCPA) (and other similar anti-corruption provisions), as well as orders, rules and regulations administered by the Bureau of Alcohol, Tobacco, Firearms and Explosives, and those related to pandemics. These requirements, whether specific to our industry or broadly applicable, may limit our conduct and ability to achieve our goals. If we are found to have violated any such requirements (including both those specific to our business and those more broadly applicable), 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/import privileges; administrative or civil judgments and liabilities; criminal judgments or convictions, liabilities and consent or other voluntary decrees or agreements; other sanctions; the assessment of penalties, fines, or compensatory, treble or other damages or non-monetary relief or actions; or suspension or debarment.

If we or those with whom we do business do not comply with the laws, regulations, contract terms and processes to which we are subject or if customer business practices or requirements change significantly, including with respect to allowable costs, it could affect our ability to compete and have a material adverse effect on 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 or enforced differently over time. Compliance with these environmental laws and regulations requires, and is expected to continue to require, significant operating and capital costs. We may be subject to substantial administrative, civil or criminal fines, penalties or other sanctions (including suspension and debarment) 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 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 or new contaminants; imposition of fines, penalties, compensatory or other damages (including natural resource

damages); a determination that certain remediation or other 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 material 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 individual and class actions) relating to alleged impacts from pollutants released into the environment. These matters could result in compensatory or other damages, remediation costs, fines, penalties, and non-monetary relief, and adverse determinations on allowability or insurance coverage.

The company is 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, as included in Note 12, substantial remediation costs related to the legacy Bethpage environmental conditions. It is also possible that applicable remediation, allocation and allowability standards and other claims and requirements to which we are subject may continue to change, and our costs may increase materially. In December 2020, the parties reached a tentative agreement with the State of New York regarding the steps the company will take to implement the State's Amended Record of Decision and to resolve certain other potential claims, including for natural resource damages. We understand that the State will next seek court approval of the consent decree. We are also in discussions with the DoD (Navy and DCMA) and the Bethpage and South Farmingdale Water Districts to explore whether claims involving these parties can be resolved at this stage. In addition to disputes and legal proceedings with government entities related to environmental conditions at the site (including remediation, allocation and allowability), we are a party to various, and may become a party to disputes and legal proceedings with individual and class action plaintiffs alleging personal injury and property damage, with insurance carriers, and with other parties.

In addition, at times, government and private parties 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 we believe 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.

- ***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. (federal, state and local) or foreign tax laws and regulations, or their interpretation and application, including the possibility of retroactive effect, have affected and could continue to affect our tax expense and profitability as, for example, they did in 2017 upon passage of the Tax Cuts and Jobs Act. In addition, the final determination of any state or federal tax audits or related litigation, in particular with regard to the sustainment of our positions on research credits and timing of revenue recognition under IRC Section 451(b), could be materially different from our historical income tax provisions and accruals.

As a result of the acquisition of OATK in 2018, we are subject to outstanding tax audits and may be subject to future tax audits and legal challenges involving OATK and its subsidiaries, their successors, the spinoff of its then subsidiary Vista Outdoor Inc. (Vista) in 2015 and related matters. OATK entered into a tax matters agreement with Vista, pursuant to which, in certain circumstances and subject to certain limitations, Vista is required to indemnify OATK against taxes on the spinoff. However, there are circumstances pursuant to which we may be unable to obtain an indemnification payment or we may be required to indemnify Vista.

Beginning in 2022, the Tax Cuts and Jobs Act of 2017 ("TCJA") eliminates the option to deduct research and development expenditures currently and requires taxpayers to amortize them over five years pursuant to IRC Section 174. Although Congress is considering legislation that would defer the amortization requirement to later years, we have no assurance that the provision will be repealed or otherwise modified. If the requirement is not modified, it will materially reduce our cash flows beginning in 2022.

Changes in our tax provisions or an increase in our tax liabilities, whether due to changes in applicable laws and regulations, the interpretation or application thereof, or a final determination of tax audits or litigation or agreements, could have a material adverse effect on our financial position, results of operations and/or cash flows.

Business and Operational Risks

- *We face various risks related to health epidemics, pandemics and similar outbreaks, which may have material adverse effects on our business, financial position, results of operations and/or cash flows.*

We face a wide variety of risks related to health epidemics, pandemics and similar outbreaks, especially of infectious diseases, including COVID-19. Since first reported in late 2019, the COVID-19 pandemic has dramatically impacted the global health and economic environment, including millions of confirmed cases and deaths, business slowdowns or shutdowns, labor shortages, supply chain challenges, changes in government spending and requirements, regulatory challenges, inflationary pressures and market volatility. Although we have, to date, managed to continue most of our operations, we cannot predict the future course of events nor can we assure that this global pandemic, including its economic impact, will not have a material adverse impact on our business, financial position, results of operations and/or cash flows. (For further information relating to the evolving environment, our experience to date, and various steps taken related to the COVID-19 pandemic, see MD&A).

Our operations have been and, we expect, will continue to be further impacted by the COVID-19 pandemic. The pandemic likely will continue to impact our workforce, including staffing levels (as a result of illnesses, quarantine, isolation and absenteeism) and adjusted work locations and schedules; our facilities and access to them; those with whom we do business and on whom we rely to continue our operations; travel restrictions; and, overall, our ability to perform as required, at cost and on schedule, and to achieve and increase efficiencies. The pandemic may require us to continue to take extraordinary measures to protect the health and well-being of our employees. We have incurred and will continue to incur additional costs which may not be fully recoverable. If, going forward, significant portions of our workforce are unable to work effectively, or we are otherwise unable to maintain our level of operations, staffing and performance, we can expect facility closures, work slowdowns or stoppages, and adverse impacts on our overall performance, operations and financial results. The macroeconomic impacts of the pandemic, including a tightened labor market and government requirements, including those related to vaccinations, will also likely continue to affect our company. They may further affect our ability to hire, develop and retain our talented and diverse workforce, to maintain performance levels (especially cost and schedule), and to maintain our corporate culture. We expect to continue to incur additional costs as a result of the COVID-19 outbreak, including to protect the health and well-being of our employees, to respond to government requirements, and as a result of impacts on operations and performance, including staffing and schedule, which costs we may not be fully able to recover. We are and may be subject to additional regulatory requirements, enforcement actions and litigation, again with costs and liabilities that are not fully recoverable or insured.

The continued global pandemic has impacted and may continue to impact the company's supply chains. If our suppliers have increased challenges with their workforce (including as a result of illness, absenteeism, reactions to health and safety or government requirements), facility closures, timely access to necessary components, materials and other supplies at reasonable prices, access to capital, and access to fundamental support services (such as shipping and transportation), they may be unable to provide the agreed-upon goods and services in a timely, compliant and cost-effective manner. We have incurred and may in the future incur additional costs and delays in our business, including as a result of higher prices, schedule delays or the need to identify and develop alternative suppliers, and we may need to provide additional resources to support our suppliers or otherwise continue performance under our contracts. In some instances, we may be unable to do that, incurring additional liabilities under our current contracts and hampering new ones.

The global COVID-19 crisis has put extraordinary pressures on the U.S. government and governments around the world. In some cases, it has caused delays or limits in the ability of the government and other customers (including other prime contractors) to perform, including making timely payments and awards to us, negotiating contracts and agreeing on appropriate costs for recovery, performing quality inspections, supporting testing, accepting delivery, approving security clearances (for individuals and facilities), and providing necessary personnel, equipment and facilities. In addition, as a result of the COVID-19 crisis, we expect continued changes in our customers' priorities and practices, as our customers in both the U.S. and globally confront competing budget priorities, staffing challenges and limited resources. These changes may impact current and future programs, customer priorities, government payments and other practices, procurements, and funding decisions.

While we have significant sources of cash and liquidity and access to committed and uncommitted credit lines, a prolonged period of generating lower cash from operations could adversely affect both our financial condition and the achievement of our strategic objectives. Additionally, there can be no assurance that we will not face credit rating downgrades, and such downgrades could adversely affect our cost of funds, liquidity and access to capital markets. Market volatility may also impact investment performance and our expected asset valuations and returns,

which could materially impact the calculation of long-term liabilities such as our pension obligations. And inflationary pressures related to COVID-19 could adversely affect our business further, including through increased cost of labor and materials on our contracts.

We continue to work with our stakeholders in an effort to address responsibly this global pandemic. We continue to monitor the situation, to assess further possible implications to our employees, business, supply chain and customers, and to take certain actions in an effort to mitigate various adverse consequences.

We expect that the longer the COVID-19 pandemic, including its economic disruption, continues, the greater the adverse impact on our business operations, financial performance and results of operations could be. Given the tremendous uncertainties and variables, we cannot at this time predict the impact of the global COVID-19 pandemic, or any future pandemic, but any one could have a material adverse effect on our business, 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 significant cyber and other security threats, including attempts to gain unauthorized access to and to harm sensitive information and networks; insider threats; ransomware; threats to the safety of our directors, officers and employees; threats to the security and viability of our facilities, infrastructure, products, and subcontractors or others in our supply chain (referred to inclusively as suppliers); and threats from terrorist acts, civil unrest or other acts of aggression. We are also subject to increasing government, customer and other cyber and security requirements, including disclosure obligations.

We have robust measures in place to address and mitigate cyber-related risks. However, we have experienced cyber attacks and expect we will continue to experience additional attacks in the future. We continue to invest in the cybersecurity and resiliency of our networks and products and to enhance our internal controls and processes, which are designed to help protect our systems and infrastructure. These include timely detection of incidents through monitoring, training, incident response capabilities, and mitigating cyber and security risks to our data, systems, technology, and products and services. However, these efforts may not be fully effective.

Our customers and partners (including our suppliers and joint ventures) with whom we do business and entrust confidential data, and on whom we rely to provide products and services, face similar threats and growing requirements, including ones for which others may seek to hold us responsible. We depend on our customers, suppliers, and other business partners to implement adequate controls and safeguards to protect against and report cyber incidents. If they fail to do so, we may suffer financial and other harm, including to our information, operations, performance, employees, customers and reputation.

Although we implement various measures and controls to monitor and mitigate risks associated with these threats and to increase the cyber resiliency of our infrastructure and products, there can be no assurance that these processes will be sufficient. Successful attacks could lead to losses or misuse of sensitive information or capabilities; theft or corruption of data; harm to personnel, infrastructure or products; financial costs and liabilities; protracted interruptions in our operations and performance; and the misuse of our products, as well as damage to our reputation as a government contractor and provider of cyber-related or cyber-protected goods and services.

Cyber threats, both on premises and in the cloud, are evolving and include, but are not limited to: malicious software, destructive malware, ransomware, attempts to gain unauthorized access to systems or data, disruption to operations, critical systems or denial of service attacks; unauthorized release of confidential, personal or otherwise protected information (ours or that of our employees, customers or partners); corruption of data, networks or systems; harm to individuals; and loss of assets. In addition, we could be impacted by cyber threats or other disruptions or vulnerabilities found in products or services we use or in our internal, partners' or customers' systems that are used in connection with our business. Some of these threats are zero-day attacks associated with unknown third party software or product vulnerabilities. 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 also face threats to our physical security, including to our facilities and the safety and well-being of our people. These threats could involve terrorism, insider threats, workplace violence, civil unrest, natural disasters, damaging weather, fires or similar acts, which could adversely affect our company. Our customers and suppliers face similar risks that, if realized, could also adversely impact our operations. The business impact of such acts could include delays, manufacturing downtime, and other impacts that could detrimentally impact our ability to perform our operations. We could also incur unanticipated costs to remediate impacts, loss of business and ability to win new business, which could adversely impact our cash flow, financial condition or results of operations.

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.

We also face increasing disclosure obligations related to cyber and other security events. Despite rigorous processes, we risk failing to meet all of our disclosure obligations and/or having our disclosures misinterpreted.

The occurrence and impact of these various risks and considerations are difficult to predict, but one or more of them could result in the loss or corruption of information or capabilities, harm to individuals or property, damage to our reputation, loss of business, disruption in our business, contractual or regulatory actions and liabilities, any one of which could 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 and growth opportunities are heavily dependent upon our ability to attract and retain sufficient personnel with security clearances and requisite skills in multiple areas, including science, technology, engineering and math, and who share our values and are able to operate effectively consistent with our culture. Outside the U.S., it is increasingly important that we are also able to attract and retain personnel with relevant local qualifications and experience. We are facing increased competition for talent, both with traditional defense companies and commercial companies, and increasing wage rates. If qualified personnel are more scarce or more difficult to attract or retain under reasonable terms, or if we experience a high level of attrition, generally or in particular areas, or if such personnel are increasingly unable to obtain security clearances on a timely basis, we would expect higher labor-related costs and we could face challenges performing on various of our programs. In addition, the macroeconomic impacts of the pandemic, including a tightened labor market and government requirements, including those related to vaccinations, may further affect our ability to hire, develop and retain our talented and diverse workforce, and to maintain performance levels and our corporate culture. These challenges may be further compounded by an increase in remote work. There is also the risk that we are unable to achieve our diversity, equity and inclusion objectives or, more broadly, to meet sustainability goals increasingly required by our shareholders, employees and other stakeholders.

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 new demands, or if our employees pursue new collective representation, we could incur additional expenses and may be subject to work stoppages, slow-downs or other labor-related disruptions. 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, which could have a material adverse effect on our financial position, results of operations and/or cash flows.

- ***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, chemicals and components and subsystems for our products, produce hardware elements and sub-assemblies, provide software and intellectual property, provide information about the parts they supply to us, and perform some of the services we need for our operations or provide to our customers, and to do so in compliance with all applicable laws, regulations and contract terms, while maintaining strong values and cultures. Disruptions or performance problems caused by our subcontractors or other suppliers (referred to inclusively as suppliers), failure to meet regulatory or contractual requirements, unethical behavior, or a misalignment between our contractual obligations to our customers and our agreement with our suppliers, have had and may continue to have various adverse impacts on the company, including on our ability to meet our commitments to customers.

Our ability to perform our obligations on time is adversely affected if one or more of our suppliers is unable to provide the agreed-upon products, materials or information, or perform the agreed-upon services in a timely, compliant and cost-effective manner or otherwise to meet the requirements of the contract or applicable regulations. Changes in political or economic conditions, including changes in defense budgets or credit availability or sanctions, or other changes impacting a supplier, as well as their ability to retain talent and other resources, and requirements imposed on them by other customers, has adversely affected and could in the future adversely affect the financial stability of our suppliers and/or their ability to perform. The inability of our suppliers to perform adequately has

resulted in and could in the future result in the need for us to transition to alternate suppliers if available, which could result in significant incremental cost and delay or the need for us to provide other resources to support our existing suppliers. This risk increases as the demands grow for our suppliers to meet extensive government-related cyber and other requirements.

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. Among many other examples, we require assured access to microelectronics. Our ability to produce and/or deliver products will be significantly impacted if the microelectronics manufacturing supply chain is cut off or significantly delayed. We also are facing increased regulatory requirements, both domestically and internationally, many of which apply to our suppliers. As a prime, we are often responsible for not only our compliance with these regulatory requirements, but that of our suppliers too. In some cases, there has been only one supplier, or one domestic supplier, for certain components. If a supplier cannot appropriately meet our needs, experiences disruptions to production or is otherwise unavailable or not fully available, including if a supplier is impacted by shipping and logistics delays, we may be unable to find a suitable alternative and to meet our obligations.

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 suppliers to comply with applicable laws and contract terms, including regarding the parts or materials we procure from them; in some circumstances, we rely on certifications provided by our suppliers regarding their compliance. We also rely on our suppliers effectively to mitigate the risk of cyber and security threats or other disruptions with respect to the products, components and services they deliver to us and the information entrusted to them by us or our customers and to comply with applicable contractual terms and laws, including cybersecurity and related certification requirements.

If our suppliers fail to perform or we are unable to procure, or experience significant delays in deliveries of, needed products, materials or services; or if they do not comply with all applicable laws, regulations, requirements and contract terms, including 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.

- ***Risks associated with climate change and other environmental impacts, and increased focus and evolving views of our customers, shareholders and other stakeholders on climate change issues, could negatively affect our business and operations.***

The effects of climate change create short and long-term financial risks to our business, both in the U.S. and globally. We have significant operations located in regions that have been, and may in the future be, exposed to significant weather events and other natural disasters. Climate related changes can increase variability in or otherwise impact natural disasters, including weather patterns, with the potential for increased frequency and severity of significant weather events (e.g., flooding, hurricanes and tropical storms), natural hazards (e.g., increased wildfire risk), rising mean temperature and sea levels, and long-term changes in precipitation patterns (e.g., drought, desertification, and/or poor water quality). For example, in recent years, our facilities in Lake Charles, LA, and Melbourne, FL, were damaged by hurricanes, which temporarily interrupted site operations and had significant adverse impacts on our employees, their families and the local communities. We expect climate change will continue to affect our facilities, operations, employees and communities in the future, particularly at facilities in coastal areas and areas prone to extreme weather events and water scarcity. Our suppliers are also subject to natural disasters that could affect their ability to deliver or perform under our contracts, including as a result of disruptions to their workforce and critical infrastructure. Disruptions also impact the availability and cost of materials needed for manufacturing and could increase insurance and other operating costs.

Increased worldwide focus on climate change has led to legislative and regulatory efforts to combat both potential causes and adverse impacts of climate change, including regulation of greenhouse gas emissions. New or more stringent laws and regulations related to greenhouse gas emissions and other climate change related concerns may adversely affect us, our suppliers and our customers. Some of our facilities are, for example, engaged in manufacturing processes that produce greenhouse gas emissions, including carbon dioxide, or rely on products from others that do so. We have worked for years to reduce our reliance on fossil-based energy sources, to decrease our greenhouse gas emissions, to reduce our consumption of water and production of waste, and to ensure our compliance with environmental regulations where we operate, enhancing our record of environmental sustainability. However, new and evolving laws and regulations could mandate different or more restrictive standards, could require capital investments to transition to low carbon technologies, could adversely impact our ongoing operations, and could require changes on a more accelerated time frame. Our suppliers may face similar challenges and incur additional compliance costs that are passed on to us. These direct and indirect costs may adversely impact our results

of operations and financial condition. And non-compliance with legislative and regulatory requirements could also negatively impact our reputation and ability to do business.

In May 2021, the Administration issued Executive Order 14030, Climate-Related Financial Risk, directing the FAR Council, in consultation with the Chair of the Council on Environmental Quality, to consider amendments to the FAR to help ensure that major federal agency procurements reduce the risk of climate change, including requiring the social cost of greenhouse gas emissions to be considered in procurement decisions. Amendments to the FAR and/or other changes to contract terms could cause us to incur additional operating and compliance costs (directly and from our suppliers) or otherwise impact our ability to win business and operate successfully.

Changes in our customers' requirements, priorities, and ways of doing business are also likely to have an impact on our business, operations, and financial success. These changes create opportunities and risks. If, for example, our customers develop requirements and adopt procurement policies that place further emphasis on social and environmental objectives, and we are unable to meet those evolving demands, we will be less successful in selling our products, winning new business, and growing our revenues

Investors, advisory services, government regulators, lenders and other market participants have focused increasingly on the environmental or "sustainability" practices of companies. Shareholders, financial institutions and others have increasingly looked to a company's environmental, social and governance practices, disclosures and performance before making investment or other financial decisions. Regulators have been increasing requirements and enforcement activities. We believe our practices, disclosures and performance are strong and growing. However, if they do not meet investor, lender, regulator, or other stakeholder expectations and standards, which continue to evolve, our access to capital may be negatively impacted, including in both the equity and debt markets, and we will be adversely affected. An enforcement action could harm our reputation, financial position and ability to grow. A failure to meet expectations may materially negatively affect our results of operations, ability to manage our liquidity, or implement our strategies.

The company is building on its environmental record, with a particular focus on the reduction of carbon emissions from our operations, and a target date to achieve net zero carbon emissions. The company is committed to working to achieve its climate change related objectives. However, the costs of doing so may be greater than expected, and there can be no assurance the company will achieve its objectives, or meet the evolving sustainability expectations and standards of our investors or other external stakeholders. Any failure to achieve our goals, a perception that we are not responsible environmental stewards, or failure effectively to respond to new or evolving legal and regulatory requirements or other sustainability concerns could adversely affect our business, reputation or financial position.

The effects and costs of climate change (or other related environmental concerns), or any failure to meet related requirements and expectations 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, including risks related to geopolitical and economic factors, laws and regulations.***

Sales to customers outside the U.S. are an important component of our strategy. Our international business (including our participation in joint ventures, requirements for local content, and our global supply chain) 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 and as our international business continues to grow.

Our international business is generally subject to both U.S. and foreign laws and regulations, including, without limitation, laws and regulations relating to export/import controls, sanctions, technology transfers, government contracts and procurement, data privacy and protection, investment, exchange rates and controls, the FCPA and other anti-corruption laws, anti-boycott provisions, securities laws, labor and employment, works councils and other labor groups, anti-human trafficking, taxes, environment, immunity, security restrictions and intellectual property. Failure by us, our employees, affiliates, partners or others with whom we work to comply with applicable laws and regulations could result in administrative, civil, commercial or criminal liabilities, including suspension or debarment from government contracts or suspension of export/import privileges. Our customers outside of the U.S. also often have the ability to terminate contracts for convenience as well as for default based on performance. Suspension or debarment, or 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.

New regulations and requirements, or changes to existing ones in countries in which we operate can significantly increase our costs and risks of doing business internationally. Despite robust processes, we also face risks related to the unintended or unauthorized use of our products and resources.

Changes in laws, regulations, political leadership and environment, political relations and instability, and/or security risks may dramatically affect our ability to conduct or continue to conduct profitable business in international markets, including sales to customers outside the U.S. and purchases from suppliers outside the U.S. Our international business is impacted by changes in U.S. and foreign national policies and priorities, and geopolitical relationships, any of which may be influenced by changes in the threat environment, political leadership, geopolitical uncertainties, world events, government budgets, and economic and political factors more generally. Any of these factors may impact funding for programs, our ability to perform, our supply chain, export authorizations, purchasing decisions or customer payments. We also could be affected by the residual impacts of Britain's exit from the European Union, the full impacts of which are still evolving. Global economic conditions and fluctuations in foreign currency exchange rates and credit could further impact our business.

Our contracts with non-U.S. customers in some cases also include terms and reflect legal requirements that create additional risks. They may include industrial cooperation agreements requiring specific in-country purchases, hiring of local nationals, local investments, manufacturing or other operational or financial obligations, including offset obligations, and provide for significant penalties if we fail to meet such requirements. They may also require us to enter into letters of credit, performance or surety bonds, bank guarantees and/or other financial arrangements to secure our obligations. We also are dependent on in-country suppliers and we face risks related to their failure to perform in accordance with the contracts and applicable laws, particularly where we rely on a sole source supplier. Our ability to sell products outside the U.S. could be adversely affected if we are unable to design our products on a cost effective basis or to obtain and retain all necessary export licenses and authorizations. The U.S. government can deny, change or revoke export authorization. Our 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. More broadly, our ability effectively to pursue and execute contracts outside the U.S. may be impacted by our ability to partner successfully with non-U.S. companies, including through joint ventures, teaming agreements, co-production or other arrangements. This risk includes the ability to timely identify and negotiate appropriate arrangements with local partners, potential exposure for their actions and the ability to effectively terminate these partnership arrangements. This risk may increase, depending on local requirements regarding who we partner with and under what circumstances, particularly where we partner with government-affiliated entities.

The products and services we provide, including those provided by suppliers and joint ventures in which we have an interest, are sometimes in countries with unstable governments, economic or fiscal challenges, military or political conflicts, different business practices and/or developing legal systems. This may increase the risk to our employees, suppliers or other third parties, and increase our risk to 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.

- ***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, including highly demanding operating conditions, to accomplish challenging missions. Problems and delays in development or delivery, or system failures, as a result of issues with respect to design, technology, research and development funding, intellectual property rights, labor, inability to achieve learning curve assumptions, operation of artificial intelligence, inability to manage effectively a broad array of programs, manufacturing materials or components, or subcontractor (or other supplier) performance can prevent us from meeting requirements and create significant risk and liabilities. Similarly, failures to perform on schedule or otherwise to fulfill our contractual obligations can 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, unintended explosions, problems with design, quality and workmanship, country

of origin of procured materials, inadequate supplier components and degradation of product performance. These failures can result, either directly or indirectly, in loss of life or property. Factors that may affect revenue and profitability include: inaccurate cost estimates, design issues, human factors, unforeseen costs and expenses, diversion of management focus, loss of follow-on work, replacement obligations, and repayment to the government customer of certain contract cost and fee payments 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 are generally 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.

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

We have significant operations, including centers of excellence, located in regions that have been, and may in the future be, exposed to hurricanes, earthquakes, water levels, wildfires and other natural disasters. Our subcontractors and other suppliers have also been, and may in the future be, subject to natural 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 disasters, the nature, frequency and severity of which may be impacted by climate change, and delays in recovery may be significant.

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 disaster, it could have a material adverse effect on our financial position, results of operations and/or cash flows.

- ***We provide products and services, including 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. We use and provide energetic materials and solid rocket motors, including products that involve highly explosive or flammable elements. We develop missile systems, and counter systems, including strategic deterrents, as well as subsystems and components. All of these and other activities subject us to various extraordinary risks, including (1) potential liabilities relating to nuclear or launch-related incidents, unintended initiation of energetic materials and explosions, including risk of personal injury, property damage and environmental harm; (2) 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 (3) to failed launches. We may be subject to reputational harm and potential liabilities arising out of a nuclear, launch or explosive incident, or other hazardous operation, whether or not the cause was within our control, and insurance may not be reasonably available. Under some circumstances, the U.S. government and prime contractors may 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, 10 U.S.C. 2354, the Price-Anderson Nuclear Industries Indemnity Act and the Terrorism Risk Insurance Reauthorization Act, for certain risks, but those protections may not be available and they are limited in scope.

Certain of our products, such as small, medium and large caliber ammunition and solid rocket motors and liquid propulsion engines, involve the use, manufacture and/or handling of a variety of explosive and flammable materials. These activities have resulted and may result in incidents that cause workplace injuries and fatalities, the temporary shut down or other disruption of manufacturing, production delays, environmental harm and expense, fines and liability to third parties. We have safety and loss prevention programs, which provide for pre-construction reviews, along with safety audits of operations involving explosive materials, to attempt to mitigate some such incidents, as well as potentially insurance coverage. We and our customers may experience similar or more serious incidents in the future which could result in various liabilities and production delays.

In addition, our customers may use or misuse our products and services in ways that can be unusually hazardous or risky, or in ways that are not intended, creating potential liabilities for our company as the provider of the products

and services. In the event of an incident, if our customers fail to use our products properly or as intended, 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, an incident related to the use of energetics or rocket motors, 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 insurance coverage or indemnification or other protection was not fully 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.

- ***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. Increasing demands from our customers to access and obtain rights in our intellectual property, and positions taken by our suppliers and competitors challenge our ability to exploit, protect and access intellectual property.

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 at times seek to use or authorize others to use such intellectual property, including in competition with us and including where we do not believe they are entitled to do so.

Governments continue to increase efforts to assert or obtain more extensive rights in intellectual property, which could reduce our ability to develop, protect and exploit certain of our intellectual property rights and to compete. Governments also decline at times to make intellectual property of others available to us under acceptable terms.

We rely significantly upon proprietary technology, information, processes and know-how. We typically seek to protect this information, including by entering into intellectual property agreements with our employees and other parties such as consultants, teammates 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, a misuse or theft of our intellectual property 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 requires us to access and use third party intellectual property. This requires 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 with third parties to obtain necessary rights on reasonable terms. That may not be practicable.

Our intellectual property is subject to challenge, invalidation, misappropriation or circumvention by third parties. Our access to and use of intellectual property licensed or otherwise obtained from third parties is also subject to challenges. 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 favorable.

If we are unable adequately to exploit our intellectual property rights, to protect our intellectual property rights, 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 identify emerging technological trends, 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. In addition, our ability to develop innovative and technologically advanced products depends on continued funding for, and investment in, research and development projects. Our success also depends on our continued access to assured suppliers of important technologies and components and our ability to provide the people, technologies, facilities, equipment and financial capacity needed to deliver those products and services with maximum efficiency. Our customers and markets also increasingly require us to be agile and efficient, digitally

enabled and able to harness integrated digital technologies and capabilities to deliver solutions with the agility and affordability that our customers seek. If we are unable to continue to develop new products and technologies in a timely fashion, and successfully to effect digital transformation, or if we fail to achieve market acceptance more rapidly than our competitors, we may be unable to maintain our competitive position and our future success could be materially adversely affected. If we fail to maintain our competitive position, we could lose a significant amount of future business to our competitors, which also could have a material adverse effect on our ability to generate favorable financial results and maintain market share and on our financial position, results of operations and/or cash flows.

General and Other Risk Factors

- ***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, responsible, highly rated counterparties in established markets to cover significant risks and liabilities (including, for example, natural disasters, space launches and on-orbit operations, cyber security, hazardous operations, energetics and products liability). Not every risk or liability can be insured, and for risks that are or should be insurable, the policy limits and terms of coverage reasonably obtainable in the market may not be sufficient to cover actual losses or liabilities incurred. Even if insurance coverage is available, at times we are not able to obtain it at a price or on terms acceptable to us or without increasing exclusions. 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 has affected and may continue to affect the availability or timing of recovery, and our ability to obtain insurance coverage at reasonable rates in the future. 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 difficult to negotiate and obtain, are typically subject to certain terms or limitations, including the availability of funds, and may not be sufficient to cover losses or liabilities incurred. If insurance coverage, customer indemnifications and/or other legal protections are not available or are not sufficient to cover risks or losses, it could have a material adverse effect on our financial position, results of operations and/or cash flows.

- ***Pension and other postretirement benefit (OPB) obligations and related expenses and funding requirements may fluctuate significantly depending upon investment performance of plan assets, changes in actuarial assumptions, and legislative or other regulatory actions.***

The company's pension and OPB obligations and related expenses are dependent upon the investment performance of plan assets and various assumptions, including discount rates, mortality and the estimated long-term rates of return on plan assets. Investment performance of plan assets and changes in assumptions associated with our pension and OPB plans could have a material adverse effect on our financial position, results of operations and/or cash flows.

Funding requirements for our pension plans, including Pension Benefit Guaranty Corporation premiums, 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 they are recognized for financial statement purposes or when pension funding is made. These timing differences, as well as government challenges to pension and OPB cost recovery, could have a material adverse effect on our financial position, results of operations and/or cash flows.

- ***Business investments and/or recorded goodwill and other long-lived assets may become impaired, resulting in substantial losses and write-downs that would reduce our operating income.***

Goodwill accounts for approximately 41 percent of our total assets as of December 31, 2021. Although we currently have excess fair value of our reporting units over their respective carrying values, changes in business conditions or in the market-based inputs used in our goodwill impairment test, could result in significant write-offs of goodwill or other long-lived assets, which could have a material adverse effect on our financial condition and/or results of operations.

Item 1B. Unresolved Staff Comments

None.

FORWARD-LOOKING STATEMENTS AND PROJECTIONS

This Annual Report on Form 10-K and the information we are incorporating by reference contain statements that constitute “forward-looking statements” within the meaning of the Private Securities Litigation Reform Act of 1995. Words such as “will,” “expect,” “anticipate,” “intend,” “may,” “could,” “should,” “plan,” “project,” “forecast,” “believe,” “estimate,” “outlook,” “trends,” “goals” and similar expressions generally identify these forward-looking statements. Forward-looking statements include, among other things, statements relating to our future financial condition, results of operations and/or cash flows. Forward-looking statements are based upon assumptions, expectations, plans and projections that we believe to be reasonable when made, but which may change over time. These statements are not guarantees of future performance and inherently involve a wide range of risks and uncertainties that are difficult to predict. Specific risks that could cause actual results to differ materially from those expressed or implied in these forward-looking statements include, but are not limited to, those identified under “Risk Factors” and other important factors disclosed in this report and from time to time in our other filings with the SEC. These risks and uncertainties are amplified by the global COVID-19 pandemic, which has caused and will continue to cause significant challenges, instability and uncertainty. They include:

Industry and Economic Risks

- our dependence on the U.S. government for a substantial portion of our business
- significant delays or reductions in appropriations for our programs, and U.S. government funding and program support more broadly
- the use of estimates when accounting for our contracts and the effect of contract cost growth and/or changes in estimated contract revenues and costs
- increased competition within our markets and bid protests

Legal and Regulatory Risks

- investigations, claims, disputes, enforcement actions, litigation and/or other legal proceedings
- the improper conduct of employees, agents, subcontractors, suppliers, business partners or joint ventures in which we participate and the impact on our reputation and our ability to do business
- changes in procurement and other laws, regulations, contract terms and practices applicable to our industry, findings by the U.S. government as to our compliance with such requirements, and changes in our customers’ business practices globally
- environmental matters, including unforeseen environmental costs and government and third party claims
- unanticipated changes in our tax provisions or exposure to additional tax liabilities

Business and Operational Risks

- impacts of the COVID-19 pandemic (or future health epidemics, pandemics or similar outbreaks), including potential new variants, case surges or prolonged recovery periods, their effects on the broader environment, and varying related government requirements, on: our business, our ability to maintain a qualified and productive workforce, work slowdowns or stoppages, labor shortages, supply chain and logistics challenges, costs we cannot recover and liabilities for which we are not compensated, performance challenges (including cost and schedule), government funding, changes in government acquisition priorities and processes, government payment rules and practices, insurance challenges, and potential impacts on access to capital, the markets and the fair value of our assets
- cyber and other security threats or disruptions faced by us, our customers or our suppliers and other partners
- the ability to maintain a qualified workforce with the required security clearances and requisite skills
- the performance and financial viability of our subcontractors and suppliers and the availability and pricing of raw materials and components
- climate change, its impacts on our company, our operations and our stakeholders (employees, suppliers, customers, shareholders and regulators), and changes in laws, regulations and priorities related to greenhouse gas emissions and other climate change related concerns
- our exposure to additional risks as a result of our international business, including risks related to geopolitical and economic factors, suppliers, laws and regulations

NORTHROP GRUMMAN CORPORATION

- our ability to meet performance obligations under our contracts, including obligations that require innovative design capabilities, are technologically complex, require certain manufacturing expertise or are dependent on factors not wholly within our control
- natural disasters
- products and services we provide related to hazardous and high risk operations, including the production and use of such products, which subject us to various environmental, regulatory, financial, reputational and other risks
- our ability appropriately to exploit and/or protect intellectual property rights
- our ability to develop new products and technologies and maintain technologies, facilities, and equipment to win new competitions and meet the needs of our customers

General and Other Risk Factors

- the adequacy and availability of our insurance coverage, customer indemnifications or other liability protections
- the future investment performance of plan assets, changes in actuarial assumptions associated with our pension and other postretirement benefit plans and legislative or other regulatory actions impacting our pension and postretirement benefit obligations
- changes in business conditions that could impact business investments and/or recorded goodwill or the value of other long-lived assets

We urge you 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, 2021, we had approximately 51 million square feet of floor space at 489 separate locations, primarily in the U.S., for manufacturing, warehousing, research and testing, administration and various other uses. We leased to third parties approximately 232,000 square feet of our owned and leased facilities. The company's major operations are at the following locations:

Aeronautics Systems

El Segundo, Mojave, Palmdale, Redondo Beach and San Diego, CA; Melbourne and St. Augustine, FL; Iuka and Moss Point, MS; Beavercreek, OH; Oklahoma City, OK; and Clearfield, UT.

Defense Systems

Huntsville, AL; Mesa and Sierra Vista, AZ; Los Angeles, CA; Warner Robins, GA; Lake Charles, LA; Cumberland and Elkton, MD; Elk River and Plymouth, MN; Dulles, McLean and Radford, VA; and Keyser, WV. Locations outside the U.S. include Australia.

Mission Systems

McClellan, San Diego, Sunnyvale and Woodland Hills, CA; Apopka, FL; Rolling Meadows, IL; Annapolis, Annapolis Junction, Elkridge, Halethorpe, Linthicum and Sykesville, MD; Bethpage and Williamsville, NY; Cincinnati, OH; Salt Lake City, UT; and Chantilly, Charlottesville and Fairfax, VA. Locations outside the U.S. include France, Germany, Italy and the United Kingdom.

Space Systems

Huntsville, AL; Chandler, Gilbert and Tempe, AZ; Azusa, Carson, Los Angeles, Manhattan Beach, Oxnard, Redondo Beach and San Diego, CA; Aurora and Colorado Springs, CO; Devens, MA; Eden Prairie, MN; Brigham City, Clearfield, Magna, Ogden, Roy and Tremonton, UT; and Dulles and Sterling, VA.

Corporate

Falls Church, VA.

NORTHROP GRUMMAN CORPORATION

The following is a summary of our floor space at December 31, 2021:

<i>Square feet (in thousands)</i>	Owned	Leased	U.S. Government Owned/Leased	Total
Aeronautics Systems	3,415	6,386	3,336	13,137
Defense Systems	1,367	3,497	2,286	7,150
Mission Systems	7,933	4,397	—	12,330
Space Systems	9,350	7,819	548	17,717
Corporate	372	398	—	770
Total	22,437	22,497	6,170	51,104

We maintain our properties in good operating condition and believe 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 Notes 11 and 12 to the consolidated financial statements.

We are a party to various investigations, lawsuits, arbitration, claims, enforcement actions and other legal proceedings, including government investigations and claims, that arise in the ordinary course of our business. These types of matters could result in administrative, civil or criminal fines, penalties or other sanctions (which terms include judgments or convictions and consent or other voluntary decrees or agreements); compensatory, treble or other damages; non-monetary relief or actions; or other liabilities. Government regulations provide that certain allegations against a contractor may lead to suspension or debarment from future government contracts or suspension of export privileges for the company or one or more of its components. The nature of legal proceedings is such that we cannot assure the outcome of any particular matter. For additional information on pending matters, please see Notes 11 and 12 to the consolidated financial statements, and for further information on the risks we face from existing and future investigations, lawsuits, arbitration, claims, enforcement actions and other legal proceedings, please see “Risk Factors.”

Consistent with SEC Regulation S-K Item 103, we have elected to disclose those environmental proceedings with a governmental entity as a party where the company reasonably believes such proceeding would result in monetary sanctions, exclusive of interest and costs, of \$1.0 million or more.

Item 4. Mine Safety Disclosures

No information is required in response to this item.

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 156,284,423 shares and 166,717,179 shares were issued and outstanding as of December 31, 2021 and 2020, 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, 2021 and 2020.

MARKET INFORMATION

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

HOLDERS

As of January 24, 2022, there were 19,801 common shareholders of record.

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, 2021:

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 2, 2021 - October 29, 2021	324,809	\$ 381.98	324,809	\$ 2,981
October 30, 2021 - November 26, 2021 ⁽²⁾	1,697,050	355.80	1,697,050	2,377
November 27, 2021 - December 31, 2021	458,499	367.94	458,499	2,209
Total	2,480,358	\$ 361.47	2,480,358	\$ 2,209

⁽¹⁾ Includes commissions paid.

⁽²⁾ The company entered into an accelerated share repurchase agreement with Goldman Sachs & Co. LLC to repurchase \$500 million of the company's common stock and received an initial delivery of shares representing approximately 85 percent of the share repurchase agreement.

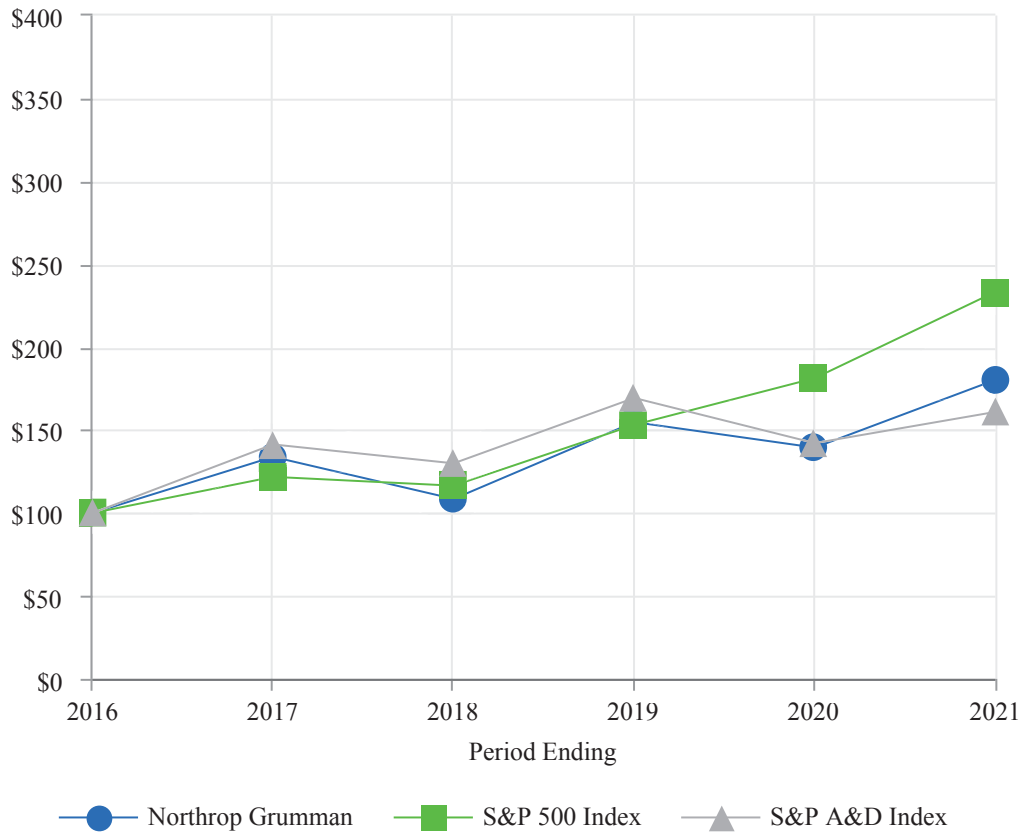
Share repurchases take place from time to time, subject to market and regulatory conditions and management's discretion, in the open market or in privately negotiated transactions. The company retires its common stock upon repurchase and, in the periods presented, has not made any purchases of common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

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

STOCK PERFORMANCE GRAPH

Comparison of Cumulative Five Year Total Return

Among Northrop Grumman, the Standard & Poor’s (S&P) 500 Index and the S&P Aerospace & Defense (A&D) Index



- Assumes \$100 invested at the close of business on December 31, 2016, in Northrop Grumman Corporation common stock, the S&P 500 Index and the S&P A&D Index.
- The cumulative total return assumes reinvestment of dividends.
- The S&P A&D Index is comprised of The Boeing Company, General Dynamics Corporation, Howmet Aerospace Inc., Huntington Ingalls Industries Inc., L3Harris Technologies, Inc., Lockheed Martin Corporation, Northrop Grumman Corporation, Raytheon Technologies Corporation, Textron, Inc., and TransDigm Group Incorporated.
- The total return is weighted according to market capitalization of each company at the beginning of each year.
- This graph is not deemed to be “filed” with the SEC or subject to the liabilities of Section 18 of the Securities 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. [Reserved]

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

OVERVIEW

The following discussion should be read along with the financial statements included in this Form 10-K, as well as Part II, "Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations" of our Form 10-K for the year ended December 31, 2020 ("2020 Annual Report on Form 10-K").

Disposition of IT and Mission Support Services Business

Effective January 30, 2021 (the "Divestiture date"), we completed the sale of our IT and mission support services business (the "IT services divestiture") for \$3.4 billion in cash and recorded a pre-tax gain of \$2.0 billion. The IT and mission support services business was comprised of the majority of the former IS&S division of Defense Systems (excluding the Vinnell Arabia business); select cyber, intelligence and missions support programs, which were part of the former CIMS division of Mission Systems; and the former Space Technical Services business unit of Space Systems. Operating results include sales and operating income for the IT and mission support services business prior to the Divestiture date. See Note 2 to the consolidated financial statements for further information regarding the disposition.

COVID-19

COVID-19 was first reported in late 2019. In March 2020, the World Health Organization characterized COVID-19 as a global pandemic, and the President declared a national emergency concerning the COVID-19 outbreak. In the almost two years since then, the pandemic has dramatically impacted the global health and economic environment, including millions of confirmed cases and deaths, business slowdowns or shutdowns, labor shortfalls, supply chain challenges, regulatory challenges, and market volatility. We discussed in some detail in our Annual Report on Form 10-K for the fiscal year ended December 31, 2020, and subsequent SEC filings in 2021, the pandemic, its impacts and risks, and actions taken up to the time of each filing. In this Form 10-K, we provide a further update.

The company's leadership, our crisis management and business resumption teams, and local site leadership continue closely to monitor and address the pandemic and related developments, including the impact on our company, our employees, our customers, our suppliers and our communities. The company has considered and continues to consider and be guided by health data and evolving guidance from the Centers for Disease Control and Prevention (CDC), in particular, as well as other health organizations globally, federal, state and local governmental authorities, and our customers, among others. We have taken, and continue to take, robust actions to help protect the health, safety and well-being of our employees, to support continued performance, to support our suppliers and local communities, and to continue to serve our customers. Our goals have been, and continue to be to lessen the potential adverse impacts, both health and economic, and to continue to position the company for long-term success. Like the communities in which we operate, our actions have varied depending on the spread of COVID-19 and applicable government requirements, the needs of our employees, the needs of our customers and the needs of our business.

Over the course of 2021, COVID-19 case rates and the health and economic impacts of the pandemic fluctuated dramatically in different communities in the U.S. and globally, particularly with the spread of new variants. But we continued to see a prolonged impact on the economy, our industry, and our company, with increased challenges for customers and suppliers, labor shortages, supply chain challenges, and increasing inflation, among other impacts. We expect these and other impacts to continue and they could worsen, depending on the future course of the pandemic and actions taken in connection with it.

In the U.S., the Food and Drug Administration issued emergency use authorization for COVID-19 vaccines and the government began extensive efforts to administer them. The company also has taken various steps to encourage and facilitate vaccination access for our employees, in accordance with federal guidance. We have provided paid leave and flexibility for employees to get vaccinated, and strongly encouraged our workforce to take care of themselves and their colleagues. In September 2021, the White House issued an executive order and guidance from the Safer Federal Workforce Task Force broadly requiring many U.S.-based federal contractors to be fully vaccinated by December 8, 2021 (or to have an approved accommodation). In early November 2021, the federal government extended that deadline to January 18, 2022. On December 7, 2021, a federal district judge issued an order, temporarily suspending the government from enforcing the federal contractor mandate. That order is on appeal. State and local governments are also taking actions related to the pandemic, imposing additional and varying requirements on industry. We have taken and are taking steps strongly to encourage our employees to be fully vaccinated (or to have an approved accommodation) to protect our workplace and to position the company to comply with the executive order, guidance, and related contract terms, if and as necessary, as we continue to evaluate the evolving situation and our customers' requirements. Evolving government requirements, including regarding a vaccine mandate, along with the broader impacts of the continuing pandemic, could significantly impact

our workforce and performance, as well as those of our suppliers, and result in costs that we may not be able to recover fully. The company continues to take robust actions globally to protect the health, safety and well-being of our employees, and to serve our customers with continued performance. We also continue to take steps to support our suppliers, with a particular focus on critical small and mid-sized business partners, including passing through increased progress payments from the DoD to our suppliers and accelerating payments to certain suppliers.

The company's fourth quarter 2021 revenue and operating income were affected by the impact of the COVID-19 pandemic on the company and the broader economic environment, including through a tightened labor market, elevated levels of employee leave, evolving government requirements, and supply chain challenges. These factors are expected to continue and could worsen and affect further our ability (and that of our suppliers) to maintain a qualified workforce and to perform fully for our customers (including with respect to cost and schedule), with delayed or reduced sales and additional liabilities, losses and costs, that we may not be able to recover fully. Our employees, customers and suppliers, the company, our economy and our global community face both continuing and new or evolving challenges related to the pandemic, and we cannot predict how this dynamic situation will evolve or the impact it will have on the company, or our financial position, results of operations and/or cash flows. For further information on the pandemic and the potential impact to the company of COVID-19, see "Management's Discussion and Analysis of Financial Condition and Results of Operations" and "Liquidity and Capital Resources" below and "Risk Factors."

Global Security and Economic Environment

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

The global geopolitical and economic environments also continue to be impacted by uncertainty. Geopolitical relationships are changing and global economic growth is expected to remain in the low single digits in 2022 reflecting the impact of and uncertainty surrounding geopolitical tensions globally and financial market volatility and the COVID-19 pandemic. The global economy may also be affected by the residual legal, regulatory and economic impacts of Britain's exit from the European Union, the full impacts of which are complex and gradually becoming evident. Rising inflation also could lead to increased interest rates, raising the cost of borrowing for the federal government, which could impact other spending priorities. Additionally, economic tensions and changes in international trade policies, including higher tariffs on imported goods and materials and renegotiation of free trade agreements, could impact the global market for defense products, services and solutions.

U.S. Political and Economic Environment

On May 28, 2021, the Administration released its budget request for FY 2022. The budget proposed \$753 billion for national defense programs and \$770 billion in non-defense discretionary funding. It continues to be the subject of debate in Congress. The Administration's budget request included funding for an infrastructure and economic recovery plan and an education and economic support plan. On November 15, 2021, the President signed into law the \$1.2 trillion Infrastructure and Investment and Jobs Act. Enactment of the infrastructure plan and any future spending plans, as well as the costs of the pandemic (as discussed more above), may have broader implications for the defense industry, our customers' budgets and priorities, and the overall economic environment, including the national debt. It is difficult to predict the specific course of future defense budgets. However, the threat to U.S. national security remains very substantial. We believe that our capabilities, particularly in space, missiles, missile defense, hypersonics, counter-hypersonics, survivable aircraft and mission systems should help our customers defend against future threats and, as a result, continue to allow for long-term profitable growth in our business.

FY 2022 appropriations have not been enacted to date. On September 30, 2021, a continuing resolution was enacted, providing funding generally at FY 2021 levels through December 3, 2021; the continuing resolution was further extended through February 18, 2022. Congressional deliberations over FY 2022 appropriations have demonstrated broad support for national security, with increased funding proposed in certain areas for national defense above the Administration's budget request. It remains uncertain whether and, if so, when the government will approve FY 2022 appropriations, with which programs funded at what levels, and for how long the government will operate under a continuing resolution, with potential impacts on our programs and new starts, in particular.

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The Bipartisan Budget Act of 2019 suspended the debt ceiling through July 31, 2021. In October 2021, the statutory debt limit was increased by \$480 billion and, in December 2021, was further increased by \$2.5 trillion, which is currently expected to allow the Treasury Department to finance the government into 2023.

The political environment, federal budget and debt ceiling are expected to continue to be the subject of considerable debate, which could have material impacts on defense spending broadly and the company's programs in particular.

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 larger contracts or two or more closely-related contracts). We recognize sales from our portfolio of long-term contracts as control is transferred to the customer, primarily over time on a cost-to-cost basis (cost incurred relative to costs estimated at completion). As a result, sales tend to fluctuate in concert with costs incurred across our large portfolio of contracts. Due to the applicable FAR and CAS requirements that govern our U.S. government business, 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, subcontractor, material, overhead 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 primarily focus on changes in sales and operating margin rates. Where applicable, significant fluctuations in operating performance attributable to individual contracts or programs, or changes in a specific cost element across multiple contracts, are described in our analysis. Based on this approach and the nature of our operations, the discussion of results of operations below first focuses on our four segments before distinguishing between products and services. Changes in sales are generally described in terms of volume, while changes in operating margin rates are generally described in terms of performance and/or contract mix. For purposes of this discussion, volume generally refers to increases or decreases in sales or cost from production/service activity levels and performance generally refers to non-volume related changes in profitability. Contract mix generally refers to changes in the ratio of contract type and/or life cycle (e.g., cost-type, fixed-price, development, production, and/or sustainment).

CONSOLIDATED OPERATING RESULTS

For purposes of the operating results discussion below, we assess our performance using certain financial measures that are not calculated in accordance with accounting principles generally accepted in the United States of America ("GAAP" or "FAS"). Organic sales is defined as total sales excluding sales attributable to the company's IT services divestiture. This measure may be useful to investors and other users of our financial statements as a supplemental measure in evaluating the company's underlying sales growth as well as in providing an understanding of our ongoing business and future sales trends by presenting the company's sales before the impact of divestiture activity.

Transaction-adjusted net earnings and transaction-adjusted earnings per share (transaction-adjusted EPS) exclude impacts related to the IT services divestiture, including the gain on sale of the business, associated federal and state income tax expenses, transaction costs, and the make-whole premium for early debt redemption. They also exclude the impact of mark-to-market pension and OPB ("MTM") benefit/(expense) and related tax impacts, which are generally only recognized during the fourth quarter. These non-GAAP measures may be useful to investors and other users of our financial statements as supplemental measures in evaluating the company's underlying financial performance by presenting the company's operating results before the non-operational impact of divestiture activity and pension and OPB actuarial gains and losses. These measures are also consistent with how management views the underlying performance of the business as the impact of the IT services divestiture and MTM accounting are not considered in management's assessment of the company's operating performance or in its determination of incentive compensation awards.

We reconcile these non-GAAP financial measures to their most directly comparable GAAP financial measures below. These non-GAAP measures may not be defined and calculated by other companies in the same manner and should not be considered in isolation or as an alternative to operating results presented in accordance with GAAP.

NORTHROP GRUMMAN CORPORATION

Selected financial highlights are presented in the table below:

<i>\$ in millions, except per share amounts</i>	Year Ended December 31			% Change in	
	2021	2020	2019	2021	2020
Sales	\$35,667	\$ 36,799	\$ 33,841	(3)%	9 %
Operating costs and expenses	31,996	32,734	29,872	(2)%	10 %
<i>Operating costs and expenses as a % of sales</i>	89.7 %	89.0 %	88.3 %		
Gain on sale of business	1,980	—	—	NM	NM
Operating income	5,651	4,065	3,969	39 %	2 %
<i>Operating margin rate</i>	15.8 %	11.0 %	11.7 %		
Mark-to-market pension and OPB benefit (expense)	2,355	(1,034)	(1,800)	(328)%	(43)%
Federal and foreign income tax expense	1,933	539	300	259 %	80 %
<i>Effective income tax rate</i>	21.6 %	14.5 %	11.8 %		
Net earnings	7,005	3,189	2,248	120 %	42 %
Diluted earnings per share	43.54	19.03	13.22	129 %	44 %

Sales

The tables below reconcile sales to organic sales:

<i>\$ in millions</i>	Year Ended December 31						Organic sales % change
	2021			2020			
	Sales	IT services sales	Organic sales	Sales	IT services sales	Organic sales	
Aeronautics Systems	\$ 11,259	\$ —	\$ 11,259	\$ 12,169	\$ —	\$ 12,169	(7)%
Defense Systems	5,776	(106)	5,670	7,543	(1,637)	5,906	(4)%
Mission Systems	10,134	(42)	10,092	10,080	(527)	9,553	6 %
Space Systems	10,608	(16)	10,592	8,744	(182)	8,562	24 %
Intersegment eliminations	(2,110)	2	(2,108)	(1,737)	17	(1,720)	
Total	\$ 35,667	\$ (162)	\$ 35,505	\$ 36,799	\$ (2,329)	\$ 34,470	3 %

<i>\$ in millions</i>	Year Ended December 31						Organic sales % change
	2020			2019			
	Sales	IT services sales	Organic sales	Sales	IT services sales	Organic sales	
Aeronautics Systems	\$ 12,169	\$ —	\$ 12,169	\$ 11,116	\$ —	\$ 11,116	9 %
Defense Systems	7,543	(1,637)	5,906	7,495	(1,594)	5,901	— %
Mission Systems	10,080	(527)	9,553	9,410	(555)	8,855	8 %
Space Systems	8,744	(182)	8,562	7,425	(180)	7,245	18 %
Intersegment eliminations	(1,737)	17	(1,720)	(1,605)	24	(1,581)	
Total	\$ 36,799	\$ (2,329)	\$ 34,470	\$ 33,841	\$ (2,305)	\$ 31,536	9 %

2021 sales decreased \$1.1 billion, or 3 percent, due to a \$2.2 billion reduction in sales related to the IT services divestiture. 2021 organic sales increased \$1.0 billion, or 3 percent due to higher sales at Space and Mission Systems, partially offset by lower sales at Aeronautics Systems and Defense Systems. 2020 sales included a \$444 million sale of equipment to a restricted customer at Aeronautics Systems.

See “Segment Operating Results” below for further information by segment and “Product and Service Analysis” for product and service detail. See Note 16 to the consolidated financial statements for information regarding the company’s sales by customer type, contract type and geographic region for each of our segments.

Operating Income and Margin Rate

2021 operating income increased \$1.6 billion, or 39 percent, primarily due to the IT services divestiture, including the \$2.0 billion pre-tax gain on sale and \$192 million of unallocated corporate expense for unallowable state taxes and transaction costs, partially offset by a \$288 million reduction in the FAS/CAS operating adjustment. Lower non-divestiture-related unallocated corporate expenses were partially offset by higher deferred state taxes principally related to the company’s 2021 MTM benefit. 2021 operating margin rate increased to 15.8 percent from 11.0 percent reflecting the items above.

2021 G&A costs as a percentage of sales increased to 10.1 percent from 9.3 percent, primarily due to an increase in investments for future business opportunities and a lower G&A cost mix in the divested IT services business.

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

Mark-to-Market Pension and OPB Benefit/Expense

The primary components of pre-tax MTM benefit (expense) are presented in the table below:

<i>\$ in millions</i>	Year Ended December 31		
	2021	2020	2019
Actuarial gains (losses) on projected benefit obligation	\$ 1,163	\$ (3,570)	\$ (4,866)
Actuarial gains on plan assets	1,192	2,536	3,066
MTM benefit (expense)	\$ 2,355	\$ (1,034)	\$ (1,800)

2021 MTM benefit of \$2.4 billion was primarily driven by a 30 basis point increase in the discount rate from year end 2020 and actual net plan asset returns of approximately 10.9 percent compared to our 7.5 percent asset return assumption.

Federal and Foreign Income Taxes

The 2021 effective tax rate (ETR) increased to 21.6 percent from 14.5 percent in the prior year period primarily due to federal income taxes resulting from the IT services divestiture, including \$250 million of income tax expense related to \$1.2 billion of nondeductible goodwill in the divested business. The company’s 2021 MTM benefit did not significantly impact the 2021 ETR; however, MTM expense in 2020 reduced the 2020 ETR by 1.3 percentage points. See Note 7 to the consolidated financial statements for additional information.

NORTHROP GRUMMAN CORPORATION

Net Earnings

The table below reconciles net earnings to transaction-adjusted net earnings:

<i>\$ in millions</i>	Year Ended December 31			% Change in	
	2021	2020	2019	2021	2020
Net earnings	\$ 7,005	\$ 3,189	\$ 2,248	120 %	42 %
MTM (benefit) expense	(2,355)	1,034	1,800	(328)%	(43)%
MTM-related deferred state tax expense (benefit) ⁽¹⁾	124	(54)	(81)	(330)%	(33)%
Federal tax expense (benefit) of items above ⁽²⁾	469	(206)	(361)	(328)%	(43)%
MTM adjustment, net of tax	(1,762)	774	1,358	(328)%	(43)%
Gain on sale of business	(1,980)	—	—	NM	NM
State tax impact ⁽³⁾	160	—	—	NM	NM
Transaction costs	32	—	—	NM	NM
Make-whole premium	54	—	—	NM	NM
Federal tax impact of items above ⁽⁴⁾	614	—	—	NM	NM
Transaction adjustment, net of tax	(1,120)	—	—	NM	NM
Transaction-adjusted net earnings	\$ 4,123	\$ 3,963	\$ 3,606	4 %	10 %

⁽¹⁾ The deferred state tax impact was calculated using the company's blended state tax rate of 5.25 percent in 2021 and 2020 and 4.50 percent in 2019 and is included in Unallocated corporate expense within operating income.

⁽²⁾ The federal tax impact in each period was calculated by subtracting the deferred state tax impact from MTM benefit (expense) and applying the 21 percent federal statutory rate.

⁽³⁾ The state tax impact includes \$62 million of incremental tax expense related to \$1.2 billion of nondeductible goodwill in the divested business.

⁽⁴⁾ The federal tax impact was calculated by applying the 21 percent federal statutory rate to the adjustment items and also includes \$250 million of incremental tax expense related to \$1.2 billion of nondeductible goodwill in the divested business.

2021 net earnings increased \$3.8 billion, or 120 percent, principally due to a \$2.5 billion increase in our MTM benefit, net of tax, and a \$1.1 billion increase associated with the IT services divestiture, net of tax. Transaction-adjusted net earnings increased \$160 million, or 4 percent, primarily due to lower unallocated corporate expense and higher segment operating income, partially offset by higher income tax expense.

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Diluted Earnings Per Share

The table below reconciles diluted earnings per share to transaction-adjusted EPS:

	Year Ended December 31			% Change in	
	2021	2020	2019	2021	2020
Diluted earnings per share	\$ 43.54	\$ 19.03	\$ 13.22	129 %	44 %
MTM (benefit) expense per share	(14.64)	6.17	10.59	(337)%	(42)%
MTM-related deferred state tax expense (benefit) per share ⁽¹⁾	0.77	(0.32)	(0.48)	(341)%	(33)%
Federal tax expense (benefit) of items above per share ⁽²⁾	2.92	(1.23)	(2.12)	(337)%	(42)%
MTM adjustment per share, net of tax	(10.95)	4.62	7.99	(337)%	(42)%
Gain on sale of business per share	(12.31)	—	—	NM	NM
State tax impact ⁽³⁾ per share	0.99	—	—	NM	NM
Transaction costs per share	0.20	—	—	NM	NM
Make-whole premium per share	0.34	—	—	NM	NM
Federal tax impact of items above ⁽⁴⁾ per share	3.82	—	—	NM	NM
Transaction adjustment per share, net of tax	(6.96)	—	—	NM	NM
Transaction-adjusted EPS	\$ 25.63	\$ 23.65	\$ 21.21	8 %	12 %

⁽¹⁾ The deferred state tax impact was calculated using the company's blended state tax rate of 5.25 percent in 2021 and 2020 and 4.50 percent in 2019 and is included in Unallocated corporate expense within operating income.

⁽²⁾ The federal tax impact in each period was calculated by subtracting the deferred state tax impact from MTM benefit (expense) and applying the 21 percent federal statutory rate.

⁽³⁾ The state tax impact includes \$62 million of incremental tax expense related to \$1.2 billion of nondeductible goodwill in the divested business.

⁽⁴⁾ The federal tax impact was calculated by applying the 21 percent federal statutory rate to the adjustment items and also includes \$250 million of incremental tax expense related to \$1.2 billion of nondeductible goodwill in the divested business.

2021 diluted earnings per share increased \$24.51, or 129 percent, principally due to a \$15.57 increase in our 2021 MTM benefit, net of tax, and a \$6.96 increase associated with the IT services divestiture, net of tax. Transaction-adjusted EPS increased \$1.98, or 8 percent, reflecting a 4 percent increase in transaction-adjusted net earnings and a 4 percent decrease in weighted-average diluted shares outstanding.

SEGMENT OPERATING RESULTS

Basis of Presentation

The company is aligned in four operating sectors, which also comprise our reportable segments: Aeronautics Systems, Defense Systems, Mission Systems and Space Systems. 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:

Aeronautics Systems	Defense Systems	Mission Systems	Space Systems
Autonomous Systems	Battle Management & Missile Systems	Airborne Multifunction Sensors	Launch & Strategic Missiles
Manned Aircraft	Mission Readiness	Maritime/Land Systems & Sensors	Space
		Navigation, Targeting & Survivability	
		Networked Information Solutions	

Effective during the first quarter of 2021 within Mission Systems, the businesses of the former CIMS business area that remained with Northrop Grumman after the IT services divestiture were merged with the Communications business unit and F-35 Communications, Navigation and Identification programs within the former Airborne, Sensors & Networks business area to form the Networked Information Solutions business area. The Airborne Sensors & Networks business area was then renamed the Airborne Multifunction Sensors business area to better reflect its new portfolio. This change had no impact on the segment operating results of Mission Systems as a whole.

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This section discusses segment sales, operating income and operating margin rate. 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 table below, and segment operating margin rate (segment operating income divided by sales) are non-GAAP measures that reflect the combined operating income of our four segments less the operating income associated with intersegment sales. Segment operating income includes pension expense allocated to our sectors under FAR and CAS and excludes FAS pension service expense and unallocated corporate items (certain corporate-level expenses, which are not considered allowable or allocable under applicable FAR and CAS requirements, and costs not considered part of management's evaluation of segment operating performance). These non-GAAP measures may be useful to investors and other users of our financial statements as supplemental measures in evaluating the financial performance and operational trends of our sectors. These measures may not be defined and calculated by other companies in the same manner and should not be considered in isolation or as alternatives to operating results presented in accordance with GAAP.

<i>\$ in millions</i>	Year Ended December 31			% Change in	
	2021	2020	2019	2021	2020
Operating income	\$5,651	\$4,065	\$3,969	39 %	2 %
Reconciliation to segment operating income:					
CAS pension expense	(544)	(827)	(832)	(34)%	(1)%
FAS pension service expense	414	409	367	1 %	11 %
FAS/CAS operating adjustment	(130)	(418)	(465)	(69)%	(10)%
Gain on sale of business	(1,980)	—	—	NM	NM
IT services divestiture – unallowable state taxes and transaction costs	192	—	—	NM	NM
Intangible asset amortization and PP&E step-up depreciation	254	322	390	(21)%	(17)%
MTM-related deferred state tax expense (benefit) ⁽¹⁾	124	(54)	(81)	(330)%	(33)%
Other unallocated corporate expense	106	273	165	(61)%	65 %
Unallocated corporate (income) expense	\$(1,304)	\$ 541	\$ 474	(341)%	14 %
Segment operating income	\$4,217	\$4,188	\$3,978	1 %	5 %
Segment operating margin rate	11.8 %	11.4 %	11.8 %		

⁽¹⁾ Represents the deferred state tax benefit associated with MTM benefit (expense), which is recorded in Unallocated corporate expense consistent with other changes in deferred state taxes.

Segment Operating Income and Margin Rate

2021 segment operating income increased \$29 million, or 1 percent. Higher operating income at Space Systems and Mission Systems was driven by increased volume and improved performance. Lower operating income at Defense Systems is due to the impact of the IT services divestiture and lower operating income at Aeronautics Systems principally relates to net unfavorable EAC adjustments on F-35. 2021 segment operating income from the IT services business was \$20 million as compared to \$247 million in 2020. Segment operating income includes a first quarter 2021 benefit of approximately \$100 million due to the impact of lower overhead rates on the company's fixed price contracts. Segment operating margin rate increased to 11.8 percent from 11.4 percent and reflects higher operating margin rates at Mission Systems, Defense Systems and Space Systems.

FAS/CAS Operating Adjustment

The decrease in our 2021 FAS/CAS operating adjustment is due to lower CAS pension expense resulting from favorable plan asset returns in 2020 and changes in certain CAS actuarial assumptions as of December 31, 2020.

Unallocated Corporate Income (Expense)

The increase in 2021 unallocated corporate income (expense) is primarily due to a \$2.0 billion pre-tax gain on the sale of our IT services business, partially offset by \$192 million of unallowable state taxes and transaction costs associated with the divestiture. Lower non-divestiture-related unallocated corporate expense reflects a \$60 million benefit from insurance settlements related to shareholder litigation involving the former Orbital ATK prior to the company's acquisition, that was resolved in June 2019, as well as benefits recognized during the year associated with changes in deferred state taxes, partially offset by higher deferred state tax expense related to the company's 2021 MTM benefit.

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

<i>\$ in millions</i>	Year Ended December 31		
	2021	2020	2019
Favorable EAC adjustments	\$ 1,242	\$ 1,082	\$ 1,040
Unfavorable EAC adjustments	(715)	(616)	(560)
Net EAC adjustments	\$ 527	\$ 466	\$ 480

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

<i>\$ in millions</i>	Year Ended December 31		
	2021	2020	2019
Aeronautics Systems	\$ 25	\$ 77	\$ 143
Defense Systems	113	148	99
Mission Systems	263	216	189
Space Systems	134	33	63
Eliminations	(8)	(8)	(14)
Net EAC adjustments	\$ 527	\$ 466	\$ 480

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

AERONAUTICS SYSTEMS

<i>\$ in millions</i>	Year Ended December 31			% Change in	
	2021	2020	2019	2021	2020
Sales	\$ 11,259	\$ 12,169	\$ 11,116	(7)%	9 %
Operating income	1,093	1,206	1,188	(9)%	2 %
<i>Operating margin rate</i>	9.7 %	9.9 %	10.7 %		

Sales

2021 sales decreased \$910 million, or 7 percent, due to lower volume in both Manned Aircraft and Autonomous Systems. Lower sales reflect a \$444 million sale of equipment to a restricted customer in 2020, \$150 million of lower F-35 sales, lower A350 production activity, and lower volume on the B-2 Defensive Management Systems Modernization (DMS) program and certain Global Hawk programs.

Operating Income

2021 operating income decreased \$113 million, or 9 percent, principally due to lower sales. 2021 operating margin rate decreased to 9.7 percent from 9.9 percent due to lower net favorable EAC adjustments, driven by F-35, partially offset by improved performance on Autonomous Systems programs.

DEFENSE SYSTEMS

<i>\$ in millions</i>	Year Ended December 31			% Change in	
	2021	2020	2019	2021	2020
Sales	\$ 5,776	\$ 7,543	\$ 7,495	(23)%	1 %
Operating income	696	846	793	(18)%	7 %
<i>Operating margin rate</i>	12.0 %	11.2 %	10.6 %		

Sales

2021 sales decreased \$1.8 billion, or 23 percent, primarily due to a \$1.5 billion reduction in sales related to the IT services divestiture. 2021 organic sales decreased \$236 million, or 4 percent, due to \$397 million lower sales in connection with the close-out of the contract at the Army's Lake City ammunition plant (Lake City) and lower volume on an international training program, partially offset by higher volume on several programs including Republic of Korea Global Hawk Contractor Logistics Support (ROK Global Hawk CLS), U.S. Customs and Border Protection P-3 (CBP P-3), GMLRS, B-2 sustainment and advanced fuzes.

NORTHROP GRUMMAN CORPORATION

Operating Income

2021 operating income decreased \$150 million, or 18 percent, due to the impact of the IT services divestiture. Operating margin rate increased to 12.0 percent from 11.2 percent and reflects improved performance at Battle Management and Missile Systems due to changes in mix as a result of recent contract completions.

MISSION SYSTEMS

<i>\$ in millions</i>	Year Ended December 31			% Change in	
	2021	2020	2019	2021	2020
Sales	\$ 10,134	\$ 10,080	\$ 9,410	1 %	7 %
Operating income	1,579	1,459	1,408	8 %	4 %
<i>Operating margin rate</i>	<i>15.6 %</i>	<i>14.5 %</i>	<i>15.0 %</i>		

Sales

2021 sales increased \$54 million, or 1 percent, due to higher volume across the sector, partially offset by a \$485 million reduction in sales related to the IT services divestiture. 2021 organic sales increased \$539 million, or 6 percent. Maritime/Land Systems and Sensors sales increased primarily due to \$137 million higher volume on G/ATOR and higher marine systems volume. Airborne Multifunction Sensors sales increased principally due to \$105 million higher volume on airborne radar programs, including SABR, and higher restricted sales, partially offset by lower volume on airborne electronic warfare programs. Navigation, Targeting and Survivability sales increased principally due to \$124 million higher intercompany volume largely related to GBSD ramp-up. Networked Information Solutions sales increased principally due to higher volume on electronic warfare programs, including JCREW, and higher intercompany volume, partially offset by lower volume on F-35 CNI programs.

Operating Income

2021 operating income increased \$120 million, or 8 percent, due to a higher operating margin rate and higher sales. Operating margin rate increased to 15.6 percent from 14.5 percent due to higher net favorable EAC adjustments, which reflect improved performance and the first quarter 2021 reduction in overhead rates, the favorable resolution of certain government accounting matters in the second quarter of 2021 and mix changes largely related to the IT services divestiture.

SPACE SYSTEMS

<i>\$ in millions</i>	Year Ended December 31			% Change in	
	2021	2020	2019	2021	2020
Sales	\$ 10,608	\$ 8,744	\$ 7,425	21 %	18 %
Operating income	1,121	893	794	26 %	12 %
<i>Operating margin rate</i>	<i>10.6 %</i>	<i>10.2 %</i>	<i>10.7 %</i>		

Sales

2021 sales increased \$1.9 billion, or 21 percent, due to higher volume in both the Launch & Strategic Missiles and Space business areas, partially offset by a \$166 million reduction in sales related to the IT services divestiture. 2021 organic sales increased \$2.0 billion, or 24 percent. Launch & Strategic Missiles sales increased primarily due to ramp-up on development programs, including a \$1.1 billion increase on GBSD and a \$206 million increase on NGI. Space sales were driven by higher volume on restricted programs and increases of \$192 million on Artemis and \$140 million on Next Gen OPIR.

Operating Income

2021 operating income increased \$228 million, or 26 percent, due to higher sales and a higher operating margin rate. Operating margin rate increased to 10.6 percent from 10.2 percent primarily due to higher net favorable EAC adjustments, which were largely driven by improved performance on commercial space programs and the first quarter 2021 reduction in overhead rates.

NORTHROP GRUMMAN CORPORATION

PRODUCT AND SERVICE ANALYSIS

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

<i>\$ in millions</i>	Year Ended December 31					
	2021		2020		2019	
Segment Information:	Sales	Operating Costs and Expenses	Sales	Operating Costs and Expenses	Sales	Operating Costs and Expenses
Aeronautics Systems						
Product	\$ 9,408	\$ 8,534	\$ 10,437	\$ 9,435	\$ 9,387	\$ 8,428
Service	1,662	1,462	1,610	1,417	1,626	1,407
Intersegment eliminations	189	170	122	111	103	93
Total Aeronautics Systems	11,259	10,166	12,169	10,963	11,116	9,928
Defense Systems						
Product	2,564	2,243	3,024	2,740	2,784	2,572
Service	2,423	2,137	3,791	3,305	4,020	3,513
Intersegment eliminations	789	700	728	652	691	617
Total Defense Systems	5,776	5,080	7,543	6,697	7,495	6,702
Mission Systems						
Product	7,064	6,017	6,744	5,757	6,022	5,073
Service	2,077	1,695	2,557	2,201	2,660	2,314
Intersegment eliminations	993	843	779	663	728	615
Total Mission Systems	10,134	8,555	10,080	8,621	9,410	8,002
Space Systems						
Product	8,832	7,898	6,810	6,084	5,659	5,021
Service	1,637	1,464	1,826	1,672	1,683	1,535
Intersegment eliminations	139	125	108	95	83	75
Total Space Systems	10,608	9,487	8,744	7,851	7,425	6,631
Segment Totals						
Total Product	\$ 27,868	\$ 24,692	\$ 27,015	\$ 24,016	\$ 23,852	\$ 21,094
Total Service	7,799	6,758	9,784	8,595	9,989	8,769
Total Segment ⁽¹⁾	\$ 35,667	\$ 31,450	\$ 36,799	\$ 32,611	\$ 33,841	\$ 29,863

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

Product Sales and Costs

2021 product sales increased \$853 million, or 3 percent, due to ramp-up on development programs including GBSD and NGI at Space Systems, as well as higher volume on airborne radar and land systems programs at Mission Systems. The increase was partially offset by lower restricted sales and lower net favorable EAC adjustments at Aeronautics Systems as well as close-out of the Lake City contract at Defense Systems.

2021 product costs increased \$676 million, or 3 percent, consistent with the higher product sales described above.

Service Sales and Costs

2021 service sales decreased \$2.0 billion, or 20 percent, primarily due to the IT services divestiture. Year to date 2021 sales from the IT services business, which were largely included in service sales, were \$162 million as compared to \$2.3 billion in the prior year period. The reductions associated with the IT services divestiture were partially offset by higher volume on the ROK Global Hawk CLS and CBP P-3 programs at Defense Systems.

2021 service costs decreased \$1.8 billion, or 21 percent, consistent with the lower service sales described above.

BACKLOG

Backlog represents the future sales we expect to recognize on firm orders received by the company and is equivalent to the company’s remaining performance obligations at the end of each period. It comprises both funded backlog (firm orders for which funding is authorized and appropriated) and unfunded backlog. Unexercised contract options

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and indefinite delivery indefinite quantity (IDIQ) contracts are not included in backlog until the time the option or IDIQ task order is exercised or awarded. Backlog is converted into sales as costs are incurred or deliveries are made.

Backlog consisted of the following at December 31, 2021 and 2020:

<i>\$ in millions</i>	2021			2020	% Change in 2021
	Funded	Unfunded	Total Backlog	Total Backlog	
Aeronautics Systems	\$ 8,842	\$ 9,435	\$ 18,277	\$ 24,002	(24)%
Defense Systems	5,802	547	6,349	8,131	(22)%
Mission Systems	9,940	4,366	14,306	13,805	4 %
Space Systems	6,210	30,904	37,114	35,031	6 %
Total backlog	\$ 30,794	\$ 45,252	\$ 76,046	\$ 80,969	(6)%

2021 net awards totaled \$32.1 billion. Significant 2021 new awards include \$6.1 billion for restricted programs (primarily at Space Systems, Mission Systems and Aeronautics Systems), \$3.2 billion for the SLS Booster Production and Operations Contract, \$2.6 billion for NGI, \$2.2 billion for F-35, \$1.0 billion for E-2 and \$0.9 billion for NASA's HALO module. In connection with the IT services divestiture, the company reduced backlog by \$1.4 billion during the first quarter of 2021 (\$1.0 billion at Defense Systems, \$0.2 billion at Mission Systems and \$0.2 billion at Space Systems).

LIQUIDITY AND CAPITAL RESOURCES

We are focused on the efficient conversion of operating income into cash to provide for the company's material cash requirements, including working capital needs, satisfaction of contractual commitments, funding of our pension and OPB plans, investment in our business through capital expenditures, and shareholder return through dividend payments and share repurchases.

As of December 31, 2021, we had cash and cash equivalents of \$3.5 billion; \$295 million was held outside of the U.S. by foreign subsidiaries. We expect cash and cash equivalents and cash generated from operating activities, supplemented by borrowings under credit facilities, commercial paper and/or in the capital markets through our shelf registration with the SEC, if needed, to be sufficient to provide liquidity to the company in the short-term and long-term. The company has a five-year senior unsecured credit facility in an aggregate principal amount of \$2.0 billion, and in April 2021, we renewed our one-year \$500 million uncommitted credit facility. At December 31, 2021, there was no balance outstanding under these credit facilities.

The company's principal contractual commitments include purchase obligations, repayments of long-term debt and related interest, and payments under operating leases. At December 31, 2021, we had \$17.7 billion of purchase obligations, approximately half of which is short-term. Purchase obligations are largely comprised of open purchase order commitments to suppliers and subcontractors under U.S. government contracts. In most circumstances, our risk associated with the purchase obligations on our U.S. government contracts is limited to the termination liability provisions within those contracts. As such, we do not believe they represent a material liquidity risk to the company. At December 31, 2021, we had capital expenditure commitments of \$1.5 billion, which we expect to satisfy with cash on hand. We also had provisions for uncertain tax positions of \$1.6 billion, some or all of which could result in future cash payments to various taxing authorities. At this time, we are unable to estimate the timing and amount of any future cash outflows related to these uncertain tax positions.

Refer to the respective notes to the consolidated financial statements for further information about our share repurchase programs (Note 3), commercial paper, credit facilities and long-term debt (Note 10), standby letters of credit and guarantees (Note 12), future minimum contributions for the company's pension and OPB plans (Note 13), and lease payment obligations (Note 15).

COVID-19 and the CARES Act

The Coronavirus Aid, Relief, and Economic Security Act (the "CARES Act") established a program with provisions to allow U.S. companies to defer the employer's portion of social security taxes between March 27, 2020 and December 31, 2020 and pay such taxes in two installments in 2021 and 2022. Our first installment of deferred social security taxes of \$200 million was paid in the fourth quarter of 2021 and the second installment of \$200 million is due in the fourth quarter of 2022. Under Section 3610, the CARES Act also authorized the government to reimburse qualifying contractors for certain costs of providing paid leave to employees as a result of COVID-19. The company continues to seek, and anticipates continuing to seek, recovery for certain COVID-19-related costs under Section

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3610 of the CARES Act and through our contract provisions, though it is unclear what funds will be available and how much we will be able to recover. In addition, the DoD has, to date, taken steps to increase the rate for certain progress payments from 80 percent to 90 percent for costs incurred and work performed on relevant contracts; it is unclear what steps the DoD will continue to take.

Cash Flow Measures

In addition to our cash position, we consider various cash flow measures in capital deployment decision-making, including cash provided by operating activities and adjusted free cash flow, a non-GAAP measure described in more detail below.

Operating Cash Flow

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

<i>\$ in millions</i>	Year Ended December 31		
	2021	2020	2019
Net earnings	\$ 7,005	\$ 3,189	\$ 2,248
Gain on sale of business	(1,980)	—	—
Non-cash items ⁽¹⁾	(1,510)	1,799	2,251
Pension and OPB contributions	(141)	(887)	(263)
Changes in trade working capital	181	227	128
Other, net	12	(23)	(67)
Net cash provided by operating activities	\$ 3,567	\$ 4,305	\$ 4,297

⁽¹⁾ Includes depreciation and amortization, non-cash lease expense, MTM benefit (expense), stock based compensation expense, deferred income taxes and net periodic pension and OPB income.

2021 cash provided by operating activities decreased \$738 million principally due to federal and state taxes of \$785 million paid in connection with the IT services divestiture. Lower 2021 pension and OPB contributions were largely offset by the impact of CARES Act social security tax deferrals and the 2020 increase in DoD progress payment rates.

Adjusted Free Cash Flow

Adjusted free cash flow, as reconciled in the table below, is a non-GAAP measure defined as net cash provided by or used in operating activities, less capital expenditures, plus proceeds from the sale of equipment to a customer (not otherwise included in net cash provided by or used in operating activities) and the after-tax impact of discretionary pension contributions. Adjusted free cash flow includes proceeds from the sale of equipment to a customer as such proceeds were generated in a customer sales transaction. It also includes the after-tax impact of discretionary pension contributions for consistency and comparability of financial performance. This measure may not be defined and calculated by other companies in the same manner. We use adjusted free cash flow as a key factor in our planning for, and consideration of, acquisitions, the payment of dividends and stock repurchases. This non-GAAP measure may be useful to investors and other users of our financial statements as a supplemental measure of our cash performance, but should not be considered in isolation, as a measure of residual cash flow available for discretionary purposes, or as an alternative to operating cash flows presented in accordance with GAAP.

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

<i>\$ in millions</i>	Year Ended December 31			% Change in	
	2021	2020	2019	2021	2020
Net cash provided by operating activities	\$ 3,567	\$ 4,305	\$ 4,297	(17)%	— %
Capital expenditures	(1,415)	(1,420)	(1,264)	— %	12 %
Proceeds from sale of equipment to a customer	84	205	—	(59)%	NM
After-tax discretionary pension contributions	—	593	95	(100)%	524 %
Adjusted free cash flow	\$ 2,236	\$ 3,683	\$ 3,128	(39)%	18 %

2021 adjusted free cash flow decreased \$1.4 billion, principally due to federal and state taxes of \$785 million paid related to the IT services divestiture as well as the impact of CARES Act social security tax deferrals and the 2020 increase in DoD progress payment rates.

Investing Cash Flow

2021 net cash provided by investing activities was \$2.1 billion compared to net cash used in investing activities of \$1.2 billion in the prior year, principally due to \$3.4 billion in cash received from the sale of our IT services business during the first quarter of 2021.

Financing Cash Flow

2021 net cash used in financing activities increased \$6.6 billion, principally due to an increase of \$3.2 billion in share repurchases and \$1.2 billion in debt repayments. 2020 net cash used in financing activities included \$2.2 billion of net proceeds from the issuance of long-term debt.

CRITICAL ACCOUNTING POLICIES, ESTIMATES AND JUDGMENTS

Our consolidated financial statements are prepared in conformity with GAAP, which requires us to make estimates and assumptions about future events that affect the amounts reported in our consolidated financial statements. We employ judgment in making our estimates in consideration of historical experience, currently available information and various other assumptions that we believe to be reasonable under the circumstances. Actual results could differ from our estimates and assumptions, and any such differences could be material to our consolidated financial statements. We believe the following accounting policies are critical to the understanding of our consolidated financial statements and require the use of significant management judgment in their application. For a summary of our significant accounting policies, see Note 1 to the consolidated financial statements.

Revenue Recognition

Due to the long-term nature of our contracts, we generally recognize revenue over time using the cost-to-cost method, which requires us to make reasonably dependable estimates regarding the revenue and cost associated with the design, manufacture and delivery of our products and services.

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

Our cost estimation process is based on the professional knowledge of our engineering, program management and financial professionals, and draws on their significant experience and judgment. We prepare EACs for our contracts and calculate an estimated contract profit based on total estimated contract sales and cost. Since our contracts typically span a period of several years, estimation of revenue, cost, and progress toward completion requires the use of judgment. Factors considered in these estimates include our historical performance, the availability, productivity and cost of labor, the nature and complexity of work to be performed, the effect of change orders, availability and cost of materials, components and subcontracts, the effect of any delays in performance and the level of indirect cost allocations.

We generally review and reassess our sales, cost and profit estimates for each significant contract at least annually or more frequently as determined by the occurrence of events, changes in circumstances and evaluations of contract performance to reflect the latest reliable information available. The company performs on a broad portfolio of long-term contracts, including the development of complex and customized military platforms and systems, as well as advanced electronic equipment and software, that often include technology at the forefront of science. Cost estimates on fixed-price development contracts are inherently more uncertain as to future events than production contracts, and, as a result, there is typically more variability in those estimates, as well as financial risk associated with unanticipated cost growth. Changes in estimates occur for a variety of reasons, including changes in contract scope, the resolution of risk at lower or higher cost than anticipated, unanticipated performance and other risks affecting contract costs, performance issues with subcontractors or suppliers, changes in indirect cost allocations, such as overhead and G&A costs, and changes in estimated award and incentive fees. Identified risks typically include technical, schedule and/or performance risk based on our evaluation of the contract effort. Similarly, the changes in estimates may include changes in, or resolution of, identified opportunities for operating margin improvement.

For the impacts of changes in estimates on our consolidated statements of earnings and comprehensive income, see “Segment Operating Results” and Note 1 to the consolidated financial statements.

Retirement Benefits

Overview – The determination of projected benefit obligations, the fair value of plan assets, and pension and OPB expense for our retirement benefit plans requires the use of estimates and actuarial assumptions. We perform an annual review of our actuarial assumptions in consultation with our actuaries. As we determine changes in the

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assumptions are warranted, or as a result of plan amendments, future pension and OPB expense and our projected benefit obligation could increase or decrease. The principal estimates and assumptions that have a significant effect on our consolidated financial position and annual results of operations are the discount rate, cash balance crediting rate, expected long-term rate of return on plan assets, estimated fair market value of plan assets, and the mortality rate of those covered by our pension and OPB plans. The effects of actual results differing from our assumptions and the effects of changing assumptions (i.e., actuarial gains or losses) are recognized immediately through earnings upon annual remeasurement in the fourth quarter, or on an interim basis as triggering events warrant remeasurement.

Discount Rate – The discount rate represents the interest rate used to determine the present value of future cash flows currently expected to be required to settle our pension and OPB obligations. The discount rate is generally based on the yield of high-quality corporate fixed-income investments. At the end of each year, we determine the discount rate using a theoretical bond portfolio model of bonds rated AA or better to match the notional cash outflows related to projected benefit payments for each of our significant benefit plans. Taking into consideration the factors noted above, our weighted-average composite pension discount rate was 2.98 percent at December 31, 2021 and 2.68 percent at December 31, 2020.

The effects of a hypothetical change in the discount rate may be nonlinear and asymmetrical for future years as the discount rate changes. Holding all other assumptions constant, an increase or decrease of 25 basis points in the December 31, 2021 discount rate assumption would have the following estimated effects on 2021 pension and OPB obligations, which would be reflected in the 2021 MTM expense (benefit), and 2022 expected pension and OPB expense:

<i>\$ in millions</i>	25 Basis Point Decrease in Rate	25 Basis Point Increase in Rate
2021 pension and OPB obligation and MTM expense (benefit)	\$ 1,343	\$ (1,274)
2022 pension and OPB (benefit) expense	(44)	40

Cash Balance Crediting Rate – A portion of the company’s pension obligation and resulting pension expense is based on a cash balance formula, where participants’ hypothetical account balances are accumulated over time with pay-based credits and interest. Interest is credited monthly using the current 30-Year Treasury bond rate. The interest crediting rate is part of the cash balance formula and independent of actual pension investment earnings. The cash balance crediting rate used for FAS purposes tends to move in concert with the discount rate but has an offsetting effect on pension benefit obligations and the related MTM expense (benefit). The minimum cash balance crediting rate allowed under the plan is 2.25 percent. The cash balance crediting rate assumption has been set to the minimum threshold of 2.25 percent as of December 31, 2021, and will remain at 2.25 percent through 2027. Holding all other assumptions constant, an increase or decrease of 25 basis points in the December 31, 2021 cash balance crediting rate assumption would have the following estimated effects on the 2021 pension benefit obligation, which would be reflected in the 2021 MTM expense (benefit), and 2022 expected pension expense:

<i>\$ in millions</i>	25 Basis Point Decrease in Rate	25 Basis Point Increase in Rate
2021 pension obligation and MTM expense (benefit)	\$ —	\$ 151
2022 pension (benefit) expense	—	10

Expected Long-Term Rate of Return on Plan Assets – The expected long-term rate of return on plan assets (EROA) assumption reflects the average rate of net earnings we expect on current and future benefit plan investments. EROA is a long-term assumption, which we review annually and adjust to reflect changes in our long-term view of expected market returns and/or significant changes in our plan asset investment policy. Due to the inherent uncertainty of this assumption, we consider multiple data points at the measurement date including the plan’s target asset allocation, historical asset returns and third party projection models of expected long-term returns for each of the plans’ strategic asset classes. In addition to the data points themselves, we consider trends in the data points, including changes from the prior measurement date. The EROA assumptions we use for pension benefits are consistent with those used for OPB plans; however, we reduce the EROA for OPB plans to allow for the impact of tax on investment earnings, as certain Voluntary Employee Beneficiary Association trusts are taxable.

During 2021, the Investment Committee of the company’s benefit plans reviewed and approved the plans’ major asset class allocations. The current asset allocation is approximately 40% public equities, 30% fixed-income, 25%

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alternatives and 5% cash. At this time, the Investment Committee is not planning any significant changes to that mix. For further information on plan asset investments, see Note 13 to the consolidated financial statements.

While historical market returns are not necessarily predictive of future market returns, given our long history of plan performance supported by the stability in our investment mix, investment managers, and active asset management, we believe our actual historical performance is a reasonable metric to consider when developing our EROA. Our average annual rate of return from 1976 to 2021 was approximately 11.2 percent and our 20-year and 30-year rolling average rates of return were approximately 8.8 percent and 9.6 percent, respectively, each determined on an arithmetic basis and net of expenses. Our 2021 actual net plan asset returns were approximately 10.9 percent.

Consistent with our past practice, we obtained long-term capital market forecasting models from several third parties and, using our target asset allocation, developed an expected rate of return on plan assets from each model. We considered not only the specific returns projected by those third party models, but also changes in the models year-to-year when developing our EROA.

For determining 2021 FAS expense, we assumed an expected long-term rate of return on pension plan assets of 7.5 percent and an expected long-term rate of return on OPB plan assets of 7.22 percent. For 2022 FAS expense, we have assumed an expected long-term rate of return on pension plan assets of 7.5 percent and 7.19 percent on OPB plans. Holding all other assumptions constant, an increase or decrease of 25 basis points in our December 31, 2021 EROA assumption would have the following estimated effects on 2022 expected pension and OPB expense:

<i>\$ in millions</i>	25 Basis Point Decrease	25 Basis Point Increase
2022 pension and OPB expense (benefit)	\$ 92	\$ (92)

In addition, holding all other assumptions constant, an increase or decrease of 100 basis points in actual versus expected return on plan assets would have the following estimated effects on our 2022 MTM expense (benefit):

<i>\$ in millions</i>	100 Basis Point Decrease	100 Basis Point Increase
2022 MTM expense (benefit)	\$ 369	\$ (369)

Estimated Fair Market Value of Plan Assets – For certain plan assets where the fair market value is not readily determinable, such as real estate, private equity, hedge funds and opportunistic investments, we develop estimates of fair value using the best information available. Estimated fair values on these plan assets are based on redemption values and net asset values (NAV), as well as valuation methodologies that include third party appraisals, comparable transactions, discounted cash flow valuation models and public market data.

Mortality Rate – Mortality assumptions are used to estimate life expectancies of plan participants. In October 2014, the Society of Actuaries Retirement Plans Experience Committee (RPEC) issued updated mortality tables and a mortality improvement scale, which reflected longer life expectancies than previously projected. In October 2019, the RPEC issued an updated mortality base table (the Private Retirement Plans Mortality table for 2012 (Pri-2012)), which we adopted after reviewing our own historical mortality experience. In October 2021, the RPEC released a new projection scale (MP-2021) that included additional underlying data for 2019, which included an increase in life expectancies relative to the prior year.

After considering the information released by the RPEC in October 2021 as well as the company's recent mortality experience in light of the COVID-19 pandemic, we adopted the full MP-2021 projection scale while continuing to use the Pri-2012 White Collar table. Accordingly, we updated the mortality assumptions used in calculating our pension and OPB obligations recognized at December 31, 2021, and the amounts estimated for our 2022 pension and OPB expense.

For further information regarding our pension and OPB plans, see "Risk Factors" and Notes 1 and 13 to the consolidated financial statements.

Litigation, Commitments and Contingencies

We are subject to a range of claims, disputes, enforcement actions, investigations, lawsuits, overhead cost claims, environmental matters, income tax matters and administrative proceedings that arise in the ordinary course of business. Estimating liabilities and costs associated with these matters requires judgment based upon the professional knowledge and experience of management. We determine whether to record a reserve and, if so, what amount based on consideration of the facts and circumstances of each matter as then known to us. Determinations regarding whether to record a reserve and, if so, of what amount, reflect management's assessment regarding what is

likely to occur; they do not necessarily reflect what management believes should occur. The ultimate resolution of any such exposure to us may vary materially from earlier estimates as further facts and circumstances develop or become known to us.

Environmental Matters – We are subject to environmental laws and regulations in the jurisdictions in which we do or have done business. Factors that could result in changes to the assessment of probability, range of reasonably estimated costs and environmental accruals include: modification of planned remedial actions; changes in the estimated time required to conduct remedial actions; discovery of more or less extensive (or different) contamination than anticipated; information regarding the potential causes and effects of contamination; results of efforts to involve other responsible parties; financial capabilities of other responsible parties; changes in laws and regulations, their interpretation or application; contractual obligations affecting remediation or responsibilities; and improvements in remediation technology. As we expect to be able to recover a portion of environmental remediation liabilities through overhead charges on government contracts, such amounts are deferred in prepaid expenses and other current assets (current portion) and other non-current assets until charged to contracts. We use judgment to evaluate the recoverability of our environmental remediation costs, assessing, among other things, U.S. government regulations, our U.S. government contract mix and past practices. Portions of the company’s environmental liabilities we do not expect to be recoverable have been expensed.

Income Tax Matters – The evaluation of tax positions taken in a filed tax return, or planned to be taken in a future tax return or claim, requires the use of judgment. We establish reserves for uncertain tax positions when, despite the belief that our tax positions are supportable, there remains uncertainty in a tax position taken in our filed tax returns or planned to be taken in a future tax return or claim. The company follows a recognition and measurement approach, considering the facts, circumstances, and information available at the reporting date. Judgment is exercised by the company in determining the level of evidence necessary and appropriate to support its assessment using all available information. The technical merits of a given tax position are derived from sources of authority in the tax law and their applicability to the facts and circumstances of the position. In measuring the tax position, the company considers the amounts and probabilities of the outcomes that could be realized upon settlement. When it is more likely than not that a tax position will be sustained, we record the largest amount of tax benefit with a greater than 50 percent likelihood of being realized upon ultimate settlement with a taxing authority. To the extent we prevail in matters for which reserves have been established or are required to pay amounts in excess of reserves, there could be a significant impact on our consolidated financial position and annual results of operations. Our 2021 increase in unrecognized tax benefits of \$149 million was primarily related to our methods of accounting associated with the timing of revenue recognition and related costs and the 2017 Tax Cuts and Jobs Act, which includes related final revenue recognition regulations issued in December 2020 under IRC Section 451(b) and procedural guidance issued in August 2021.

For further information on litigation, commitments and contingencies, see “Risk Factors” and Note 1, Note 7, Note 11 and Note 12 to the consolidated financial statements.

Goodwill and Other Purchased Intangible Assets

Overview – We allocate the purchase price of acquired businesses to the underlying tangible and intangible assets acquired and liabilities assumed based upon their respective fair values, with the excess recorded as goodwill. Such fair value assessments require judgments and estimates that can be affected by contract performance and other factors over time, which may cause final amounts to differ materially from original estimates. Adjustments to the fair value of purchased assets and liabilities after the initial measurement period are recognized in net earnings.

We recognize purchased intangible assets in connection with our business acquisitions at fair value on the acquisition date. The most significant purchased intangible assets recognized from our acquisitions are generally customer-related intangible assets, including customer contracts and commercial customer relationships. We determine the fair value of those customer-related intangible assets based on estimates and judgments, including the amount and timing of expected future cash flows, long-term growth rates and discount rates. In some cases, we use discounted cash flow analyses, which are based on estimates of future sales, earnings and cash flows after considering such factors as general market conditions, customer budgets, existing firm and future orders, changes in working capital, long term business plans and recent operating performance.

Impairment Testing – We test for impairment of goodwill annually at each of our reporting units, which comprise our operating segments. The results of our annual goodwill impairment tests as of December 31, 2021 and 2020, respectively, indicated that the estimated fair value of each reporting unit exceeded its respective carrying value. There were no impairment charges recorded in the years ended December 31, 2021, 2020 and 2019.

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In addition to performing an annual goodwill impairment test, we may perform an interim impairment test if events occur or circumstances change that suggest goodwill in any of our reporting units may be impaired. Such indicators may include, but are not limited to, the loss of significant business, significant reductions in federal government appropriations or other significant adverse changes in industry or market conditions. During 2021, we considered COVID-19-related impacts on our business and determined there were no impairment indicators requiring us to perform an interim goodwill impairment test.

When testing goodwill for impairment, we compare the fair values of each of our reporting units to their respective carrying values. To determine the fair value of our reporting units, we primarily use the income approach based on the cash flows we expect the reporting units to generate in the future, consistent with our operating plans. This income valuation method requires management to project sales, operating expenses, working capital, capital spending and cash flows for the reporting units over a multi-year period, as well as to determine the weighted-average cost of capital (WACC) used as a discount rate and terminal value assumptions. The WACC takes into account the relative weights of each component of our consolidated capital structure (equity and debt) and represents the expected cost of new capital adjusted as appropriate to consider lower risk profiles associated with longer-term contracts and barriers to market entry. The terminal value assumptions are applied to the final year of the discounted cash flow model. We use industry multiples (including relevant control premiums) of operating earnings to corroborate the fair values of our reporting units determined under the market valuation method of the income approach.

We test for impairment of our purchased intangible assets when events or changes in circumstances indicate that the carrying amount of these assets may not be recoverable. Our assessment is based on our projection of the undiscounted future operating cash flows of the related asset group. If such projections indicate that future undiscounted cash flows are not sufficient to recover the carrying amount, we recognize a non-cash impairment charge to reduce the carrying amount to fair value. There were no impairment charges recorded in the years ended December 31, 2021, 2020 and 2019.

Impairment assessment inherently involves management judgments as to assumptions about expected future cash flows and the impact of market conditions on those assumptions. Due to the many variables inherent in the estimation of a business' fair value and the relative size of our recorded goodwill and other purchased intangible assets, differences in assumptions may have a material effect on the results of our impairment analysis.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

EQUITY RISK

We are exposed to market risk with respect to our portfolio of marketable securities with a fair value of \$418 million at December 31, 2021. These securities are exposed to market volatilities, changes in price and interest rates.

INTEREST RATE RISK

We are exposed to interest rate risk on variable-rate short-term credit facilities for which there were no borrowings outstanding at December 31, 2021. At December 31, 2021, we have \$12.8 billion of long-term debt, primarily consisting of fixed-rate debt, with a fair value of approximately \$15.1 billion. The terms of our fixed-rate debt obligations do not generally allow investors to demand payment of these obligations prior to maturity. Therefore, we do not have significant exposure to interest rate risk for our fixed-rate debt; however, we do have exposure to fair value risk if we repurchase or exchange long-term debt prior to maturity.

FOREIGN CURRENCY RISK

In certain circumstances, we are exposed to foreign currency risk. We enter into foreign currency forward contracts to manage a portion of the exchange rate risk related to receipts from customers and payments to suppliers denominated in foreign currencies. We do not hold or issue derivative financial instruments for trading purposes. At December 31, 2021, foreign currency forward contracts with a notional amount of \$120 million were outstanding. At December 31, 2021, a 10 percent unfavorable foreign exchange rate movement would not have a material impact on our consolidated financial position, annual results of operations and/or cash flows.

INFLATION RISK

We have generally been able to anticipate increases in costs when pricing our contracts. Bids for longer-term firm fixed-price contracts typically include assumptions for labor and other cost escalations in amounts that historically have been sufficient to cover cost increases over the period of performance.

Item 8. Financial Statements and Supplementary Data

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

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

Opinion on the Financial Statements

We have audited the accompanying consolidated statements of financial position of Northrop Grumman Corporation and subsidiaries (the “Company”) as of December 31, 2021 and 2020, the related consolidated statements of earnings and comprehensive income, changes in shareholders’ equity, and cash flows for each of the three years in the period ended December 31, 2021, and the related notes (collectively referred to as the “financial statements”). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2021 and 2020, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2021, in conformity with accounting principles generally accepted in the United States of America.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company’s internal control over financial reporting as of December 31, 2021, based on the criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission and our report dated January 26, 2022 expressed an unqualified opinion on the Company’s internal control over financial reporting.

Basis for Opinion

These financial statements are the responsibility of the Company’s management. Our responsibility is to express an opinion on the Company’s financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current-period audit of the financial statements that were communicated or required to be communicated to the audit and risk committee and that (1) relate to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Revenue Recognition - Cost and Revenue Estimates for Development Contracts - Refer to Note 1 to the financial statements

Critical Audit Matter Description

As more fully described in Note 1 to the financial statements, the Company recognizes substantially all revenue as control is transferred to the customer on their long-term contracts over time using the cost-to-cost method (cost incurred relative to total cost estimated at completion). Use of the cost-to-cost-method requires the Company to make reasonably dependable estimates regarding the revenue and costs associated with the design, manufacture and delivery of their products or services. The Company estimates profit on these contracts as the difference between total estimated sales and total estimated costs at completion and recognizes that profit as costs are incurred. Cost

NORTHROP GRUMMAN CORPORATION

estimates on contracts requiring development work are inherently more uncertain as to future events than production contracts, and, as a result, there is typically more variability in those estimates. Certain of these contracts are fixed price in nature, which results in greater financial risk associated with unanticipated cost growth. Alternatively, cost-type contracts may have award or incentive fees that are subject to uncertainty and may be earned over extended periods or towards the end of the contract. As a result, the estimation of costs required to complete these contracts and the expected revenues that will be earned is complex and requires significant judgment.

Given the judgment necessary to make reasonably dependable estimates regarding the revenue and costs associated with such contracts, auditing these estimates required extensive audit effort due to the complexity of the underlying programs and a high degree of auditor judgment when performing audit procedures and evaluating the results of those procedures.

How the Critical Audit Matter Was Addressed in the Audit

Our auditing procedures related to the cost and revenue estimates for these development contracts included the following, among others:

- We tested the effectiveness of controls over the estimates of total costs and revenues on such contracts, including development costs and any related award or incentive fee estimates for the relevant performance obligations.
- We selected certain long-term contracts for testing and performed the following procedures:
 - Evaluated whether the recognition of revenue over time on such contracts was appropriate based on the terms and conditions of each contract, including whether continuous transfer of control to the customer occurred as progress was made toward fulfilling the performance obligation.
 - Tested management’s identification of distinct performance obligations by evaluating whether the underlying goods and services were highly interdependent and interrelated.
 - Tested management’s determination of the transaction price, including any award or incentive fees, based on the consideration expected to be received in accordance with the rights and obligations established under the contracts and any contractual modifications.
 - Evaluated the estimates of total cost and revenue for the performance obligation by:
 - Conducting inquiries at the relevant program locations, or virtually, (as a result of the COVID-19 pandemic and remote working environment) regarding any challenges related to the program.
 - Comparing costs incurred to date to the costs management estimated to be incurred to date.
 - Evaluating management’s ability to achieve the estimates of total cost and revenue by performing corroborating inquiries with the Company’s program and business management, and testing management’s process used to develop the estimates based on their work plans, engineering specifications, program labor, and supplier contracts. This includes management’s process to identify COVID-19 impacts to programs, which could include forecasted cost impacts and assumptions on the ability to recover those costs.
 - Comparing management’s estimates for the selected contracts to costs and revenues of similar performance obligations, when applicable.
 - Tested the mathematical accuracy of management’s calculation of revenue recognized during the period for the performance obligations.

Income Taxes - Uncertain Tax Positions - Refer to Notes 1 and 7 to the financial statements

Critical Audit Matter Description

The Company files income tax returns in the U.S. federal jurisdiction and in various state and foreign jurisdictions. Uncertain tax positions reflect the Company’s expected treatment of tax positions taken in a filed tax return, or planned to be taken in a future tax return or claim, which have not been reflected in measuring income tax expense or taxes payable for financial reporting purposes. Until these positions are sustained by the taxing authorities or the statute of limitations concerning such issues lapses, the Company does not generally recognize the tax benefits resulting from such positions and reports the tax effects as a liability for uncertain tax positions in its consolidated statements of financial position. The Company has recognized increased uncertain tax positions in recent years

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principally related to state apportionment, the methods of accounting associated with the timing of revenue recognition and related costs, and the 2017 Tax Act. Until the matters are resolved, the outcome is inherently uncertain and the Company discloses a summary of changes in their uncertain tax positions within the notes to their financial statements.

Auditing the assumptions associated with the Company's uncertain tax positions involves especially challenging judgments given the complexity and inherent subjectivity involved in evaluating the potential outcomes of these matters.

How the Critical Audit Matter Was Addressed in the Audit

Our audit procedures related to the assumptions used in determining uncertain tax positions included the following, among others:

- We tested the effectiveness of internal controls relating to the identification and completeness of, and recognition for, uncertain tax positions, including management's controls over the underlying key assumptions and inputs used to derive the estimates.
- With the assistance of our income tax specialists, we selected specific uncertain tax positions for testing and performed the following procedures:
 - Inquired both in-person and virtually (as a result of the COVID-19 pandemic and the remote working environment) of the Company's tax department, financial reporting department, and other personnel directly involved in the development of the estimates.
 - Obtained supporting documentation and evaluated how the Company supported the position, including the assumptions and estimates used for measurement, and how the taxing authorities have historically challenged the tax position, if applicable.
 - Obtained and read opinions provided by external counsel, as applicable, regarding the tax position taken by the Company.
 - Evaluated whether the uncertain tax position met the "more likely than not" recognition threshold.
 - Evaluated the appropriateness and consistency of the methodologies and assumptions used by management when developing these estimates.
- We tested the mathematical accuracy of management's calculations.

/s/ Deloitte & Touche LLP
McLean, Virginia
January 26, 2022

We have served as the Company's auditor since 1975.

NORTHROP GRUMMAN CORPORATION

CONSOLIDATED STATEMENTS OF EARNINGS AND COMPREHENSIVE INCOME

<i>\$ in millions, except per share amounts</i>	Year Ended December 31		
	2021	2020	2019
Sales			
Product	\$ 27,868	\$ 27,015	\$ 23,852
Service	7,799	9,784	9,989
Total sales	35,667	36,799	33,841
Operating costs and expenses			
Product	22,309	21,559	18,675
Service	6,090	7,762	7,907
General and administrative expenses	3,597	3,413	3,290
Total operating costs and expenses	31,996	32,734	29,872
Gain on sale of business	1,980	—	—
Operating income	5,651	4,065	3,969
Other (expense) income			
Interest expense	(556)	(593)	(528)
Non-operating FAS pension benefit	1,469	1,198	800
Mark-to-market pension and OPB benefit (expense)	2,355	(1,034)	(1,800)
Other, net	19	92	107
Earnings before income taxes	8,938	3,728	2,548
Federal and foreign income tax expense	1,933	539	300
Net earnings	\$ 7,005	\$ 3,189	\$ 2,248
Basic earnings per share	\$ 43.70	\$ 19.08	\$ 13.28
Weighted-average common shares outstanding, in millions	160.3	167.1	169.3
Diluted earnings per share	\$ 43.54	\$ 19.03	\$ 13.22
Weighted-average diluted shares outstanding, in millions	160.9	167.6	170.0
Net earnings (from above)	\$ 7,005	\$ 3,189	\$ 2,248
Other comprehensive loss			
Change in unamortized prior service credit, net of tax expense of \$2 in 2021, \$14 in 2020 and \$15 in 2019	(8)	(41)	(47)
Change in cumulative translation adjustment and other, net	(7)	10	2
Other comprehensive loss, net of tax	(15)	(31)	(45)
Comprehensive income	\$ 6,990	\$ 3,158	\$ 2,203

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

NORTHROP GRUMMAN CORPORATION

CONSOLIDATED STATEMENTS OF FINANCIAL POSITION

<i>\$ in millions, except par value</i>	December 31	
	2021	2020
Assets		
Cash and cash equivalents	\$ 3,530	\$ 4,907
Accounts receivable, net	1,467	1,501
Unbilled receivables, net	5,492	5,140
Inventoried costs, net	811	759
Prepaid expenses and other current assets	1,126	1,402
Assets of disposal group held for sale	—	1,635
Total current assets	12,426	15,344
Property, plant and equipment, net of accumulated depreciation of \$6,819 for 2021 and \$6,335 for 2020	7,894	7,071
Operating lease right-of-use assets	1,655	1,533
Goodwill	17,515	17,518
Intangible assets, net	578	783
Deferred tax assets	200	311
Other non-current assets	2,311	1,909
Total assets	\$ 42,579	\$ 44,469
Liabilities		
Trade accounts payable	\$ 2,197	\$ 1,806
Accrued employee compensation	1,993	1,997
Advance payments and billings in excess of costs incurred	3,026	2,517
Other current liabilities	2,314	3,002
Liabilities of disposal group held for sale	—	258
Total current liabilities	9,530	9,580
Long-term debt, net of current portion of \$6 for 2021 and \$742 for 2020	12,777	14,261
Pension and other postretirement benefit plan liabilities	3,269	6,498
Operating lease liabilities	1,590	1,343
Deferred tax liabilities	490	—
Other non-current liabilities	1,997	2,208
Total liabilities	29,653	33,890
Commitments and contingencies (Note 12)		
Shareholders' equity		
Preferred stock, \$1 par value; 10,000,000 shares authorized; no shares issued and outstanding	—	—
Common stock, \$1 par value; 800,000,000 shares authorized; issued and outstanding: 2021—156,284,423 and 2020—166,717,179	156	167
Paid-in capital	—	58
Retained earnings	12,913	10,482
Accumulated other comprehensive loss	(143)	(128)
Total shareholders' equity	12,926	10,579
Total liabilities and shareholders' equity	\$ 42,579	\$ 44,469

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

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CONSOLIDATED STATEMENTS OF CASH FLOWS

<i>\$ in millions</i>	Year Ended December 31		
	2021	2020	2019
Operating activities			
Net earnings	\$ 7,005	\$ 3,189	\$ 2,248
Adjustments to reconcile to net cash provided by operating activities:			
Depreciation and amortization	1,239	1,267	1,265
Mark-to-market pension and OPB (benefit) expense	(2,355)	1,034	1,800
Stock-based compensation	94	90	127
Deferred income taxes	603	210	(509)
Gain on sale of business	(1,980)	—	—
Net periodic pension and OPB income	(1,091)	(802)	(432)
Pension and OPB contributions	(141)	(887)	(263)
Changes in assets and liabilities:			
Accounts receivable, net	(10)	(285)	122
Unbilled receivables, net	(414)	160	(335)
Inventoried costs, net	(52)	18	(135)
Prepaid expenses and other assets	66	(147)	(78)
Accounts payable and other liabilities	376	719	617
Income taxes payable, net	215	(238)	(63)
Other, net	12	(23)	(67)
Net cash provided by operating activities	3,567	4,305	4,297
Investing activities			
Divestiture of IT services business	3,400	—	—
Capital expenditures	(1,415)	(1,420)	(1,264)
Proceeds from sale of equipment to a customer	84	205	—
Other, net	(11)	4	57
Net cash provided by (used in) investing activities	2,058	(1,211)	(1,207)
Financing activities			
Net proceeds from issuance of long-term debt	—	2,239	—
Payments of long-term debt	(2,236)	(1,027)	(500)
Payments to credit facilities	—	(78)	(31)
Net repayments of commercial paper	—	—	(198)
Common stock repurchases	(3,705)	(490)	(744)
Cash dividends paid	(983)	(953)	(880)
Payments of employee taxes withheld from share-based awards	(34)	(66)	(65)
Other, net	(44)	(57)	(6)
Net cash used in financing activities	(7,002)	(432)	(2,424)
(Decrease) increase in cash and cash equivalents	(1,377)	2,662	666
Cash and cash equivalents, beginning of year	4,907	2,245	1,579
Cash and cash equivalents, end of year	\$ 3,530	\$ 4,907	\$ 2,245

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

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CONSOLIDATED STATEMENTS OF CHANGES IN SHAREHOLDERS' EQUITY

<i>\$ in millions, except per share amounts</i>	Year Ended December 31		
	2021	2020	2019
Common stock			
Beginning of year	\$ 167	\$ 168	\$ 171
Common stock repurchased	(11)	(1)	(3)
Shares issued for employee stock awards and options	—	—	—
End of year	156	167	168
Paid-in capital			
Beginning of year	58	—	—
Common stock repurchased	(60)	—	—
Stock compensation	2	63	—
Other	—	(5)	—
End of year	—	58	—
Retained earnings			
Beginning of year	10,482	8,748	8,068
Common stock repurchased	(3,645)	(479)	(751)
Net earnings	7,005	3,189	2,248
Dividends declared	(989)	(951)	(880)
Stock compensation	60	(36)	63
Other	—	11	—
End of year	12,913	10,482	8,748
Accumulated other comprehensive loss			
Beginning of year	(128)	(97)	(52)
Other comprehensive loss, net of tax	(15)	(31)	(45)
End of year	(143)	(128)	(97)
Total shareholders' equity	\$ 12,926	\$ 10,579	\$ 8,819
Cash dividends declared per share	\$ 6.16	\$ 5.67	\$ 5.16

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

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Nature of Operations

Northrop Grumman Corporation is a leading global aerospace and defense company. We deliver a broad range of products, services and solutions to U.S. and international customers, and principally to the U.S. Department of Defense and intelligence community. Our broad portfolio is aligned to support national security priorities and our solutions equip our customers with capabilities they need to connect, protect and advance humanity.

The company is a leading provider of space systems, advanced aircraft, missile defense, advanced weapons and long-range fires capabilities, mission systems, networking and communications, strategic deterrence systems, and breakthrough technologies, such as artificial intelligence, advanced computing and cyber. We are focused on competing and winning programs that enable continued growth, performing on our commitments and affordably delivering capability our customers need. With the investments we've made in advanced technologies, combined with our talented workforce and digital transformation capabilities, Northrop Grumman is well positioned to meet our customers' needs today and in the future.

Principles of Consolidation

The consolidated financial statements include the accounts of Northrop Grumman and its subsidiaries and joint ventures or other investments for which we consolidate the financial results. Intercompany accounts, transactions and profits are eliminated in consolidation. Investments in equity securities and joint ventures where the company has significant influence, but not control, are accounted for using the equity method.

Basis of Presentation

Effective January 30, 2021 (the "Divestiture date"), we completed the sale of our IT and mission support services business (the "IT services divestiture") for \$3.4 billion in cash and recorded a pre-tax gain of \$2.0 billion. The IT and mission support services business was comprised of the majority of the former IS&S division of Defense Systems (excluding the Vinnell Arabia business); select cyber, intelligence and missions support programs, which were part of the former CIMS division of Mission Systems; and the former Space Technical Services business unit of Space Systems. The assets and liabilities of the IT and mission support services business were classified as held for sale in the consolidated statement of financial position as of December 31, 2020. Operating results include sales and operating income for the IT and mission support services business prior to the Divestiture date. See Note 2 for further information regarding the divestiture and Note 8 for the allocation of goodwill to the divestiture.

During the first quarter of 2021, we changed the naming convention for our FAS/CAS pension accounts. The Net FAS (service)/CAS pension adjustment is now referred to as the FAS/CAS operating adjustment and the FAS (non-service) pension benefit is now referred to as the Non-operating FAS pension benefit. This change does not impact any current or previously reported amounts. During the second quarter of 2021, we changed the presentation of the retiree benefits components in the operating cash flow section of the consolidated statements of cash flows. Prior period amounts have been conformed to current period presentation and this change does not impact previously reported cash provided by operating activities.

Accounting Estimates

The company's consolidated financial statements are prepared in conformity with U.S. GAAP. The preparation thereof requires management to make estimates and judgments that affect the reported amounts of assets and liabilities and the disclosure of contingencies at the date of the financial statements, as well as the reported amounts of sales and expenses during the reporting period. Estimates have been prepared using the most current and best available information; however, actual results could differ materially from those estimates.

Revenue Recognition

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

The company recognizes revenue for each separately identifiable performance obligation in a contract representing a promise to transfer a distinct good or service to a customer. In most cases, goods and services provided under the company's contracts are accounted for as single performance obligations due to the complex and integrated nature of our products and services. These contracts generally require significant integration of a group of goods and/or services to deliver a combined output. In some contracts, the company provides multiple distinct goods or services to a customer, most commonly when a contract covers multiple phases of the product life cycle (e.g., development, production, sustainment, etc.). In those cases, the company accounts for the distinct contract deliverables as separate

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performance obligations and allocates the transaction price to each performance obligation based on its relative standalone selling price, which is generally estimated using cost plus a reasonable margin. Warranties are provided on certain contracts, but do not typically provide for services beyond standard assurances and are therefore not considered to be separate performance obligations. Assets recognized from the costs to obtain or fulfill a contract are not material.

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

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

Contract Estimates

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

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

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

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

<i>\$ in millions, except per share data</i>	Year Ended December 31		
	2021	2020	2019
Revenue	\$ 568	\$ 504	\$ 538
Operating income	527	466	480
Net earnings ⁽¹⁾	416	368	379
Diluted earnings per share ⁽¹⁾	2.59	2.20	2.23

⁽¹⁾ Based on a 21% federal statutory tax rate.

EAC adjustments on a single performance obligation can have a significant effect on the company's financial statements. When such adjustments occur, we generally disclose the nature, underlying conditions and financial impact of the adjustments. During the third quarter of 2021, we recorded a \$42 million unfavorable EAC adjustment on the F-35 program at Aeronautics Systems due to labor-related production inefficiencies largely driven by COVID-19-related impacts on the labor market and employee leave. During the fourth quarter of 2021, we recorded an additional \$93 million unfavorable EAC adjustment on the F-35 program at Aeronautics Systems related to continued labor-related production impacts largely driven by COVID-19. During the fourth quarter of 2021, we modified our F-35 production plan to support a more consistent flow on the program and expect gradually to

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increase production rate over time as COVID-19-related impacts subside. No other such adjustments were significant to the financial statements during the years ended December 31, 2021, 2020 and 2019.

Backlog

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

Company backlog as of December 31, 2021 was \$76.0 billion. Of our December 31, 2021 backlog, we expect to recognize approximately 40 percent as revenue over the next 12 months and 60 percent as revenue over the next 24 months, with the remainder to be recognized thereafter.

Contract Assets and Liabilities

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

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

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

Net contract assets are as follows:

<i>\$ in millions</i>	December 31, 2021	December 31, 2020	\$ Change	% Change
Unbilled receivables, net	\$ 5,492	\$ 5,140	\$ 352	7 %
Advance payments and amounts in excess of costs incurred	(3,026)	(2,517)	(509)	20 %
Net contract assets	\$ 2,466	\$ 2,623	\$ (157)	(6)%

The change in the balances of the company's contract assets and liabilities primarily results from timing differences between revenue recognition and customer billings and/or payments. Net contract assets as of December 31, 2021 decreased 6 percent from the prior year, primarily due to an increase in Advance payments and amounts in excess of costs incurred at Aeronautics Systems, partially offset by an increase in unbilled receivables driven by sales growth at Space Systems.

The amount of revenue recognized for the years ended December 31, 2021, 2020 and 2019 that was included in the contract liability balance at the beginning of each year was \$2.0 billion, \$1.6 billion and \$1.3 billion, respectively.

Disaggregation of Revenue

See Note 16 for information regarding the company's sales by customer type, contract type and geographic region for each of our segments. We believe those categories best depict how the nature, amount, timing and uncertainty of our revenue and cash flows are affected by economic factors.

General and Administrative Expenses

In accordance with applicable FAR and CAS requirements, most general management and corporate expenses incurred at the segment and corporate locations are considered allowable and allocable costs to our U.S. government contracts. Allowable and allocable G&A costs, including independent research and development (IR&D) and bid and proposal (B&P) costs, are allocated on a systematic basis to contracts in progress and are included as a component of total estimated contract costs.

Research and Development

Company-sponsored research and development activities primarily include efforts related to government programs. Company-sponsored IR&D expenses totaled \$1.1 billion, \$1.1 billion and \$953 million in 2021, 2020 and 2019, respectively, which represented 3.2 percent, 2.9 percent and 2.8 percent of total sales, respectively. Customer-funded research and development activities are charged directly to the related contracts.

Income Taxes

Provisions for federal and foreign income taxes are calculated on reported earnings before income taxes based on current tax law and include the cumulative effect of any changes in tax rates from those used previously in determining deferred tax assets and liabilities. Such provisions differ from the amounts currently payable because certain items of income and expense are recognized in different periods for financial reporting purposes than for income tax purposes. The company recognizes federal and foreign interest accrued related to unrecognized tax benefits in income tax expense. Federal tax penalties are also recognized as a component of income tax expense.

In accordance with applicable FAR and CAS requirements, current state and local income and franchise taxes are generally considered allowable and allocable costs to our U.S. government contracts and, consistent with industry practice, are recorded in operating costs and expenses. The company generally recognizes changes in deferred state taxes and unrecognized state tax benefits in unallocated corporate expenses.

Uncertain tax positions reflect the company's expected treatment of tax positions taken in a filed tax return, or planned to be taken in a future tax return or claim, which have not been reflected in measuring income tax expense or taxes payable for financial reporting purposes. Until these positions are sustained by the taxing authorities or the statute of limitations concerning such issues lapses, the company does not generally recognize the tax benefits resulting from such positions and reports the tax effects as a liability for uncertain tax positions in its consolidated statements of financial position.

Cash and Cash Equivalents

Cash and cash equivalents are comprised of cash in banks and highly liquid instruments with original maturities of three months or less, primarily consisting of bank time deposits and investments in institutional money market funds. Cash in bank accounts often exceeds federally insured limits.

Fair Value of Financial Instruments

The company measures the fair value of its financial instruments using observable and unobservable inputs. Observable inputs reflect market data obtained from independent sources, while unobservable inputs reflect internal market assumptions.

These two types of inputs create the following fair value hierarchy:

Level 1 - Quoted prices for identical instruments in active markets.

Level 2 - Quoted prices for similar instruments in active markets; quoted prices for identical or similar instruments in markets that are not active; and model-derived valuations whose inputs are observable or whose significant value drivers are observable.

Level 3 - Significant inputs to the valuation model are unobservable.

The company holds a portfolio of marketable securities to partially fund non-qualified employee benefit plans. A portion of these securities are held in common/collective trust funds and are measured at fair value using NAV per share as a practical expedient. Marketable securities accounted for as trading are recorded at fair value on a recurring basis and are included in Other non-current assets in the consolidated statements of financial position. Changes in unrealized gains and losses on trading securities are included in Other, net in the consolidated statements of earnings and comprehensive income. Investments in held-to-maturity instruments with original maturities greater than three months are recorded at amortized cost.

Derivative financial instruments are recognized as assets or liabilities in the financial statements and measured at fair value on a recurring basis. Changes in the fair value of derivative financial instruments that are designated as fair value hedges are recorded in net earnings, while changes in the fair value of derivative financial instruments that are

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designated as cash flow hedges are recorded as a component of other comprehensive income until settlement. For derivative financial instruments not designated as hedging instruments, gains or losses resulting from changes in the fair value are reported in Other, net in the consolidated statements of earnings and comprehensive income.

The company uses derivative financial instruments to manage its exposure to foreign currency exchange risk related to receipts from customers and payments to suppliers denominated in foreign currencies (i.e., foreign currency forward contracts). For foreign currency forward contracts, where model-derived valuations are appropriate, the company utilizes the income approach to determine the fair value using internal models based on observable market inputs such as forward rates, interest rates, our own credit risk and our counterparties' credit risks.

The company does not use derivative financial instruments for trading or speculative purposes, nor does it use leveraged financial instruments. Credit risk related to derivative financial instruments is considered minimal and is managed through the use of multiple counterparties with high credit standards and periodic settlements of positions, as well as by entering into master netting agreements with most of our counterparties.

Inventoried Costs

Inventoried costs generally comprise costs associated with unsatisfied performance obligations on contracts accounted for using point in time revenue recognition, costs incurred in excess of existing contract requirements or funding that are probable of recovery and other accrued contract costs that are expected to be recoverable when allocated to specific contracts. Product inventory primarily consists of raw materials and is stated at the lower of cost or net realizable value, generally using the average cost method.

Inventoried costs include direct production costs, factory and engineering overhead, production tooling costs, and allowable G&A. G&A included in Inventoried costs, net was \$44 million and \$41 million as of December 31, 2021 and 2020, respectively. Inventoried costs are classified as current assets and, in accordance with industry practice, include amounts related to contracts having production cycles longer than one year.

Cash Surrender Value of Life Insurance Policies

The company maintains whole life insurance policies on a group of executives, which are recorded at their cash surrender value as determined by the insurance carrier. The company also has split-dollar life insurance policies on former officers and executives from acquired businesses, which are recorded at the lesser of their cash surrender value or premiums paid. These policies are utilized as a partial funding source for deferred compensation and other non-qualified employee retirement plans. As of December 31, 2021 and 2020, the carrying values associated with these policies were \$440 million and \$419 million, respectively, and are recorded in Other non-current assets in the consolidated statements of financial position.

Property, Plant and Equipment

Property, plant and equipment are depreciated over the estimated useful lives of individual assets. Most assets are depreciated using declining-balance methods, with the remainder using the straight-line method. Depreciation expense is generally an allowable and allocable cost in accordance with applicable FAR and CAS requirements and recorded in the same segment where the related assets are held. However, the additional depreciation expense related to the step-up in fair value of property, plant and equipment acquired through business combinations is recorded in unallocated corporate expense within operating income as such depreciation is not allocable to government contracts and not considered part of management's evaluation of segment operating performance. Major classes of property, plant and equipment and their useful lives are as follows:

<i>Useful life in years, \$ in millions</i>	Useful Life	December 31	
		2021	2020
Land and land improvements	Up to 40 ⁽¹⁾	\$ 636	\$ 628
Buildings and improvements	Up to 45	3,019	2,762
Machinery and other equipment	Up to 20	8,064	7,206
Capitalized software costs	3-5	481	602
Leasehold improvements	Lease Term ⁽²⁾	2,513	2,208
Property, plant and equipment, at cost		14,713	13,406
Accumulated depreciation		(6,819)	(6,335)
Property, plant and equipment, net		\$ 7,894	\$ 7,071

⁽¹⁾ Land is not a depreciable asset.

⁽²⁾ Leasehold improvements are depreciated over the shorter of the useful life of the asset or lease term.

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During the fourth quarter of 2020, the company completed a sale of equipment to a customer on a restricted Aeronautics Systems program for \$444 million. The company previously intended to use the equipment for internal purposes so we recognized the acquisition costs as capital expenditures and included the equipment in property, plant and equipment. As we regularly sell this type of equipment to customers in the ordinary course of business, we recorded the sale as a revenue transaction and included the net book value of the equipment in Operating costs and expenses. Although we generally classify proceeds from revenue transactions as cash inflows from operating activities, we recognized the proceeds from this transaction as cash inflows from investing activities, consistent with our prior recognition of the cost to acquire the equipment as capital expenditures. The company received cash payments of \$84 million and \$205 million related to the equipment sale during 2021 and 2020, respectively, and included it in Proceeds from sale of equipment to a customer in the consolidated statement of cash flows. The remaining \$155 million is expected to be collected in 2022.

During the year ended December 31, 2021, the company received lease incentives for landlord funded leasehold improvements of \$150 million related to a Space Systems real estate lease, which were recorded in PP&E and included in non-cash investing activities. Non-cash investing activities also include capital expenditures incurred but not yet paid of \$91 million, \$72 million and \$166 million as of December 31, 2021, 2020 and 2019, respectively.

Goodwill and Other Purchased Intangible Assets

The company tests goodwill for impairment at least annually as of December 31, or when an indicator of potential impairment exists. When performing the goodwill impairment test, the company uses a discounted cash flow approach corroborated by comparative market multiples, where appropriate, to determine the fair value of its reporting units.

Goodwill and other purchased intangible asset balances are included in the identifiable assets of their assigned business segment. However, the company includes the amortization of other purchased intangible assets in unallocated corporate expense within operating income as such amortization is not allocable to government contracts and not considered part of management's evaluation of segment operating performance. The company's customer-related intangible assets are generally amortized over their respective useful lives based on the pattern in which the future economic benefits of the intangible assets are expected to be consumed. Other intangible assets are generally amortized on a straight-line basis over their estimated useful lives.

Leases

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

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

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

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

Litigation, Commitments and Contingencies

We accrue for litigation, commitments and contingencies when management, after considering the facts and circumstances of each matter as then known to management, has determined it is probable a liability will be found to have been incurred and the amount of the loss can be reasonably estimated. When only a range of amounts is reasonably estimable and no amount within the range is more likely than another, the low end of the range is recorded. Legal fees are expensed as incurred. Due to the inherent uncertainties surrounding gain contingencies, we generally do not recognize potential gains until realized.

Environmental Costs

We accrue for environmental liabilities when management determines that, based on the facts and circumstances known to the company, it is probable the company will incur costs to address environmental impacts and the costs are reasonably estimable. When only a range of amounts is reasonably estimable and no amount within the range is more probable than another, we record the low end of the range. The company typically projects environmental costs for up to 30 years, records environmental liabilities on an undiscounted basis, and excludes asset retirement obligations and certain legal costs. At sites involving multiple parties, we accrue environmental liabilities based upon our expected share of liability, taking into account the financial viability of other liable parties.

Retirement Benefits

The company sponsors various defined benefit pension plans and defined contribution retirement plans covering substantially all of its employees. In most cases, our defined contribution plans provide for a company match of employee contributions. The company also provides postretirement benefits other than pensions to eligible retirees and qualifying dependents, consisting principally of health care and life insurance benefits.

The liabilities, unamortized prior service credits and annual income or expense of the company's defined benefit pension and OPB plans are determined using methodologies that involve several actuarial assumptions.

Because U.S. government regulations provide for the costs of pension and OPB plans to be charged to our contracts in accordance with applicable FAR and CAS requirements, we calculate retiree benefit plan costs under both FAS and CAS methods. While both FAS and CAS recognize a normal service cost component in measuring periodic pension cost, there are differences in the way the components of annual pension costs are calculated under each method. Measuring plan obligations under FAS and CAS includes different assumptions and models, such as in estimating returns on plan assets, calculating interest expense and the periods over which gains/losses related to pension assets and actuarial changes are recognized. As a result, annual retiree benefit plan expense amounts for FAS are different from the amounts for CAS in any given reporting period even though the ultimate cost of providing benefits over the life of the plans is the same under either method. CAS retiree benefit plan costs are charged to contracts and are included in segment operating income, and the difference between the service cost component of FAS expense and total CAS expense is recorded in operating income at the consolidated company level. Not all net periodic pension expense is recognized in net earnings in the year incurred because it is allocated as production costs and a portion remains in inventory at the end of a reporting period.

Actuarial gains and losses are immediately recognized in net periodic benefit cost for FAS through MTM benefit (expense) upon annual remeasurement in the fourth quarter, or on an interim basis as triggering events warrant remeasurement. Prior service credits are recognized as a component of Accumulated other comprehensive loss and amortized into earnings in future periods.

Stock Compensation

The company's stock compensation plans are classified as equity plans and compensation expense is generally recognized over the vesting period of stock awards (typically three years), net of estimated forfeitures. The company issues stock awards in the form of restricted performance stock rights and restricted stock rights. The fair value of stock awards and performance stock awards is determined based on the closing market price of the company's common stock on the grant date. The fair value of market-based stock awards is determined at the grant date using a Monte Carlo simulation model. At each reporting date, the number of shares used to calculate compensation expense and diluted earnings per share is adjusted to reflect the number ultimately expected to vest.

Accumulated Other Comprehensive Loss

The components of accumulated other comprehensive loss are as follows:

<i>\$ in millions</i>	December 31	
	2021	2020
Unamortized prior service credit, net of tax expense of \$1 for 2021 and \$3 for 2020	\$ 2	\$ 10
Cumulative translation adjustment and other, net	(145)	(138)
Total accumulated other comprehensive loss	\$ (143)	\$ (128)

Related Party Transactions

For all periods presented, the company had no material related party transactions.

Accounting Standards Updates

Accounting standards updates adopted and/or issued, but not effective until after December 31, 2021, are not expected to have a material effect on the company's consolidated financial position, annual results of operations and/or cash flows.

2. DISPOSITIONS

Disposition of IT and Mission Support Services Business

Effective January 30, 2021, we completed the IT services divestiture for \$3.4 billion in cash and recorded a pre-tax gain of \$2.0 billion. The IT and mission support services business was comprised of the majority of the former IS&S division of Defense Systems (excluding the Vinnell Arabia business); select cyber, intelligence and missions support programs, which were part of the former CIMS division of Mission Systems; and the former Space Technical Services business unit of Space Systems. The assets and liabilities of the IT and mission support services business were classified as held for sale in the consolidated statement of financial position as of December 31, 2020. Operating results include sales and operating income for the IT and mission support services business prior to the Divestiture date.

The company recorded pre-tax profit of the IT and mission support services business of \$20 million, \$247 million and \$245 million for the years ended December 31, 2021, 2020 and 2019, respectively.

The carrying amounts of the major classes of assets and liabilities of the IT and mission support services business classified as held for sale as of December 31, 2020 were as follows:

<i>\$ in millions</i>	
Accounts receivable, net	\$ 110
Unbilled receivables, net	269
Other current assets	9
Property, plant and equipment	14
Operating lease right-of-use assets	38
Goodwill ⁽¹⁾	1,195
Total assets of disposal group held for sale	\$ 1,635
Trade accounts payable	(99)
Accrued employee compensation	(59)
Advance payments and billings in excess of costs incurred	(31)
Other current liabilities	(42)
Non-current operating lease liabilities	(27)
Total liabilities of disposal group held for sale	\$ (258)

⁽¹⁾ See Note 8 for a summary by reportable segment of Goodwill reclassified to Assets of disposal group held for sale as of December 31, 2020.

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

Basic Earnings Per Share

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

Diluted Earnings Per Share

Diluted earnings per share include the dilutive effect of awards granted to employees under stock-based compensation plans. The dilutive effect of these securities totaled 0.6 million, 0.5 million and 0.7 million shares for the years ended December 31, 2021, 2020 and 2019, respectively.

Share Repurchases

On September 16, 2015, the company's board of directors authorized a share repurchase program of up to \$4.0 billion of the company's common stock (the "2015 Repurchase Program"). On December 4, 2018, the company's board of directors authorized a share repurchase program of up to an additional \$3.0 billion in share repurchases of the company's common stock (the "2018 Repurchase Program"). Repurchases under the 2015 Repurchase Program commenced in March 2016 and were completed in March 2020 at which time repurchases under the 2018 Repurchase Program commenced. Repurchases under the 2018 Repurchase Program were completed in October 2021.

On January 25, 2021, the company's board of directors authorized a new share repurchase program of up to an additional \$3.0 billion in share repurchases of the company's common stock (the "2021 Repurchase Program"). Repurchases under the 2021 Repurchase Program commenced in October 2021 upon the completion of the 2018 Repurchase Program. As of December 31, 2021, repurchases under the 2021 Repurchase Program totaled \$0.8 billion; \$2.2 billion remained under this share repurchase authorization. By its terms, the 2021 Repurchase Program is set to expire when we have used all authorized funds for repurchases.

On January 24, 2022, the company's board of directors authorized a new share repurchase program of up to an additional \$2.0 billion in share repurchases of the company's common stock (the "2022 Repurchase Program"), bringing the total outstanding authorization up to \$4.2 billion. By its terms, repurchases under the 2022 Repurchase Program will commence upon completion of the 2021 Repurchase Program and will expire when we have used all authorized funds for repurchases.

During the first quarter of 2021, the company entered into an accelerated share repurchase (ASR) agreement with Goldman Sachs & Co. LLC (Goldman Sachs) to repurchase \$2.0 billion of the company's common stock as part of the 2018 Repurchase Program. Under the agreement, we made a payment of \$2.0 billion to Goldman Sachs and received an initial delivery of 5.9 million shares valued at \$1.7 billion that were immediately canceled by the company. The remaining balance of \$300 million was settled on June 1, 2021 with a final delivery of 0.2 million shares from Goldman Sachs. The final average purchase price was \$327.29 per share.

During the fourth quarter of 2021, the company entered into an ASR agreement with Goldman Sachs to repurchase \$500 million of the company's common stock as part of the 2021 Repurchase Program. Under the agreement, we made a payment of \$500 million to Goldman Sachs and received an initial delivery of 1.2 million shares valued at \$425 million that were immediately canceled by the company. The remaining balance of \$75 million is included as a reduction to Retained earnings on the consolidated statement of financial position. The final number of shares to be repurchased will be based on the company's daily volume-weighted average share price during the term of the transaction, less a discount, and is expected to be completed in the first quarter of 2022. Goldman Sachs may be required to deliver additional shares of common stock to the company at final settlement or, under certain circumstances, the company may be required to either, at the company's election, deliver shares or make a cash payment to Goldman Sachs.

Share repurchases take place from time to time, subject to market and regulatory 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.

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

Repurchase Program Authorization Date	Amount Authorized (in millions)	Total Shares Retired (in millions)	Average Price Per Share ⁽¹⁾	Date Completed	Shares Repurchased (in millions)		
					Year Ended December 31		
					2021	2020	2019
September 16, 2015	\$ 4,000	15.4	\$ 260.33	March 2020	—	0.9	3.2
December 4, 2018	\$ 3,000	8.9	\$ 337.18	October 2021	8.4	0.5	—
January 25, 2021	\$ 3,000	2.2	\$ 358.38		2.2	—	—
					10.6	1.4	3.2

⁽¹⁾ Includes commissions paid.

Dividends on Common Stock

In May 2021, the company increased the quarterly common stock dividend 8 percent to \$1.57 per share from the previous amount of \$1.45 per share.

In May 2020, the company increased the quarterly common stock dividend 10 percent to \$1.45 per share from the previous amount of \$1.32 per share.

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

4. ACCOUNTS RECEIVABLE, NET

Accounts receivable, net represent amounts billed and due from customers. Substantially all accounts receivable at December 31, 2021 are expected to be collected in 2022. The company does not believe it has significant exposure to credit risk as the majority of our accounts receivable are due from the U.S. government either as the ultimate customer or in connection with foreign military sales.

Accounts receivable, net consisted of the following:

<i>\$ in millions</i>	December 31	
	2021	2020
Due from U.S. government ⁽¹⁾	\$ 1,173	\$ 956
Due from international and other customers	328	578
Accounts receivable, gross	1,501	1,534
Allowance for expected credit losses	(34)	(33)
Accounts receivable, net	\$ 1,467	\$ 1,501

⁽¹⁾ Includes receivables due from the U.S. government associated with FMS sales. For FMS, we contract with and are paid by the U.S. government.

5. UNBILLED RECEIVABLES, NET

Unbilled receivables, net represent revenue recognized under the cost-to-cost method that exceeds amounts billed to customers. Substantially all unbilled receivables at December 31, 2021 are expected to be billed and collected in 2022. Progress and performance-based payments are reflected as an offset to the related unbilled receivable balances.

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Unbilled receivables, net consisted of the following:

\$ in millions	December 31	
	2021	2020
Due from U.S. government ⁽¹⁾		
Unbilled receivables	\$ 22,140	\$ 19,315
Progress and performance-based payments received	(17,038)	(14,615)
Total due from U.S. government	5,102	4,700
Due from international and other customers		
Unbilled receivables	2,913	3,361
Progress and performance-based payments received	(2,503)	(2,881)
Total due from international and other customers	410	480
Unbilled receivables, net of progress and performance-based payments received	5,512	5,180
Allowance for expected credit losses	(20)	(40)
Unbilled receivables, net	\$ 5,492	\$ 5,140

⁽¹⁾ Includes unbilled receivables due from the U.S. government associated with FMS sales. For FMS, we contract with and are paid by the U.S. government.

6. INVENTORIED COSTS, NET

Inventoried costs are primarily associated with contracts where the U.S. government is the primary customer, therefore the company does not believe it has significant exposure to recoverability risk related to these amounts.

Inventoried costs, net consisted of the following:

\$ in millions	December 31	
	2021	2020
Contracts in process	\$ 478	\$ 430
Product inventory and raw material	333	329
Inventoried costs, net	\$ 811	\$ 759

7. INCOME TAXES

Federal and foreign income tax expense consisted of the following:

\$ in millions	Year Ended December 31		
	2021	2020	2019
Federal income tax expense:			
Current	\$ 1,398	\$ 246	\$ 758
Deferred	518	288	(474)
Total federal income tax expense	1,916	534	284
Foreign income tax expense:			
Current	6	3	10
Deferred	11	2	6
Total foreign income tax expense	17	5	16
Total federal and foreign income tax expense	\$ 1,933	\$ 539	\$ 300

Earnings from foreign operations before income taxes are not material for all periods presented.

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Income tax expense differs from the amount computed by multiplying earnings before income taxes by the statutory federal income tax rate due to the following:

<i>\$ in millions</i>	Year Ended December 31					
	2021		2020		2019	
Income tax expense at statutory rate	\$ 1,877	21.0 %	\$ 783	21.0 %	\$ 535	21.0 %
Research credit	(192)	(2.2)	(206)	(5.5)	(216)	(8.5)
Foreign derived intangible income	(50)	(0.6)	(55)	(1.5)	(28)	(1.1)
IT services divestiture nondeductible goodwill	250	2.8	—	—	—	—
Other, net	48	0.6	17	0.5	9	0.4
Total federal and foreign income taxes	\$ 1,933	21.6 %	\$ 539	14.5 %	\$ 300	11.8 %

The year to date 2021 ETR increased to 21.6 percent from 14.5 percent in the same period of 2020 primarily due to federal income taxes resulting from the IT services divestiture, including \$250 million of income tax expense related to \$1.2 billion of nondeductible goodwill in the divested business. The company's 2021 MTM benefit did not significantly impact the 2021 ETR; however, MTM expense in 2020 reduced the 2020 ETR by 1.3 percentage points.

The year to date 2020 ETR increased to 14.5 percent from 11.8 percent in the same period of 2019. MTM expense reduced the 2020 ETR by 1.3 percentage points and the 2019 ETR by 3.7 percentage points.

Income tax payments, net of refunds received, were \$1.3 billion, \$312 million and \$324 million for the years ended December 31, 2021, 2020 and 2019, respectively. Taxes receivable, which are included in Prepaid expenses and other current assets in the consolidated statements of financial position, were \$571 million and \$792 million as of December 31, 2021 and 2020, respectively.

Uncertain Tax Positions

We file income tax returns in the U.S. federal jurisdiction and in various state and foreign jurisdictions. The Northrop Grumman 2017-2018 federal tax returns are currently under Internal Revenue Service (IRS) examination. During the third quarter of 2021, the company requested an appeal with the IRS for the Northrop Grumman 2014-2016 federal income tax returns and refund claims related to its 2007-2016 federal tax returns. In addition, legacy OATK federal tax returns for the years ended March 31, 2014 and 2015, the nine-month transition period ended December 31, 2015 and calendar years 2016-2017 (the "OATK 2014 to 2017 tax years") are currently under appeal with the IRS.

Tax returns for open tax years related to state and foreign jurisdictions remain subject to examination. As state income taxes are generally considered allowable and allocable costs, any individual or aggregate state examination impacts are not expected to have a material impact on our financial results. Amounts currently subject to examination related to foreign jurisdictions are not material.

The change in unrecognized tax benefits during 2021, 2020 and 2019, excluding interest, is as follows:

<i>\$ in millions</i>	December 31		
	2021	2020	2019
Unrecognized tax benefits at beginning of the year	\$ 1,481	\$ 1,223	\$ 748
Additions based on tax positions related to the current year	355	187	158
Additions for tax positions of prior years	47	270	400
Reductions for tax positions of prior years	(251)	(190)	(65)
Settlements with taxing authorities	(1)	(7)	(15)
Other, net	(1)	(2)	(3)
Net change in unrecognized tax benefits	149	258	475
Unrecognized tax benefits at end of the year	\$ 1,630	\$ 1,481	\$ 1,223

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Our 2021 increase in unrecognized tax benefits was primarily related to our methods of accounting associated with the timing of revenue recognition and related costs and the 2017 Tax Cuts and Jobs Act, which includes related final revenue recognition regulations issued in December 2020 under IRC Section 451(b) and procedural guidance issued in August 2021. As of December 31, 2021, we have approximately \$1.6 billion in unrecognized tax benefits, including \$399 million related to our position on IRC Section 451(b). If these matters, including our position on IRC Section 451(b), are unfavorably resolved, there could be a material impact on our future cash flows. It is reasonably possible that within the next 12 months unrecognized tax benefits may increase by approximately \$120 million. Additionally, it is reasonably possible that within the next twelve months, unrecognized tax benefits claimed in legacy OATK's 2014 to 2017 tax years may decline by up to \$110 million through administrative resolution with IRS Appeals.

Our current unrecognized tax benefits, which are included in Other current liabilities in the consolidated statements of financial position, were \$590 million and \$433 million as of December 31, 2021 and 2020, respectively, with the remainder of our unrecognized tax benefits included within Other non-current liabilities. These liabilities include \$175 million of accrued interest and penalties. If the income tax benefits from these tax positions are ultimately realized, \$664 million of federal and foreign tax benefits would reduce the company's ETR.

Net interest expense within the company's federal, foreign and state income tax provisions was not material for all years presented.

Deferred Income Taxes

Deferred income taxes reflect the net tax effects of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and tax purposes. Net deferred tax assets and liabilities are classified as non-current in the consolidated statements of financial position.

The tax effects of significant temporary differences and carryforwards that gave rise to year-end deferred federal, state and foreign tax balances, as presented in the consolidated statements of financial position, are as follows:

<i>\$ in millions</i>	December 31	
	2021	2020
Deferred Tax Assets		
Retiree benefits	\$ 804	\$ 1,738
Accrued employee compensation	371	360
Provisions for accrued liabilities	156	232
Inventory	649	849
Stock-based compensation	39	40
Operating lease liabilities	493	435
Tax credits	431	343
Other	135	112
Gross deferred tax assets	3,078	4,109
Less: valuation allowance	(349)	(307)
Net deferred tax assets	2,729	3,802
Deferred Tax Liabilities		
Goodwill	533	533
Purchased intangibles	148	201
Property, plant and equipment, net	755	737
Operating lease right-of-use assets	444	423
Contract accounting differences	1,036	1,513
Other	103	84
Deferred tax liabilities	3,019	3,491
Total net deferred tax (liabilities) assets	\$ (290)	\$ 311

Realization of deferred tax assets is primarily dependent on generating sufficient taxable income in future periods. The company believes it is more-likely-than-not our net deferred tax assets will be realized.

At December 31, 2021, the company has available tax credits and unused net operating losses of \$524 million and \$316 million, respectively, that may be applied against future taxable income. The majority of tax credits and net

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operating losses expire in 2022 through 2046, however, some may be carried forward indefinitely. Due to the uncertainty of the realization of the tax credits and net operating losses, the company has recorded valuation allowances of \$230 million and \$40 million as of December 31, 2021, respectively.

Undistributed Foreign Earnings

As of December 31, 2021, the company has accumulated undistributed earnings generated by our foreign subsidiaries and most have been taxed in the U.S. We intend to indefinitely reinvest these earnings, as well as future earnings from our foreign subsidiaries to fund our international operations. In addition, we expect future U.S. cash generation will be sufficient to meet future U.S. cash needs.

8. GOODWILL AND OTHER PURCHASED INTANGIBLE ASSETS

Goodwill

Changes in the carrying amounts of goodwill for the years ended December 31, 2020 and 2021, were as follows:

<i>\$ in millions</i>	Aeronautics Systems	Defense Systems	Mission Systems	Space Systems	Total
Balance as of December 31, 2019	\$ 3,467	\$ 4,376	\$ 6,062	\$ 4,803	\$ 18,708
Reclassification to assets of disposal group held for sale ⁽¹⁾	—	(966)	(181)	(48)	(1,195)
Other ⁽²⁾	—	5	—	—	5
Balance as of December 31, 2020	\$ 3,467	\$ 3,415	\$ 5,881	\$ 4,755	\$ 17,518
Other ⁽²⁾	—	(3)	—	—	(3)
Balance as of December 31, 2021	\$ 3,467	\$ 3,412	\$ 5,881	\$ 4,755	\$ 17,515

⁽¹⁾ Represents the reclassification of goodwill to assets of disposal group held for sale due to the divestiture of our IT and mission support services business that was pending as of December 31, 2020 (See Note 2).

⁽²⁾ Other consists primarily of adjustments for foreign currency translation.

At December 31, 2021 and 2020, accumulated goodwill impairment losses totaled \$417 million and \$153 million at Aeronautics Systems and Space Systems, respectively.

Other Purchased Intangible Assets

Net customer-related and other intangible assets are as follows:

<i>\$ in millions</i>	December 31	
	2021	2020
Gross customer-related and other intangible assets	\$ 3,361	\$ 3,362
Less accumulated amortization	(2,783)	(2,579)
Net customer-related and other intangible assets	\$ 578	\$ 783

Amortization expense for 2021, 2020 and 2019, was \$204 million, \$262 million and \$332 million, respectively. As of December 31, 2021, the expected future amortization of purchased intangibles for each of the next five years is as follows:

<i>\$ in millions</i>	
2022	\$ 197
2023	79
2024	56
2025	44
2026	42

9. FAIR VALUE OF FINANCIAL INSTRUMENTS

The following table presents the financial assets and liabilities the company records at fair value on a recurring basis identified by the level of inputs used to determine fair value. See Note 1 for the definitions of these levels and for further information on our financial instruments.

\$ in millions	December 31, 2021				December 31, 2020			
	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
Financial Assets								
Marketable securities	\$ 393	\$ 1	\$ 7	\$ 401	\$ 377	\$ 1	\$ —	\$ 378
Marketable securities valued using NAV				17				18
Total marketable securities	393	1	7	418	377	1	—	396
Derivatives	—	(1)	—	(1)	—	—	—	—

The notional value of the company's foreign currency forward contracts at December 31, 2021 and 2020 was \$120 million and \$133 million, respectively. At December 31, 2021 and 2020, no portion of the notional value was designated as a cash flow hedge.

The derivative fair values and related unrealized gains/losses at December 31, 2021 and 2020 were not material.

There were no transfers of financial instruments into or out of Level 3 of the fair value hierarchy during the years ended December 31, 2021 and 2020.

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

10. DEBT

Commercial Paper

The company maintains a commercial paper program that serves as a source of short-term financing with capacity to issue unsecured commercial paper notes up to \$2.0 billion. There were no commercial paper borrowings outstanding at December 31, 2021 and December 31, 2020, respectively. The outstanding balance of commercial paper borrowings is recorded in Other current liabilities in the consolidated statements of financial position.

Credit Facility

In August 2018, the company entered into a five-year senior unsecured credit facility in an aggregate principal amount of \$2.0 billion (the "2018 Credit Agreement"). In October 2019, the company amended the 2018 Credit Agreement to extend its maturity date by one year from August 2023 to August 2024. The revolving credit facility established under the 2018 Credit Agreement is intended to support the company's commercial paper program and other general corporate purposes. At December 31, 2021, there was no balance outstanding under this facility. Commercial paper borrowings reduce the amount available for borrowing under the 2018 Credit Agreement.

Our credit agreement contains generally customary terms and conditions, including covenants restricting the company's ability to sell all or substantially all of its assets, merge or consolidate with another entity or undertake other fundamental changes and incur liens. The company also cannot permit the ratio of its debt to capitalization (as set forth in the credit agreement) to exceed 65 percent. At December 31, 2021, the company was in compliance with all covenants under its credit agreement.

Unsecured Senior Notes

Repayments of Senior Notes

In March 2021, the company repaid \$700 million of 3.50 percent unsecured notes upon maturity.

In March 2021, the company redeemed \$1.5 billion of 2.55 percent unsecured notes due October 2022. The company recorded a pre-tax charge of \$54 million principally related to the premium paid on the redemption, which was recorded in Other, net in the unaudited condensed consolidated statements of earnings and comprehensive income.

Debt Exchange

On September 2, 2021, the company completed an exchange offer to eligible holders of the outstanding notes of our direct wholly owned subsidiary, Northrop Grumman Systems Corporation ("NGSC") maturing through 2036. An aggregate principal amount of \$422 million of the NGSC notes was exchanged for \$422 million of Northrop Grumman Corporation notes with the same interest rates and maturity dates as the NGSC notes exchanged. Because

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the debt instruments are not substantially different, the exchange was treated as a debt modification for accounting purposes with no gain or loss recognized.

Long-term debt consists of the following:

<i>\$ in millions</i>		December 31	
		2021	2020
Fixed-rate notes and debentures, maturing in	Interest rate		
2021	3.50%	\$ —	\$ 700
2022	2.55%	—	1,500
2023	3.25%	1,050	1,050
2025	2.93%	1,500	1,500
2026	7.75% - 7.88%	527	527
2027	3.20%	750	750
2028	3.25%	2,000	2,000
2030	4.40%	750	750
2031	7.75%	466	466
2040	5.05% - 5.15%	800	800
2043	4.75%	950	950
2045	3.85%	600	600
2047	4.03%	2,250	2,250
2050	5.25%	1,000	1,000
Other	Various	205	235
Debt issuance costs		(65)	(75)
Total long-term debt		12,783	15,003
Less: current portion ⁽¹⁾		6	742
Long-term debt, net of current portion		\$ 12,777	\$ 14,261

⁽¹⁾ The current portion of long-term debt is recorded in Other current liabilities in the consolidated statements of financial position.

The estimated fair value of long-term debt was \$15.1 billion and \$18.2 billion as of December 31, 2021 and 2020, respectively. We calculated the fair value of long-term debt using Level 2 inputs, based on interest rates available for debt with terms and maturities similar to the company's existing debt arrangements.

Indentures underlying long-term debt issued by the company or its subsidiaries contain various restrictions with respect to the issuer, including one or more restrictions relating to limitations on liens, sale-leaseback arrangements and funded debt of subsidiaries. The majority of these fixed rate notes and debentures are subject to redemption at the company's discretion at any time prior to maturity in whole or in part at the principal amount plus any make-whole premium and accrued and unpaid interest. Interest on these fixed rate notes and debentures are payable semi-annually in arrears.

Total interest payments, net of interest received, were \$570 million, \$572 million and \$521 million for the years ended December 31, 2021, 2020 and 2019, respectively.

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Maturities of long-term debt as of December 31, 2021, are as follows:

\$ in millions

Year Ending December 31	
2022	\$ 6
2023	1,063
2024	3
2025	1,503
2026	530
Thereafter	9,757
Total principal payments	12,862
Unamortized premium on long-term debt, net of discount	(14)
Debt issuance costs	(65)
Total long-term debt	\$ 12,783

11. INVESTIGATIONS, CLAIMS AND LITIGATION

On May 4, 2012, the company commenced an action, *Northrop Grumman Systems Corp. v. United States*, in the U.S. Court of Federal Claims. This lawsuit relates to an approximately \$875 million firm fixed-price contract awarded to the company in 2007 by the U.S. Postal Service (USPS) for the construction and delivery of flats sequencing systems (FSS) as part of the postal automation program. The FSS were delivered. The company's lawsuit seeks approximately \$63 million for unpaid portions of the contract price, and approximately \$115 million based on the company's assertions that, through various acts and omissions over the life of the contract, the USPS adversely affected the cost and schedule of performance and materially altered the company's obligations under the contract. The United States responded to the company's complaint with an answer, denying most of the company's claims, and counterclaims seeking approximately \$410 million, less certain amounts outstanding under the contract. In the course of the litigation, the United States subsequently amended its counterclaim, reducing it to seek approximately \$193 million. The principal counterclaim alleges that the company delayed its performance and caused damages to the USPS because USPS did not realize certain costs savings as early as it had expected. On February 3, 2020, after extensive discovery and motions practice, the parties commenced what was expected to be a seven-week trial. After COVID-19-related interruptions, trial concluded on March 5, 2021. On October 12, 2021, the parties completed post-trial briefing, and on December 8, 2021, the court held a post-trial oral argument. Although the ultimate outcome of this matter cannot be predicted or reasonably estimated at this time, the company intends to continue vigorously to pursue and defend the matter.

The company is engaged in remediation activities relating to environmental conditions allegedly resulting from historic operations at the former United States Navy and Grumman facilities in Bethpage, New York. For over 20 years, the company has worked closely with the United States Navy, the United States Environmental Protection Agency, the New York State Department of Environmental Conservation (NYSDEC), the New York State Department of Health and other federal, state and local governmental authorities, to address legacy environmental conditions in Bethpage. In December 2019, the State of New York issued an Amended Record of Decision seeking to impose additional remedial requirements beyond measures the company previously had been taking; the State also communicated that it was assessing potential natural resource damages. In December 2020, the parties reached a tentative agreement regarding the steps the company will take to implement the State's Amended Record of Decision and to resolve certain potential other claims, including for natural resource damages. On September 22, 2021, the State of New York issued for public comment a new consent decree reflecting the agreement. On December 7, 2021, the public comment period closed. We understand that the State will next seek court approval of the consent decree. We are also in discussions with the DoD (Navy and DCMA) and the Bethpage and South Farmingdale Water Districts to explore whether claims involving these parties can be resolved at this stage.

We have incurred, and expect to continue to incur, as included in Note 12, substantial remediation costs related to the legacy Bethpage environmental conditions. It is also possible that applicable remediation, allocation and allowability standards and other requirements to which we are subject may continue to change, and our costs may increase materially. In addition to disputes and legal proceedings related to environmental conditions at the site (including remediation, allocation and allowability), we are a party to various, and may become a party to additional disputes and legal proceedings with individual and class action plaintiffs alleging personal injury and property

damage, with insurance carriers and with other parties. We cannot at this time predict or reasonably estimate the potential cumulative outcomes or ranges of possible liability of these aggregate Bethpage matters.

In June 2018, the FTC issued a Decision and Order enabling the company's acquisition of OATK to proceed and providing generally for the company to continue to make solid rocket motors available to competing missile primes on a non-discriminatory basis. The company has taken and continues to take robust actions to help ensure compliance with the terms of the Order. Similarly, the Compliance Officer, appointed under the Order, and the FTC have taken and continue to take various actions to oversee compliance. In October 2019, the company received a civil investigative demand from the FTC requesting certain information relating to a potential issue regarding the company's compliance with the Order in connection with a then pending missile competition. The company promptly provided information in response to the request. We have recently resumed discussions with staff at the FTC regarding our response and their views. We cannot predict the outcome of those discussions, but we do not believe they are likely to have a material adverse effect on the company's consolidated financial position as of December 31, 2021, or its annual results of operations and/or cash flows. We believe the company has been and continues to be in compliance with the Order.

The company is a party to various other investigations, lawsuits, arbitration, claims, enforcement actions and other legal proceedings, including government investigations and claims, that arise in the ordinary course of our business. The nature of legal proceedings is such that we cannot assure the outcome of any particular matter. However, based on information available to the company to date, the company does not believe that the outcome of any of these other matters pending against the company is likely to have a material adverse effect on the company's consolidated financial position as of December 31, 2021, or its annual results of operations and/or cash flows.

12. COMMITMENTS AND CONTINGENCIES

U.S. Government Cost Claims and Contingencies

From time to time, the company is advised of claims by the U.S. government concerning certain potential disallowed costs, plus, at times, penalties and interest. When such findings are presented, the company and U.S. government representatives engage in discussions to enable the company to evaluate the merits of these claims, as well as to assess the amounts being claimed. Where appropriate, provisions are made to reflect the company's estimated exposure for such potential disallowed costs. Such provisions are reviewed periodically using the most recent information available. The company believes it has adequately reserved for disputed amounts that are probable and reasonably estimable, and that the outcome of any such matters would not have a material adverse effect on its consolidated financial position as of December 31, 2021, or its annual results of operations and/or cash flows.

The U.S. government has raised questions about an interest rate assumption used by the company to determine our CAS pension expense. On June 1, 2020, the government provided written notice that the assumptions the company used during the period 2013-2019 were potentially noncompliant with CAS. We submitted a formal response on July 31, 2020, which we believe demonstrates the appropriateness of the assumptions used. On November 24, 2020, the government replied to the company's response, disagreeing with our position and requesting additional input, which we provided on February 22, 2021 and further discussed with the government. We are prepared to engage further if, and as, appropriate. The sensitivity to changes in interest rate assumptions makes it reasonably possible the outcome of this matter could have a material adverse effect on our financial position, results of operations and/or cash flows, although we are not currently able to estimate a range of any potential loss.

Environmental Matters

The table below summarizes the amount accrued for environmental remediation costs, management’s estimate of the amount of reasonably possible future costs in excess of accrued costs and the deferred costs expected to be recoverable through overhead charges on U.S. government contracts as of December 31, 2021 and 2020:

<i>\$ in millions</i>	Accrued Costs ⁽¹⁾⁽²⁾	Reasonably Possible Future Costs in excess of Accrued Costs ⁽²⁾	Deferred Costs ⁽³⁾
December 31, 2021	\$ 572	\$ 363	\$ 486
December 31, 2020	614	346	529

⁽¹⁾ As of December 31, 2021, \$208 million is recorded in Other current liabilities and \$364 million is recorded in Other non-current liabilities.

⁽²⁾ Estimated remediation costs are not discounted to present value. The reasonably possible future costs in excess of accrued costs do not take into consideration amounts expected to be recoverable through overhead charges on U.S. government contracts.

⁽³⁾ As of December 31, 2021, \$182 million is deferred in Prepaid expenses and other current assets and \$304 million is deferred in Other non-current assets. These amounts are evaluated for recoverability on a routine basis.

Although management cannot predict whether new information gained as our environmental remediation projects progress, or as changes in facts and circumstances occur, will materially affect the estimated liability accrued, except with respect to Bethpage, we do not anticipate that future remediation expenditures associated with our currently identified projects will have a material adverse effect on the company’s consolidated financial position as of December 31, 2021, or its annual results of operations and/or cash flows.

With respect to Bethpage, as discussed in Note 11, in December 2019, the State of New York issued an Amended Record of Decision, seeking to impose additional remedial requirements beyond those the company previously had been taking; the State also communicated that it was assessing potential natural resource damages. In December 2020, the parties reached a tentative agreement regarding the steps the company will take to implement the State’s Amended Record of Decision and to resolve certain potential other claims, including for natural resource damages. On September 22, 2021, the State of New York issued for public comment a new consent decree reflecting the agreement. On December 7, 2021, the public comment period closed. We understand that the State will next seek court approval of the consent decree. As discussed in Note 11, the applicable remediation standards and other requirements to which we are subject may continue to change, our costs may increase materially, and those costs may not be fully recoverable.

Financial Arrangements

In the ordinary course of business, the company uses standby letters of credit and guarantees issued by commercial banks and surety bonds issued principally by insurance companies to guarantee the performance on certain obligations. At December 31, 2021, there were \$434 million of stand-by letters of credit and guarantees and \$71 million of surety bonds outstanding.

Indemnifications

The company has provided indemnifications for certain environmental, income tax and other potential liabilities in connection with certain of its divestitures. The settlement of these liabilities is not expected to have a material adverse effect on the company’s consolidated financial position as of December 31, 2021, or its annual results of operations and/or cash flows.

13. RETIREMENT BENEFITS

Plan Descriptions

U.S. Defined Benefit Pension Plans – The company sponsors several defined benefit pension plans in the U.S. Pension benefits for most participants are based on years of service, age and compensation. It is our policy to fund at least the minimum amount required for all qualified plans, using actuarial cost methods and assumptions acceptable under U.S. government regulations, by making payments into benefit trusts separate from the company.

U.S. Defined Contribution Plans – The company also sponsors defined contribution plans covering the majority of its employees, including certain employees covered under collective bargaining agreements. Company contributions vary depending on date of hire, with a majority of employees being eligible for employer matching of employee contributions. Based on date of hire, certain employees are eligible to receive a company non-elective contribution

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or an enhanced matching contribution in lieu of a defined benefit pension plan benefit. The company's contributions to these defined contribution plans for the years ended December 31, 2021, 2020 and 2019, were \$588 million, \$590 million and \$481 million, respectively.

Non-U.S. Benefit Plans – The company sponsors several benefit plans for non-U.S. employees. These plans are designed to provide benefits appropriate to local practice and in accordance with local regulations. Some of these plans are funded using benefit trusts separate from the company.

Medical and Life Benefits – The company funds a portion of the costs for certain health care and life insurance benefits for a substantial number of its active and retired employees. In addition to a company and employee cost-sharing feature, the health plans also have provisions for deductibles, co-payments, coinsurance percentages, out-of-pocket limits, conformance to a schedule of reasonable fees, the use of managed care providers and coordination of benefits with other plans. The plans also provide for a Medicare carve-out. The company reserves the right to amend or terminate the plans at any time.

Certain covered employees and dependents are eligible to participate in plans upon retirement if they meet specified age and years of service requirements. The company provides subsidies to reimburse certain retirees for a portion of the cost of individual Medicare-supplemental coverage purchased directly by the retiree through a private insurance exchange. The company has capped the amount of its contributions to substantially all of its remaining postretirement medical and life benefit plans. In addition, after January 1, 2005 (or earlier at some businesses), newly hired employees are not eligible for subsidized postretirement medical and life benefits.

Summary Plan Results

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

<i>\$ in millions</i>	Year Ended December 31					
	Pension Benefits			Medical and Life Benefits		
	2021	2020	2019	2021	2020	2019
Components of net periodic benefit cost (benefit)						
Service cost	\$ 414	\$ 409	\$ 367	\$ 16	\$ 17	\$ 16
Interest cost	1,054	1,226	1,360	53	67	80
Expected return on plan assets	(2,512)	(2,376)	(2,101)	(105)	(102)	(92)
Amortization of prior service (credit) cost	(9)	(59)	(59)	(1)	4	(3)
Mark-to-market (benefit) expense	(1,921)	1,034	1,783	(434)	—	17
Other	(1)	10	—	—	2	—
Net periodic benefit cost (benefit)	\$ (2,975)	\$ 244	\$ 1,350	\$ (471)	\$ (12)	\$ 18

The table below summarizes the components of changes in unamortized prior service credit (cost) for the years ended December 31, 2019, 2020 and 2021:

<i>\$ in millions</i>	Pension Benefits	Medical and Life Benefits	Total
Changes in unamortized prior service credit			
Amortization of prior service credit	\$ 59	\$ 3	\$ 62
Tax expense	(14)	(1)	(15)
Change in unamortized prior service credit – 2019	45	2	47
Amortization of prior service credit (cost)	59	(4)	55
Tax expense	(15)	1	(14)
Change in unamortized prior service credit (cost) – 2020	44	(3)	41
Amortization of prior service credit (cost)	9	1	10
Tax expense	(2)	—	(2)
Change in unamortized prior service credit (cost) – 2021	\$ 7	\$ 1	\$ 8

The following table sets forth the funded status and amounts recognized in the consolidated statements of financial position for the company's defined benefit retirement plans. Pension benefits data includes the qualified plans,

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foreign plans and U.S. unfunded non-qualified plans for benefits provided to directors, officers and certain employees. The company uses a December 31 measurement date for its plans.

<i>\$ in millions</i>	Pension Benefits		Medical and Life Benefits	
	2021	2020	2021	2020
Plan Assets				
Fair value of plan assets at beginning of year	\$ 34,452	\$ 30,646	\$ 1,515	\$ 1,392
Net gain on plan assets	3,637	4,802	170	218
Employer contributions	104	851	37	36
Participant contributions	8	8	23	24
Benefits paid	(1,964)	(1,865)	(157)	(155)
Other	(1)	10	—	—
Fair value of plan assets at end of year	36,236	34,452	1,588	1,515
Projected Benefit Obligation				
Projected benefit obligation at beginning of year	40,182	36,914	2,119	2,048
Service cost	414	409	16	17
Interest cost	1,054	1,226	53	67
Participant contributions	8	8	23	24
Actuarial (gain) loss	(794)	3,455	(369)	115
Benefits paid	(1,964)	(1,865)	(157)	(155)
Other	(12)	35	—	3
Projected benefit obligation at end of year	38,888	40,182	1,685	2,119
Funded status	\$ (2,652)	\$ (5,730)	\$ (97)	\$ (604)

Pension Benefits

The increase in the fair value of our plan assets for the year ended December 31, 2021 was principally driven by net plan asset returns of 10.9 percent. In 2020, the fair value of our plan assets increased primarily due to net plan asset returns of 16.2 percent and a \$750 million discretionary pension contribution.

The decrease in our projected benefit obligation for the year ended December 31, 2021, was primarily driven by a 30 basis point increase in the discount rate from year end 2020. In 2020, our projected benefit obligation increased primarily due to a 71 basis point decrease in the discount rate from year end 2019.

<i>\$ in millions</i>	Pension Benefits		Medical and Life Benefits	
	2021	2020	2021	2020
Classification of amounts recognized in the consolidated statements of financial position				
Non-current assets	\$ 462	\$ 211	\$ 285	\$ 179
Current liability	(182)	(180)	(45)	(46)
Non-current liability	(2,932)	(5,761)	(337)	(737)

The accumulated benefit obligation for all defined benefit pension plans was \$38.3 billion and \$39.6 billion at December 31, 2021 and 2020, respectively.

Amounts for pension plans with accumulated benefit obligations in excess of fair value of plan assets are as follows:

<i>\$ in millions</i>	December 31	
	2021	2020
Projected benefit obligation	\$ 36,524	\$ 37,681
Accumulated benefit obligation	35,994	37,135
Fair value of plan assets	33,410	31,741

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Plan Assumptions

On a weighted-average basis, the following assumptions were used to determine benefit obligations at December 31 of each year and net periodic benefit cost for the following year:

	Pension Benefits			Medical and Life Benefits		
	2021	2020	2019	2021	2020	2019
Discount rate	2.98 %	2.68 %	3.39 %	2.93 %	2.58 %	3.35 %
Expected long-term return on plan assets	7.50 %	7.50 %	8.00 %	7.19 %	7.22 %	7.66 %
Initial cash balance crediting rate assumed for the next year	2.25 %	2.25 %	2.39 %			
Rate to which the cash balance crediting rate is assumed to increase (the ultimate rate)	2.25 %	2.25 %	2.64 %			
Year that the cash balance crediting rate reaches the ultimate rate	2027	2026	2025			
Rate of compensation increase	3.00 %	3.00 %	3.00 %			
Initial health care cost trend rate assumed for the next year				5.30 %	5.60 %	5.90 %
Rate to which the health care cost trend rate is assumed to decline (the ultimate trend rate)				5.00 %	5.00 %	5.00 %
Year that the health care cost trend rate reaches the ultimate trend rate				2023	2023	2023

Plan Assets and Investment Policy

Plan assets are invested in various asset classes that are expected to produce a sufficient level of diversification and investment return over the long term. Through consultation with our investment management team and outside investment advisers, management develops expected long-term returns for each of the plans' strategic asset classes. In doing so, we consider a number of factors, including our historical investment performance, current market data such as yields/price-earnings ratios, historical market returns over long periods and periodic surveys of investment managers' expectations. Liability studies are conducted on a regular basis to provide guidance in setting investment goals with an objective to balance risk. Risk targets are established and monitored against acceptable ranges.

Our investment policies and procedures are designed to ensure the plans' investments are in compliance with ERISA. Guidelines are established defining permitted investments within each asset class. Derivatives are used for transitioning assets, asset class rebalancing, managing currency risk and for management of fixed-income and alternative investments.

For the majority of the plans' assets, the investment policies require that the asset allocation be maintained within the following ranges as of December 31, 2021:

	Asset Allocation Ranges
Cash and cash equivalents	—% - 12%
Global public equities	30% - 50%
Fixed-income securities	20% - 40%
Alternative investments	18% - 38%

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The table below provides the fair values of the company's pension and Voluntary Employee Beneficiary Association (VEBA) trust plan assets at December 31, 2021 and 2020, by asset category. The table also identifies the level of inputs used to determine the fair value of assets in each category. See Note 1 for the definitions of these levels. Certain investments that are measured at fair value using NAV per share (or its equivalent) as a practical expedient are not required to be categorized in the fair value hierarchy table. The total fair value of these investments is included in the table below to permit reconciliation of the fair value hierarchy to amounts presented in the funded status table. As of December 31, 2021 and 2020, there were no investments expected to be sold at a value materially different than NAV.

<i>\$ in millions</i>	Level 1		Level 2		Level 3		Total	
	2021	2020	2021	2020	2021	2020	2021	2020
Asset category								
Cash and cash equivalents	\$ 119	\$ 120	\$ 2,268	\$ 1,238			\$ 2,387	\$ 1,358
U.S. equities	3,085	2,981	2	—			3,087	2,981
International equities	3,105	3,354			\$ 3	\$ 2	3,108	3,356
Fixed-income securities								
U.S. Treasuries	21	22	2,815	2,273			2,836	2,295
U.S. Government Agency			180	258			180	258
Non-U.S. Government			277	332			277	332
Corporate debt	30	31	5,501	6,228			5,531	6,259
Asset backed			987	1,080			987	1,080
High yield debt	19	24	31	48			50	72
Bank loans			21	59			21	59
Other assets	33	(2)	57	59	2	2	92	59
Investments valued using NAV as a practical expedient								
U.S. equities							1,652	1,567
International equities							6,849	7,193
Fixed-income funds							1,461	1,959
Hedge funds							63	65
Opportunistic investments							3,039	2,499
Private equity funds							3,535	2,627
Real estate funds							2,742	2,180
Payables, net							(73)	(232)
Fair value of plan assets at the end of the year	\$ 6,412	\$ 6,530	\$ 12,139	\$ 11,575	\$ 5	\$ 4	\$ 37,824	\$ 35,967

There were no transfers of plan assets into or out of Level 3 of the fair value hierarchy during the years ended December 31, 2021 and 2020.

Generally, investments are valued based on information in financial publications of general circulation, statistical and valuation services, records of security exchanges, appraisal by qualified persons, transactions and bona fide offers. Cash and cash equivalents are predominantly held in money market or short-term investment funds. U.S. and international equities consist primarily of common stocks and institutional common trust funds. Investments in certain equity securities, which include domestic and international securities and registered investment companies, and exchange-traded funds with fixed income strategies are valued at the last reported sales or quoted price on the last business day of the reporting period. Fair values for certain fixed-income securities, which are not exchange-traded, are valued using third-party pricing services.

Other assets include derivative assets with a fair value of \$78 million and \$29 million, derivative liabilities with a fair value of \$38 million and \$27 million, and net notional amounts of \$3.7 billion and \$2.3 billion, as of December 31, 2021 and 2020, respectively. Derivative instruments may include exchange traded futures contracts, interest rate swaps, options on futures and swaps, currency contracts, total return swaps and credit default swaps. Notional amounts do not quantify risk or represent assets or liabilities of the pension and VEBA trusts, but are used in the

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calculation of cash settlement under the contracts. The volume of derivative activity is commensurate with the amounts disclosed at year-end. Certain derivative financial instruments within the pension trust are subject to master netting agreements with certain counterparties.

Investments in certain equity and fixed-income funds, which include common/collective trust funds, and alternative investments, including hedge funds, opportunistic investments, private equity funds and real estate funds, are valued based on the NAV derived by the investment managers, as a practical expedient, and are described further below.

U.S. and International equities: Generally, redemption periods are daily, monthly or quarterly with a notice requirement less than 90 days. As of December 31, 2021, unfunded commitments were \$100 million. There were no unfunded commitments as of December 31, 2020.

Fixed-income funds: Generally, redemption periods are daily, monthly or quarterly with a notice requirement of two days. There were no unfunded commitments as of December 31, 2021. Unfunded commitments were \$2 million as of December 31, 2020.

Hedge funds: Consist of closed-end funds with a 5-10 year life as well as funds that allow redemption requests subject to the liquidity limitations of the underlying investments. As of December 31, 2021 and 2020, unfunded commitments were \$6 million and \$9 million, respectively.

Opportunistic investments: Primarily held in partnerships with a 5-10 year life. As of December 31, 2021 and 2020, unfunded commitments were \$1.7 billion and \$1.9 billion, respectively.

Private equity funds: The term of each fund is typically 10 or more years and the fund's investors do not have an option to redeem their interest in the fund. As of December 31, 2021 and 2020, unfunded commitments were \$2.1 billion and \$2.3 billion, respectively.

Real estate funds: Consist primarily of open-end funds that generally allow investors to redeem their interests in the funds. Certain closed-end real estate funds have terms of 10 or more years. As of December 31, 2021 and 2020, unfunded commitments were \$350 million and \$60 million, respectively.

For the years ended December 31, 2021 and 2020, the defined benefit pension and VEBA trusts did not hold any Northrop Grumman common stock.

Benefit Payments

The following table reflects estimated future benefit payments for the next ten years, based upon the same assumptions used to measure the benefit obligation, and includes expected future employee service, as of December 31, 2021:

<i>\$ in millions</i>	Pension Plans	Medical and Life Plans	Total
Year Ending December 31			
2022	\$ 1,945	\$ 146	\$ 2,091
2023	1,988	145	2,133
2024	2,039	122	2,161
2025	2,081	118	2,199
2026	2,118	114	2,232
2027 through 2031	10,857	506	11,363

In 2022, the company expects to contribute the required minimum funding of approximately \$100 million to its pension plans and approximately \$38 million to its medical and life benefit plans. During the year ended December 31, 2021, the company made no discretionary pension contributions.

14. STOCK COMPENSATION PLANS AND OTHER COMPENSATION ARRANGEMENTS

Stock Compensation Plans

At December 31, 2021, the company had stock-based compensation awards outstanding under the following shareholder-approved plans: the 2011 Long-Term Incentive Stock Plan (2011 Plan), applicable to employees and non-employee directors, and the 1993 Stock Plan for Non-Employee Directors (1993 SPND).

Employee Plans – In May 2015, the company's shareholders approved amendments to the 2011 Plan. These amendments provided that shares issued under the plan would be counted against the aggregate share limit on a one-

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for-one basis. As amended, 5.1 million shares plus 2.4 million of newly authorized shares were available for issuance under the 2011 Plan; as of December 31, 2021, 4.9 million shares remain available for issuance.

The 2011 Plan provides for the following equity awards: stock options, stock appreciation rights (SARs) and stock awards. Under the 2011 Plan, no SARs have been granted and there are no outstanding stock options. Stock awards include restricted performance stock rights (RPSR) and restricted stock rights (RSR). RPSRs generally vest and are paid following the completion of a three-year performance period, based primarily on achievement of certain performance metrics determined by the Board. RSRs generally vest 100% after three years. Each includes dividend equivalents, which are paid concurrently with the RPSR or RSR. The terms of equity awards granted under the 2011 Plan provide for accelerated vesting, and in some instances forfeiture, of all or a portion of an award upon termination of employment.

Non-Employee Director Plans – Awards to non-employee directors are made pursuant to the Northrop Grumman Corporation Equity Grant Program for Non-Employee Directors under the 2011 Plan (the Director Program), which was amended and restated effective January 1, 2016. Under the amended Director Program, each non-employee director is awarded an annual equity grant in the form of Automatic Stock Units, which vest on the one-year anniversary of the grant date. Directors may elect to have all or any portion of their Automatic Stock Units paid on (A) the earlier of (i) the beginning of a specified calendar year after the vesting date or (ii) their separation from service as a member of the Board, or (B) on the vesting date.

Directors also may elect to defer to a later year all or a portion of their remaining cash retainer or committee retainer fees into a stock unit account as Elective Stock Units or in alternative investment options. Elective Stock Units are awarded on a quarterly basis. Directors may elect to have all or a portion of their Elective Stock Units paid on the earlier of (i) the beginning of a specified calendar year or (ii) their separation from service as a member of the Board. Stock units awarded under the Director Program are paid out in an equivalent number of shares of Northrop Grumman common stock. Directors are credited with dividend equivalents in connection with the accumulated stock units until the shares of common stock relating to such stock units are issued.

Compensation Expense

Stock-based compensation expense for the years ended December 31, 2021, 2020 and 2019 was \$94 million, \$90 million and \$127 million, respectively. The related tax (deficiencies) benefits for stock-based compensation for the years ended December 31, 2021, 2020 and 2019 were \$(2) million, \$14 million and \$14 million, respectively.

At December 31, 2021, there was \$96 million of unrecognized compensation expense related to unvested stock awards granted under the company's stock-based compensation plans. These amounts are expected to be charged to expense over a weighted-average period of 1.3 years.

Stock Awards

Compensation expense for stock awards is measured at the grant date based on the fair value of the award and is recognized over the vesting period (generally three years). The fair value of stock awards and performance stock awards is determined based on the closing market price of the company's common stock on the grant date. The fair value of market-based stock awards is determined at the grant date using a Monte Carlo simulation model. For purposes of measuring compensation expense for performance awards, the number of shares ultimately expected to vest is estimated at each reporting date based on management's expectations regarding the relevant performance criteria.

NORTHROP GRUMMAN CORPORATION

Stock award activity for the years ended December 31, 2019, 2020 and 2021, is presented in the table below. Vested awards do not include any adjustments to reflect the final performance measure for issued shares.

	Stock Awards (in thousands)	Weighted-Average Grant Date Fair Value Per Share	Weighted-Average Remaining Contractual Term (in years)
Outstanding at January 1, 2019	796	\$ 244	0.8
Granted	339	274	
Vested	(383)	222	
Forfeited	(51)	280	
Outstanding at December 31, 2019	701	\$ 278	0.9
Granted	262	350	
Vested	(296)	305	
Forfeited	(64)	303	
Outstanding at December 31, 2020	603	\$ 311	1.4
Granted	304	296	
Vested	(269)	286	
Forfeited	(58)	318	
Outstanding at December 31, 2021	580	\$ 314	1.4

The majority of our stock awards are granted annually during the first quarter.

The grant date fair value of shares issued in settlement of fully vested stock awards was \$103 million, \$118 million and \$119 million during the years ended December 31, 2021, 2020 and 2019, respectively.

Cash Awards

The company grants certain employees cash units (CUs) and cash performance units (CPUs). Depending on actual performance against financial objectives, recipients of CPUs earn between 0 and 200 percent of the original grant. The following table presents the minimum and maximum aggregate payout amounts related to those cash awards granted for the periods presented:

<i>\$ in millions</i>	Year Ended December 31		
	2021	2020	2019
Minimum aggregate payout amount	\$ 31	\$ 31	\$ 36
Maximum aggregate payout amount	178	175	203

The majority of our cash awards are granted annually during the first quarter. CUs typically vest and settle in cash on the third anniversary of the grant date, while CPUs generally vest and pay out in cash based primarily on the achievement of certain performance metrics over a three-year period. At December 31, 2021, there was \$115 million of unrecognized compensation expense related to cash awards.

15. LEASES**Total Lease Cost**

Total lease cost is included in Product and Service costs in the consolidated statement of earnings and comprehensive income and is recorded net of immaterial sublease income. Total lease cost is comprised of the following:

<i>\$ in millions</i>	Year Ended December 31		
	2021	2020	2019
Operating lease cost	\$ 315	\$ 320	\$ 318
Variable lease cost	31	28	11
Short-term lease cost	80	93	75
Total lease cost	\$ 426	\$ 441	\$ 404

Supplemental Balance Sheet Information

Supplemental operating lease balance sheet information consists of the following:

<i>\$ in millions</i>	Year Ended December 31	
	2021	2020
Operating lease right-of-use assets	\$ 1,655	\$ 1,533
Other current liabilities	284	263
Operating lease liabilities	1,590	1,343
Total operating lease liabilities	\$ 1,874	\$ 1,606

Other Supplemental Information

Other supplemental operating lease information consists of the following:

<i>\$ in millions</i>	Year Ended December 31	
	2021	2020
Cash paid for amounts included in the measurement of operating lease liabilities	\$ 306	\$ 275
Right-of-use assets obtained in exchange for new lease liabilities	394	345
Weighted average remaining lease term	11.3 years	12.1 years
Weighted average discount rate	3.1 %	3.5 %

Maturities of Lease Liabilities

Maturities of operating lease liabilities as of December 31, 2021 are as follows:

<i>\$ in millions</i>	
Year Ending December 31	
2022	\$ 322
2023	297
2024	251
2025	206
2026	173
Thereafter	1,058
Total lease payments	2,307
Less: imputed interest	(433)
Present value of operating lease liabilities	\$ 1,874

As of December 31, 2021, we have approximately \$300 million in rental commitments for real estate leases that have not yet commenced. These leases are expected to commence in 2022 with lease terms of 3 to 16 years.

16. SEGMENT INFORMATION

The company is aligned in four operating sectors, which also comprise our reportable segments: Aeronautics Systems, Defense Systems, Mission Systems and Space Systems.

The following table presents sales and operating income by segment:

<i>\$ in millions</i>	Year Ended December 31		
	2021	2020	2019
Sales			
Aeronautics Systems	\$ 11,259	\$ 12,169	\$ 11,116
Defense Systems	5,776	7,543	7,495
Mission Systems	10,134	10,080	9,410
Space Systems	10,608	8,744	7,425
Intersegment eliminations	(2,110)	(1,737)	(1,605)
Total sales	35,667	36,799	33,841
Operating income			
Aeronautics Systems	1,093	1,206	1,188
Defense Systems	696	846	793
Mission Systems	1,579	1,459	1,408
Space Systems	1,121	893	794
Intersegment eliminations	(272)	(216)	(205)
Total segment operating income	4,217	4,188	3,978
FAS/CAS operating adjustment	130	418	465
Unallocated corporate income (expense)	1,304	(541)	(474)
Total operating income	\$ 5,651	\$ 4,065	\$ 3,969

FAS/CAS Operating Adjustment

For financial statement purposes, we account for our employee pension plans in accordance with FAS. However, the cost of these plans is charged to our contracts in accordance with applicable FAR and CAS requirements. The FAS/CAS operating adjustment, previously referred to as the net FAS (service)/CAS pension adjustment, reflects the difference between CAS pension expense included as cost in segment operating income and the service cost component of FAS expense included in total operating income.

Unallocated Corporate Income (Expense)

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

During the first quarter of 2021, the \$2.0 billion pre-tax gain on the sale of our IT services business and \$192 million of unallowable state taxes and transaction costs associated with the divestiture were recorded in Unallocated corporate income (expense).

NORTHROP GRUMMAN CORPORATION

Disaggregation of Revenue

<i>Sales by Customer Type</i>	Year Ended December 31					
	2021		2020		2019	
	\$	% ⁽³⁾	\$	% ⁽³⁾	\$	% ⁽³⁾
<i>\$ in millions</i>						
Aeronautics Systems						
U.S. government ⁽¹⁾	\$ 9,631	85 %	\$ 10,411	86 %	\$ 9,258	83 %
International ⁽²⁾	1,421	13 %	1,595	13 %	1,688	15 %
Other customers	18	— %	41	— %	67	1 %
Intersegment sales	189	2 %	122	1 %	103	1 %
Aeronautics Systems sales	11,259	100 %	12,169	100 %	11,116	100 %
Defense Systems						
U.S. government ⁽¹⁾	3,595	62 %	5,103	68 %	4,952	66 %
International ⁽²⁾	1,317	23 %	1,317	17 %	1,442	19 %
Other customers	75	1 %	395	5 %	410	6 %
Intersegment sales	789	14 %	728	10 %	691	9 %
Defense Systems sales	5,776	100 %	7,543	100 %	7,495	100 %
Mission Systems						
U.S. government ⁽¹⁾	7,223	71 %	7,279	72 %	6,765	72 %
International ⁽²⁾	1,846	18 %	1,945	19 %	1,839	19 %
Other customers	72	1 %	77	1 %	78	1 %
Intersegment sales	993	10 %	779	8 %	728	8 %
Mission Systems sales	10,134	100 %	10,080	100 %	9,410	100 %
Space Systems						
U.S. government ⁽¹⁾	9,885	93 %	8,110	93 %	6,959	94 %
International ⁽²⁾	398	4 %	331	4 %	185	2 %
Other customers	186	2 %	195	2 %	198	3 %
Intersegment sales	139	1 %	108	1 %	83	1 %
Space Systems sales	10,608	100 %	8,744	100 %	7,425	100 %
Total						
U.S. government ⁽¹⁾	30,334	85 %	30,903	84 %	27,934	83 %
International ⁽²⁾	4,982	14 %	5,188	14 %	5,154	15 %
Other customers	351	1 %	708	2 %	753	2 %
Total Sales	\$ 35,667	100 %	\$ 36,799	100 %	\$ 33,841	100 %

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

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

⁽³⁾ Percentages calculated based on total segment sales.

NORTHROP GRUMMAN CORPORATION
Sales by Contract Type

<i>\$ in millions</i>	Year Ended December 31					
	2021		2020		2019	
	\$	% ⁽¹⁾	\$	% ⁽¹⁾	\$	% ⁽¹⁾
Aeronautics Systems						
Cost-type	\$ 5,419	49 %	\$ 6,142	51 %	\$ 5,299	48 %
Fixed-price	5,651	51 %	5,905	49 %	5,714	52 %
Intersegment sales	189		122		103	
Aeronautics Systems sales	11,259		12,169		11,116	
Defense Systems						
Cost-type	1,739	35 %	2,345	34 %	2,509	37 %
Fixed-price	3,248	65 %	4,470	66 %	4,295	63 %
Intersegment sales	789		728		691	
Defense Systems sales	5,776		7,543		7,495	
Mission Systems						
Cost-type	3,139	34 %	3,582	39 %	3,335	38 %
Fixed-price	6,002	66 %	5,719	61 %	5,347	62 %
Intersegment sales	993		779		728	
Mission Systems sales	10,134		10,080		9,410	
Space Systems						
Cost-type	7,731	74 %	6,369	74 %	5,336	73 %
Fixed-price	2,738	26 %	2,267	26 %	2,006	27 %
Intersegment sales	139		108		83	
Space Systems sales	10,608		8,744		7,425	
Total						
Cost-type	18,028	51 %	18,438	50 %	16,479	49 %
Fixed-price	17,639	49 %	18,361	50 %	17,362	51 %
Total Sales	\$ 35,667		\$ 36,799		\$ 33,841	

⁽¹⁾ Percentages calculated based on external customer sales.

NORTHROP GRUMMAN CORPORATION
Sales by Geographic Region

<i>\$ in millions</i>	Year Ended December 31					
	2021		2020		2019	
	\$	% ⁽²⁾	\$	% ⁽²⁾	\$	% ⁽²⁾
Aeronautics Systems						
United States	\$ 9,649	87 %	\$ 10,452	87 %	\$ 9,325	85 %
Asia/Pacific	896	8 %	841	7 %	810	7 %
Europe	461	4 %	574	5 %	587	5 %
All other ⁽¹⁾	64	1 %	180	1 %	291	3 %
Intersegment sales	189		122		103	
Aeronautics Systems sales	11,259		12,169		11,116	
Defense Systems						
United States	3,670	74 %	5,498	81 %	5,362	79 %
Asia/Pacific	465	9 %	402	6 %	369	5 %
Europe	314	6 %	315	4 %	249	4 %
All other ⁽¹⁾	538	11 %	600	9 %	824	12 %
Intersegment sales	789		728		691	
Defense Systems sales	5,776		7,543		7,495	
Mission Systems						
United States	7,295	80 %	7,356	79 %	6,843	79 %
Asia/Pacific	518	6 %	707	8 %	637	7 %
Europe	1,004	10 %	893	9 %	850	10 %
All other ⁽¹⁾	324	4 %	345	4 %	352	4 %
Intersegment sales	993		779		728	
Mission Systems sales	10,134		10,080		9,410	
Space Systems						
United States	10,071	96 %	8,305	96 %	7,157	98 %
Asia/Pacific	60	1 %	18	— %	20	— %
Europe	328	3 %	300	4 %	147	2 %
All other ⁽¹⁾	10	— %	13	— %	18	— %
Intersegment sales	139		108		83	
Space Systems sales	10,608		8,744		7,425	
Total						
United States	30,685	86 %	31,611	86 %	28,687	85 %
Asia/Pacific	1,939	5 %	1,968	5 %	1,836	6 %
Europe	2,107	6 %	2,082	6 %	1,833	5 %
All other ⁽¹⁾	936	3 %	1,138	3 %	1,485	4 %
Total Sales	\$ 35,667		\$ 36,799		\$ 33,841	

⁽¹⁾ All other is principally comprised of the Middle East.

⁽²⁾ Percentages calculated based on external customer sales.

NORTHROP GRUMMAN CORPORATION

Intersegment Sales and Operating Income

Sales between segments are recorded at values that include intercompany operating income for the performing segment based on that segment's estimated average operating margin rate for external sales. Such intercompany operating income is eliminated in consolidation, so that the company's total sales and total operating income reflect only those transactions with external customers. See Note 1 for additional information.

The following table presents intersegment sales and operating income before eliminations:

<i>\$ in millions</i>	Year Ended December 31					
	2021		2020		2019	
	Sales	Operating Income	Sales	Operating Income	Sales	Operating Income
Intersegment sales and operating income						
Aeronautics Systems	\$ 189	\$ 19	\$ 122	\$ 11	\$ 103	\$ 10
Defense Systems	789	89	728	76	691	74
Mission Systems	993	150	779	116	728	113
Space Systems	139	14	108	13	83	8
Total	\$ 2,110	\$ 272	\$ 1,737	\$ 216	\$ 1,605	\$ 205

Assets

Substantially all of the company's operating assets are located in the U.S. The following table presents assets by segment:

<i>\$ in millions</i>	December 31	
	2021	2020
Assets		
Aeronautics Systems	\$ 9,423	\$ 8,997
Defense Systems	5,911	7,352
Mission Systems	9,869	10,029
Space Systems	10,760	10,028
Corporate assets ⁽¹⁾	6,616	8,063
Total assets	\$ 42,579	\$ 44,469

⁽¹⁾ Corporate assets principally consist of cash and cash equivalents, refundable taxes, deferred tax assets, property, plant and equipment, marketable securities and deferred costs associated with certain environmental matters.

Capital Expenditures and Depreciation and Amortization

The following table presents capital expenditures and depreciation and amortization by segment:

<i>\$ in millions</i>	Year Ended December 31					
	2021	2020	2019	2021	2020	2019
	Capital Expenditures			Depreciation and Amortization ⁽¹⁾		
Aeronautics Systems	\$ 465	\$ 540	\$ 528	\$ 216	\$ 238	\$ 224
Defense Systems	133	78	71	45	48	44
Mission Systems	236	302	229	170	150	133
Space Systems	530	440	352	247	211	189
Corporate	51	60	84	295	358	428
Total	\$ 1,415	\$ 1,420	\$ 1,264	\$ 973	\$ 1,005	\$ 1,018

⁽¹⁾ Corporate amounts include the amortization of purchased intangible assets and the additional depreciation expense related to the step-up in fair value of property, plant and equipment acquired through business combinations as they are not considered part of management's evaluation of segment operating performance.

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

None.

Item 9A. Controls and Procedures

DISCLOSURE CONTROLS AND PROCEDURES

Our principal executive officer (Chairman, Chief Executive Officer and President) and principal financial officer (Corporate Vice President and Chief Financial Officer) have evaluated the company's disclosure controls and procedures (as defined in Rule 13a-15(e) and Rule 15d-15(e) of the Securities Exchange Act of 1934 (the Exchange Act)) as of December 31, 2021, and have concluded that these controls and procedures are effective to ensure that information required to be disclosed by us in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms. These disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed in the reports that we file or submit is accumulated and communicated to management, including the principal executive officer and the principal financial officer, as appropriate to allow timely decisions regarding required disclosure.

CHANGES IN INTERNAL CONTROL OVER FINANCIAL REPORTING

During the three months ended December 31, 2021, no change occurred in our internal control over financial reporting that materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information

None.

MANAGEMENT'S REPORT ON INTERNAL CONTROL OVER FINANCIAL REPORTING

The management of Northrop Grumman Corporation (the company) prepared and is responsible for the consolidated financial statements and all related financial information contained in this Annual Report. This responsibility includes establishing and maintaining effective internal control over financial reporting. The company's internal control over financial reporting is designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with accounting principles generally accepted in the United States of America.

To comply with the requirements of Section 404 of the Sarbanes–Oxley Act of 2002, the company designed and implemented a structured and comprehensive assessment process to evaluate its internal control over financial reporting across the enterprise. The assessment of the effectiveness of the company's internal control over financial reporting is based on criteria established in *Internal Control—Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission. Because of its inherent limitations, a system of internal control over financial reporting can provide only reasonable assurance and may not prevent or detect misstatements. Management regularly monitors its internal control over financial reporting, and actions are taken to correct deficiencies as they are identified. Based on its assessment, management has concluded that the company's internal control over financial reporting was effective as of December 31, 2021.

Deloitte & Touche LLP issued an attestation report dated January 26, 2022, concerning the company's internal control over financial reporting, which is contained in this Annual Report. The company's consolidated financial statements as of and for the year ended December 31, 2021, have been audited by the independent registered public accounting firm of Deloitte & Touche LLP in accordance with the standards of the Public Company Accounting Oversight Board (United States).

/s/ Kathy J. Warden
Chairman, Chief Executive Officer and President

/s/ David F. Keffer
Corporate Vice President and Chief Financial Officer
January 26, 2022

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

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

Opinion on Internal Control over Financial Reporting

We have audited the internal control over financial reporting of Northrop Grumman Corporation and subsidiaries (the “Company”) as of December 31, 2021, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2021, based on the criteria established in *Internal Control - Integrated Framework (2013)* issued by COSO.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated financial statements as of and for the year ended December 31, 2021 of the Company and our report dated January 26, 2022 expressed an unqualified opinion on those financial statements.

Basis for Opinion

The Company’s management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management’s Report on Internal Control over Financial Reporting. Our responsibility is to express an opinion on the Company’s internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control over Financial Reporting

A company’s internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company’s internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company’s assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ Deloitte & Touche LLP
McLean, Virginia
January 26, 2022

Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

DIRECTORS

Information about our Directors will be incorporated herein by reference to the Proxy Statement for the 2022 Annual Meeting of Shareholders, to be filed with the SEC within 120 days after the end of the company's fiscal year.

INFORMATION ABOUT OUR EXECUTIVE OFFICERS

Our executive officers as of January 26, 2022, are listed below, along with their ages on that date, positions and offices held with the company, and principal occupations and employment, focused primarily on the past five years.

Name	Age	Office Held	Since	Recent Business Experience
Kathy J. Warden	50	Chairman, Chief Executive Officer and President	2019	Chief Executive Officer and President (2019); President and Chief Operating Officer (2018); Corporate Vice President and President, Mission Systems Sector (2016-2017)
Ann M. Addison	60	Corporate Vice President and Chief Human Resources Officer	2019	Corporate Vice President (2018); Executive Vice President and Chief Human Resources Officer, Leidos (2016-2018); Vice President, Human Resources, Lockheed Martin (2010-2016)
Mark A. Caylor	57	Corporate Vice President and President, Mission Systems Sector	2018	Corporate Vice President and President, Enterprise Services and Chief Strategy Officer (2014-2017)
Sheila C. Cheston	63	Corporate Vice President and General Counsel	2010	
Michael A. Hardesty	50	Corporate Vice President, Controller, and Chief Accounting Officer	2013	
Thomas H. Jones	55	Corporate Vice President and President, Aeronautics Systems Sector	2021	Vice President and General Manager, Airborne C4ISR Division, Mission Systems Sector (2017-2020); Vice President and General Manager, Advanced Concepts & Technologies Division, Mission Systems Sector (2015-2017)
Lesley A. Kalan	48	Corporate Vice President and Chief Strategy and Development Officer	2020	Corporate Vice President, Government Relations (2018-2019); Vice President, Legislative Affairs (2010-2017)
David F. Keffer	44	Corporate Vice President and Chief Financial Officer	2020	General Partner, Blue Delta Capital Partners (2018-2020); Chief Financial Officer and Executive Vice President, CSRA, Inc. (2015-2018)
Blake E. Larson	62	Corporate Vice President	2022	Corporate Vice President and President, Space Systems Sector (2020-2021); Corporate Vice President and President, Former Innovation Systems Sector (2018-2020); Chief Operating Officer, Orbital ATK, Inc. (2015-2018)
David T. Perry	57	Corporate Vice President and Chief Global Business Officer	2019	Corporate Vice President and Chief Global Business Development Officer (2012-2019)
Mary D. Petryszyn	60	Corporate Vice President and President, Defense Systems Sector	2020	Vice President and General Manager, Land and Avionics C4ISR Division, Mission Systems Sector (2016-2019), Vice President, Global Strategy and Mission Solutions, Aerospace Systems Sector (2015-2016)

NORTHROP GRUMMAN CORPORATION

<u>Name</u>	<u>Age</u>	<u>Office Held</u>	<u>Since</u>	<u>Recent Business Experience</u>
Shawn N. Purvis	48	Corporate Vice President and President, Enterprise Services	2018	Vice President and Chief Information Officer (2016-2017); Vice President and General Manager, Cyber Division, Former Information Systems Sector (2014-2016)
Lucy C. Ryan	48	Corporate Vice President, Communications	2019	Vice President, Enterprise Communications (2018); Director of Communications, General Dynamics (2010-2018)
Thomas L. Wilson	53	Corporate Vice President and President, Space Systems Sector	2022	Vice President and General Manager, Strategic Space Systems Division, Space Systems Sector (2020-2021); Vice President of Strategy and Business Development, Space Systems Sector (2020); Vice President of Business Development, Former Innovation Systems Sector (2018-2020); Vice President of Strategy and Business Development, Space Systems Group, Orbital ATK, Inc. (2015-2018)

AUDIT COMMITTEE FINANCIAL EXPERT

The information as to the Audit and Risk Committee and the Audit and Risk Committee Financial Expert will be incorporated herein by reference to the Proxy Statement for the 2022 Annual Meeting of Shareholders.

CODE OF ETHICS

We have adopted Standards of Business Conduct for all of our employees, including the principal executive officer, principal financial officer and principal accounting officer. The Standards of Business Conduct can be found on our internet website at www.northropgrumman.com under “Who We Are – Investors – Corporate Governance – Standards of Business Conduct.” A copy of the Standards of Business Conduct is available to any stockholder who requests it by writing to: Northrop Grumman Corporation, c/o Office of the Secretary, 2980 Fairview Park Drive, Falls Church, VA 22042. We disclose amendments to provisions of our Standards of Business Conduct by posting amendments on our website. Waivers of the provisions of our Standards of Business Conduct that apply to our directors and executive officers are disclosed in a Current Report on Form 8-K.

The website and information contained on it or incorporated in it are not intended to be incorporated in this Annual Report on Form 10-K or other filings with the SEC.

OTHER DISCLOSURES

Other disclosures required by this Item will be incorporated herein by reference to the Proxy Statement for the 2022 Annual Meeting of Shareholders.

Item 11. Executive Compensation

Information concerning Executive Compensation, including information concerning Compensation Committee Interlocks and Insider Participation and the Compensation Committee Report, will be incorporated herein by reference to the Proxy Statement for the 2022 Annual Meeting of Shareholders.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

The information as to Securities Authorized for Issuance Under Equity Compensation Plans and Security Ownership of Certain Beneficial Owners and Management will be incorporated herein by reference to the Proxy Statement for the 2022 Annual Meeting of Shareholders.

For a description of securities authorized under our equity compensation plans, see Note 14 to the consolidated financial statements.

Item 13. Certain Relationships and Related Transactions, and Director Independence

The information as to Certain Relationships and Related Transactions and Director Independence will be incorporated herein by reference to the Proxy Statement for the 2022 Annual Meeting of Shareholders.

Item 14. Principal Accounting Fees and Services

The information as to Principal Accounting Fees and Services will be incorporated herein by reference to the Proxy Statement for the 2022 Annual Meeting of Shareholders.

PART IV

Item 15. Exhibits, Financial Statement Schedules

- (a) 1. Report of Independent Registered Public Accounting Firm (PCAOB ID No. 34)

Financial Statements

Consolidated Statements of Earnings and Comprehensive Income
Consolidated Statements of Financial Position
Consolidated Statements of Cash Flows
Consolidated Statements of Changes in Shareholders' Equity
Notes to Consolidated Financial Statements

2. Financial Statement Schedules

All schedules have been omitted because they are not applicable, not required, or the information has been otherwise supplied in the consolidated financial statements or notes to the consolidated financial statements.

3. Exhibits

- 2(a) Agreement and Plan of Merger among Titan II, Inc. (formerly Northrop Grumman Corporation), Northrop Grumman Corporation (formerly New P, Inc.) and Titan Merger Sub Inc., dated March 30, 2011 (incorporated by reference to Exhibit 10.1 to Form 8-K filed April 4, 2011, File No. 001-16411)
- 2(b) Separation and Distribution Agreement dated as of March 29, 2011, among Titan II, Inc. (formerly Northrop Grumman Corporation), Northrop Grumman Corporation (formerly New P, Inc.), Huntington Ingalls Industries, Inc., Northrop Grumman Shipbuilding, Inc. and Northrop Grumman Systems Corporation (incorporated by reference to Exhibit 10.2 to Form 8-K filed April 4, 2011, File No. 001-16411)
- 2(c) Agreement and Plan of Merger dated as of September 17, 2017, among Northrop Grumman Corporation, Neptune Merger, Inc. and Orbital ATK, Inc. (incorporated by reference to Exhibit 2.1 to Form 8-K filed September 18, 2017, File No. 001-16411)
- 2(d) Transaction Agreement dated as of April 28, 2014, among Alliant Techsystems Inc., Vista Spinco Inc., Vista Merger Sub Inc. and Orbital Sciences Corporation (incorporated by reference to Exhibit 2.1 to Alliant Techsystems Inc. (now known as Northrop Grumman Innovation Systems, Inc.) Form 8-K filed May 2, 2014, File No. 001-16411)
- 3(a) Amended and Restated Certificate of Incorporation of Northrop Grumman Corporation dated May 29, 2012 (incorporated by reference to Exhibit 3.1 to Form 10-Q for the quarter ended June 30, 2012, filed July 25, 2012, File No. 001-16411)
- 3(b) Amended and Restated Bylaws of Northrop Grumman Corporation dated December 4, 2018 (incorporated by reference to Exhibit 3.1 to Form 8-K filed December 10, 2018, File No. 001-16411)
- 4(a) Registration Rights Agreement dated as of January 23, 2001, by and among Northrop Grumman Corporation (now Northrop Grumman Systems Corporation), NNG, Inc. (now Northrop Grumman Corporation) and Unitrin, Inc. (incorporated by reference to Exhibit(d)(6) to Amendment No. 4 to Schedule TO filed January 31, 2001, File No. 001-3229)
- 4(b) Indenture dated as of October 15, 1994, between Northrop Grumman Corporation (now Northrop Grumman Systems Corporation) and The Chase Manhattan Bank (National Association), Trustee (incorporated by reference to Exhibit 4.1 to Form 8-K filed October 25, 1994, File No. 001-3229)
- 4(c) First Supplemental Indenture dated as of March 30, 2011 by and among Northrop Grumman Systems Corporation, The Bank of New York Mellon (successor trustee to JPMorgan Chase Bank and The Chase Manhattan Bank, N.A.), Titan II, Inc. (formerly known as Northrop Grumman Corporation), and Titan Holdings II, L.P., to Indenture dated as of October 15, 1994, between Northrop Grumman Corporation (now Northrop Grumman Systems Corporation) and The Chase Manhattan Bank, N.A., Trustee (incorporated by reference to Exhibit 4.1 to Form 10-Q for the quarter ended March 31, 2011, filed April 27, 2011, File No. 001-16411)

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- 4(d) Second Supplemental Indenture dated as of March 30, 2011 by and among Northrop Grumman Systems Corporation, The Bank of New York Mellon (successor trustee to JPMorgan Chase Bank and The Chase Manhattan Bank, N.A.), Titan Holdings II, L.P., and Northrop Grumman Corporation (formerly known as New P, Inc.), to Indenture dated as of October 15, 1994, between Northrop Grumman Corporation (now Northrop Grumman Systems Corporation) and The Chase Manhattan Bank, N.A., Trustee (incorporated by reference to Exhibit 4.2 to Form 10-Q for the quarter ended March 31, 2011, filed April 27, 2011, File No. 001-16411)
- 4(e) Form of Officers' Certificate (without exhibits) establishing the terms of Northrop Grumman Corporation's (now Northrop Grumman Systems Corporation's) 7.875% Debentures due 2026 (incorporated by reference to Exhibit 4.3 to Form S-4 Registration Statement No. 333-02653 filed April 19, 1996)
- 4(f) Form of Northrop Grumman Corporation's (now Northrop Grumman Systems Corporation's) 7.875% Debentures due 2026 (incorporated by reference to Exhibit 4.6 to Form S-4 Registration Statement No. 333-02653 filed April 19, 1996)
- 4(g) Form of Officers' Certificate establishing the terms of Northrop Grumman Corporation's (now Northrop Grumman Systems Corporation's) 7.75% Debentures due 2031 (incorporated by reference to Exhibit 10.9 to Form 8-K filed April 17, 2001, File No. 001-16411)
- 4(h) Senior Indenture dated as of December 15, 1991, between Litton Industries, Inc. (predecessor-in-interest to Northrop Grumman Systems Corporation) and The Bank of New York, as trustee, under which its 7.75% and 6.98% debentures due 2026 and 2036 were issued, and specimens of such debentures (incorporated by reference to Exhibit 4.1 to the Form 10-Q of Litton Industries, Inc. for the quarter ended April 30, 1996, filed June 11, 1996, File No. 001-3998)
- 4(i) Supplemental Indenture with respect to Senior Indenture dated December 15, 1991, dated as of April 3, 2001, among Litton Industries, Inc. (predecessor-in-interest to Northrop Grumman Systems Corporation), Northrop Grumman Corporation, Northrop Grumman Systems Corporation and The Bank of New York, as trustee (incorporated by reference to Exhibit 4.7 to Form 10-Q for the quarter ended March 31, 2001, filed May 10, 2001, File No. 001-16411)
- 4(j) Supplemental Indenture with respect to Senior Indenture dated December 15, 1991, dated as of December 20, 2002, among Litton Industries, Inc. (predecessor-in-interest to Northrop Grumman Systems Corporation), Northrop Grumman Corporation, Northrop Grumman Systems Corporation and The Bank of New York, as trustee (incorporated by reference to Exhibit 4(t) to Form 10-K for the year ended December 31, 2002, filed March 24, 2003, File No. 001-16411)
- 4(k) Third Supplemental Indenture dated as of March 30, 2011 by and among Northrop Grumman Systems Corporation (successor-in-interest to Litton Industries, Inc.), The Bank of New York Mellon (formerly known as The Bank of New York), as trustee, Titan II, Inc. (formerly known as Northrop Grumman Corporation), and Titan Holdings II, L.P., to Senior Indenture dated December 15, 1991, between Litton Industries, Inc. and The Bank of New York, as trustee (incorporated by reference to Exhibit 4.5 to Form 10-Q for the quarter ended March 31, 2011, filed April 27, 2011, File No. 001-16411)
- 4(l) Fourth Supplemental Indenture dated as of March 30, 2011 by and among Northrop Grumman Systems Corporation (successor-in-interest to Litton Industries, Inc.), The Bank of New York Mellon (formerly known as The Bank of New York) as trustee, Titan Holdings II, L.P., and Northrop Grumman Corporation (formerly known as New P, Inc.), to Senior Indenture dated December 15, 1991, between Litton Industries, Inc. and The Bank of New York, as trustee (incorporated by reference to Exhibit 4.6 to Form 10-Q for the quarter ended March 31, 2011, filed April 27, 2011, File No. 001-16411)
- 4(m) Indenture between TRW Inc. (predecessor-in-interest to Northrop Grumman Systems Corporation) and Mellon Bank, N.A., as trustee, dated as of May 1, 1986 (incorporated by reference to Exhibit 2 to the Form 8-A Registration Statement of TRW Inc. dated July 3, 1986, File No. 001-02384)
- 4(n) First Supplemental Indenture between TRW Inc. (predecessor-in-interest to Northrop Grumman Systems Corporation) and Mellon Bank, N.A., as trustee, dated as of August 24, 1989 (incorporated by reference to Exhibit 4(b) to Form S-3 Registration Statement No. 33-30350 of TRW Inc.)

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- 4(o) Fifth Supplemental Indenture between TRW Inc. (predecessor-in-interest to Northrop Grumman Systems Corporation) and The Chase Manhattan Bank, as successor trustee, dated as of June 2, 1999 (incorporated by reference to Exhibit 4(f) to Form S-4 Registration Statement No. 333-83227 of TRW Inc. filed July 20, 1999)
- 4(p) Ninth Supplemental Indenture dated as of December 31, 2009 among Northrop Grumman Space & Mission Systems Corp. (predecessor-in-interest to Northrop Grumman Systems Corporation); The Bank of New York Mellon, as successor trustee; Northrop Grumman Corporation; and Northrop Grumman Systems Corporation (incorporated by reference to Exhibit 4(p) to Form 10-K for the year ended December 31, 2009, filed February 9, 2010, File No. 001-16411)
- 4(q) Tenth Supplemental Indenture dated as of March 30, 2011, by and among Northrop Grumman Systems Corporation (successor-in-interest to Northrop Grumman Space & Mission Systems Corp. and TRW, Inc.), The Bank of New York Mellon, as successor trustee to JPMorgan Chase Bank and to Mellon Bank, N.A., Titan II Inc. (formerly known as Northrop Grumman Corporation), and Titan Holdings II, L.P., to Indenture between TRW Inc. and Mellon Bank, N.A., as trustee, dated as of May 1, 1986 (incorporated by reference to Exhibit 4.7 to Form 10-Q for the quarter ended March 31, 2011, filed April 27, 2011, File No. 001-16411)
- 4(r) Eleventh Supplemental Indenture dated as of March 30, 2011, by and among Northrop Grumman Systems Corporation (successor-in-interest to Northrop Grumman Space & Mission Systems Corp. and TRW Inc.), The Bank of New York Mellon, as successor trustee to JPMorgan Chase Bank and to Mellon Bank, N.A., Titan Holdings II, L.P., and Northrop Grumman Corporation (formerly known as New P, Inc.) to Indenture between TRW Inc. and Mellon Bank, N.A., as trustee, dated as of May 1, 1986 (incorporated by reference to Exhibit 4.8 to Form 10-Q for the quarter ended March 31, 2011, filed April 27, 2011, File No. 001-16411)
- 4(s) Twelfth Supplemental Indenture, dated as of August 25, 2021, to the Indenture dated as of May 1, 1986, by and among Northrop Grumman Systems Corporation, Northrop Grumman Corporation and The Bank of New York Mellon, as trustee (incorporated by reference to Exhibit 4.1 to Form 8-K filed August 27, 2021, File No. 001-16411)
- 4(t) Thirteenth Supplemental Indenture, dated as of August 25, 2021, to the Indenture dated as of May 1, 1986, by and among Northrop Grumman Systems Corporation, Northrop Grumman Corporation and The Bank of New York Mellon, as trustee (incorporated by reference to Exhibit 4.2 to Form 8-K filed August 27, 2021, File No. 001-16411)
- 4(u) Indenture dated as of November 21, 2001, between Northrop Grumman Corporation and JPMorgan Chase Bank, as trustee (incorporated by reference to Exhibit 4.1 to Form 8-K filed November 21, 2001, File No. 001-16411)
- 4(v) First Supplemental Indenture dated as of July 30, 2009, between Northrop Grumman Corporation and The Bank of New York Mellon, as successor trustee to Indenture dated as of November 21, 2001 (incorporated by reference to Exhibit 4(a) to Form 8-K filed July 30, 2009, File No. 001-16411)
- 4(w) Second Supplemental Indenture dated as of November 8, 2010, between Northrop Grumman Corporation and The Bank of New York Mellon, as successor trustee, to Indenture dated as of November 21, 2001 (incorporated by reference to Exhibit 4(a) to Form 8-K filed November 8, 2010, File No. 001-16411)
- 4(x) Form of Northrop Grumman Corporation's 5.050% Senior Note due 2040 (incorporated by reference to Exhibit C to Exhibit 4(a) to Form 8-K filed November 8, 2010, File No. 001-16411)
- 4(y) Third Supplemental Indenture dated as of March 30, 2011, by and among Titan II, Inc. (formerly known as Northrop Grumman Corporation), The Bank of New York Mellon, as successor trustee to JPMorgan Chase Bank, and Titan Holdings II, L.P., to Indenture dated as of November 21, 2001 between Northrop Grumman Corporation and JPMorgan Chase Bank, as trustee (incorporated by reference to Exhibit 4.9 to Form 10-Q for the quarter ended March 31, 2011, filed April 27, 2011, File No. 001-16411)

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- 4(z) Fourth Supplemental Indenture dated as of March 30, 2011, by and among Titan Holdings II, L.P., The Bank of New York Mellon, as successor trustee to JPMorgan Chase Bank, and Northrop Grumman Corporation (formerly known as New P, Inc.), to Indenture dated as of November 21, 2001 between Northrop Grumman Corporation and JPMorgan Chase Bank, as trustee (incorporated by reference to Exhibit 4.10 to Form 10-Q for the quarter ended March 31, 2011, filed April 27, 2011, File No. 001-16411)
- 4(aa) Fifth Supplemental Indenture, dated as of May 31, 2013, between Northrop Grumman Corporation and The Bank of New York Mellon, as successor to JPMorgan Chase Bank, Trustee, to Indenture dated as of November 21, 2001 (incorporated by reference to Exhibit 4(a) to Form 8-K filed May 31, 2013, File No. 001-16411)
- 4(bb) Form of 3.250% Senior Note due 2023 (incorporated by reference to Exhibit B to Exhibit 4(a) to Form 8-K filed May 31, 2013, File No. 001-16411)
- 4(cc) Form of 4.750% Senior Note due 2043 (incorporated by reference to Exhibit C to Exhibit 4(a) to Form 8-K filed May 31, 2013, File No. 001-16411)
- 4(dd) Sixth Supplemental Indenture, dated as of February 6, 2015, between Northrop Grumman Corporation and The Bank of New York Mellon, as successor to JPMorgan Chase Bank, Trustee, to Indenture dated as of November 21, 2001 (incorporated by reference to Exhibit 4.1 to Form 8-K filed February 6, 2015, File No. 001-16411)
- 4(ee) Form of 3.850% Senior Note due 2045 (incorporated by reference to Exhibit A to Exhibit 4.1 to Form 8-K filed February 6, 2015, File No. 001-16411)
- 4(ff) Seventh Supplemental Indenture, dated as of December 1, 2016, between Northrop Grumman Corporation and The Bank of New York Mellon, as successor to JPMorgan Chase Bank, Trustee, to Indenture dated as of November 21, 2001 (incorporated by reference to Exhibit 4.1 to Form 8-K filed December 1, 2016, File No. 001-16411)
- 4(gg) Form of 3.200% Senior Note due 2027 (incorporated by reference to Exhibit A to Exhibit 4.1 to Form 8-K filed December 1, 2016, File No. 001-16411)
- 4(hh) Eighth Supplemental Indenture, dated as of October 13, 2017, between Northrop Grumman Corporation and The Bank of New York Mellon, as successor to JPMorgan Chase Bank, Trustee, to Indenture dated as of November 21, 2001 (incorporated by reference to Exhibit 4.1 to Form 8-K filed October 13, 2017, File No. 001-16411)
- 4(ii) Ninth Supplemental Indenture, dated as of March 23, 2020, between Northrop Grumman Corporation and The Bank of New York Mellon, as successor to JPMorgan Chase, Trustee, to Indenture dated as of November 21, 2001 (incorporated by reference to Exhibit 4.1 to Form 8-K filed March 24, 2020, File No. 001-16411)
- 4(jj) Form of 2.930% Senior Note due 2025 (incorporated by reference to Exhibit C to Exhibit 4.1 to Form 8-K filed October 13, 2017, File No. 001-16411)
- 4(kk) Form of 3.250% Senior Note due 2028 (incorporated by reference to Exhibit D to Exhibit 4.1 to Form 8-K filed October 13, 2017, File No. 001-16411)
- 4(ll) Form of 4.030% Senior Note due 2047 (incorporated by reference to Exhibit E to Exhibit 4.1 to Form 8-K filed October 13, 2017, File No. 001-16411)
- 4(mm) Form of 4.400% Senior Note due 2030 (incorporated by reference to Exhibit 4.1 to Form 8-K filed March 24, 2020, File No. 001-16411)
- 4(nn) Form of 5.150% Senior Note due 2040 (incorporated by reference to Exhibit 4.1 to Form 8-K filed March 24, 2020, File No. 001-16411)
- 4(oo) Form of 5.250% Senior Note due 2050 (incorporated by reference to Exhibit 4.1 to Form 8-K filed March 24, 2020, File No. 001-16411)
- 4(pp) Tenth Supplemental Indenture, dated as of September 2, 2021, between Northrop Grumman Corporation and The Bank of New York Mellon, as successor to JPMorgan Chase Bank, Trustee, to Indenture dated as of November 21, 2001 (incorporated by reference to Exhibit 4.1 to Form 8-K filed September 3, 2021, File No. 001-16411)

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- 4(qq) Form of 7.875% Senior Note due 2026 (incorporated by reference to Exhibit A in Exhibit 4.1 to Form 8-K filed September 3, 2021, File No. 001-16411)
- 4(rr) Form of 7.750% Senior Note due 2026 (incorporated by reference to Exhibit B in Exhibit 4.1 to Form 8-K filed September 3, 2021, File No. 001-16411)
- 4(ss) Form of 6.650% Senior Note due 2028 (incorporated by reference to Exhibit C in Exhibit 4.1 to Form 8-K filed September 3, 2021, File No. 001-16411)
- 4(tt) Form of 7.750% Senior Note due 2029 (incorporated by reference to Exhibit D in Exhibit 4.1 to Form 8-K filed September 3, 2021, File No. 001-16411)
- 4(uu) Form of 7.750% Senior Note due 2031 (incorporated by reference to Exhibit E in Exhibit 4.1 to Form 8-K filed September 3, 2021, File No. 001-16411)
- 4(vv) Form of 6.980% Senior Note due 2036 (incorporated by reference to Exhibit F in Exhibit 4.1 to Form 8-K filed September 3, 2021, File No. 001-16411)
- 4(ww) Registration Rights Agreement, dated as of September 2, 2021, between Northrop Grumman Corporation and BofA Securities, Inc., BNP Paribas Securities Corp. and Wells Fargo Securities, LLC, as dealer managers (incorporated by reference to Exhibit 4.8 to Form 8-K filed September 3, 2021, File No. 001-16411)
- 4(xx) Description of Securities (incorporated by reference to Exhibit 4(II) to Form 10-K for the year ended December 31, 2019, filed January 30, 2020, File No. 001-16411)
- 10(a) Credit Agreement, dated as of August 17, 2018, among Northrop Grumman Corporation, as Borrower; Northrop Grumman Systems Corporation, as Guarantor; the lenders party thereto and JPMorgan Chase Bank, N.A., as Administrative Agent (incorporated by reference to Exhibit 10.1 to Form 8-K filed August 17, 2018, File No. 001-16411)
 - (i) Extension and Amendment Agreement, dated as of October 17, 2019, among Northrop Grumman Corporation, as Borrower, Northrop Grumman Systems Corporation, as Guarantor, the issuing banks party thereto, the lenders party thereto and JPMorgan Chase Bank, N.A., as Administrative Agent (incorporated by reference to Exhibit 10.1 to Form 8-K filed October 21, 2019, File No. 001-16411)
- 10(b) Form of Guarantee dated as of April 3, 2001, by Northrop Grumman Corporation of the indenture indebtedness issued by Litton Industries, Inc. (predecessor-in-interest to Northrop Grumman Systems Corporation) (incorporated by reference to Exhibit 10.10 to Form 8-K filed April 17, 2001, File No. 001-16411)
- 10(c) Form of Guarantee dated as of April 3, 2001, by Northrop Grumman Corporation of Northrop Grumman Systems Corporation indenture indebtedness (incorporated by reference to Exhibit 10.11 to Form 8-K and filed April 17, 2001, File No. 001-16411)
- 10(d) Form of Guarantee dated as of March 27, 2003, by Northrop Grumman Corporation, as Guarantor, in favor of JP Morgan Chase Bank, as trustee, of certain debt securities issued by the former Northrop Grumman Space & Mission Systems Corp. (predecessor-in-interest to Northrop Grumman Systems Corporation) (incorporated by reference to Exhibit 4.2 to Form 10-Q for the quarter ended March 31, 2003, filed May 14, 2003, File No. 001-16411)
 - (i) First Amendment to Guarantee, dated as of August 25, 2021, to the Guarantee dated as of March 27, 2003, by and among Northrop Grumman Systems Corporation, Northrop Grumman Corporation and The Bank of New York Mellon, as trustee (incorporated by reference to Exhibit 10.1 to Form 8-K filed August 27, 2021, File No. 001-16411)
- +10(e) Northrop Grumman Corporation 1993 Stock Plan for Non-Employee Directors (as Amended and Restated January 1, 2010) (incorporated by reference to Exhibit 10.1 to Form 10-Q for the quarter ended June 30, 2009, filed July 23, 2009, File No. 001-16411)
- +10(f) Amended and Restated 2011 Long-Term Incentive Stock Plan (as amended and restated effective as of May 20, 2015) (incorporated by reference to Appendix B to the Company's Proxy Statement on Schedule 14A for the 2015 Annual Meeting of Shareholders filed April 6, 2015, File No. 001-16411)

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- (i) Northrop Grumman Corporation Equity Grant Program for Non-Employee Directors under the Northrop Grumman 2011 Long-Term Incentive Stock Plan, Amended and Restated Effective as of January 1, 2016 (incorporated by reference to Exhibit 10.1 to Form 10-Q for the quarter ended September 30, 2015, filed October 28, 2015, File No. 001-16411)
 - (ii) Grant Certificate Specifying the Terms and Conditions Applicable to 2018 Restricted Stock Rights Granted Under the 2011 Long-Term Incentive Stock Plan (incorporated by reference to Exhibit 10.1 to Form 10-Q for the quarter ended March 31, 2018, filed April 25, 2018, File No. 001-16411)
 - (iii) Grant Certificate Specifying the Terms and Conditions Applicable to 2018 Restricted Performance Stock Rights Granted Under the 2011 Long-Term Incentive Stock Plan (incorporated by reference to Exhibit 10.2 to Form 10-Q for the quarter ended March 31, 2018, filed April 25, 2018, File No. 001-16411)
 - (iv) Grant Certificate Specifying the Terms and Conditions Applicable to Special 2018 Restricted Stock Rights Granted to Blake Larson Under the 2011 Long-Term Incentive Stock Plan (incorporated by reference to Exhibit 10.2 to Form 10-Q for the quarter ended June 30, 2018, filed July 25, 2018, File No. 001-16411)
 - (v) Grant Certificate Specifying the Terms and Conditions Applicable to 2018 Restricted Stock Rights Granted to Mark Caylor Under the 2011 Long-Term Incentive Stock Plan (incorporated by reference to Exhibit 10(g)(xvii) to Form 10-K for the year ended December 31, 2018, filed January 31, 2019, File No. 001-16411)
 - (vi) 2019 Restricted Stock Rights Grant Agreement Granted Under the 2011 Long-Term Incentive Stock Plan (incorporated by reference to Exhibit 10.1 to Form 10-Q for the quarter ended March 31, 2019, filed April 24, 2019, File No. 001-16411)
 - (vii) 2019 Restricted Performance Stock Rights Grant Agreement Granted Under the 2011 Long-Term Incentive Stock Plan (incorporated by reference to Exhibit 10.2 to Form 10-Q for the quarter ended March 31, 2019, filed April 24, 2019, File No. 001-16411)
 - (viii) 2020 Restricted Stock Rights Grant Agreement Granted Under the 2011 Long-Term Incentive Stock Plan (incorporated by reference to Exhibit 10.1 to Form 10-Q for the quarter ended March 31, 2020, filed April 29, 2020, File No. 001-16411)
 - (ix) 2020 Restricted Performance Stock Rights Grant Agreement Granted Under the 2011 Long-Term Incentive Stock Plan (incorporated by reference to Exhibit 10.2 to Form 10-Q for the quarter ended March 31, 2020, filed April 29, 2020, File No. 001-16411)
 - (x) 2020 Restricted Stock Rights Grant Agreement Granted to Blake Larson and Janis Pamiljans Under the 2011 Long-Term Incentive Stock Plan (incorporated by reference to Exhibit 10.3 to Form 10-Q for the quarter ended March 31, 2020, filed April 29, 2020, File No. 001-16411)
 - (xi) 2021 Restricted Stock Rights Grant Agreement Granted Under the 2011 Long-Term Incentive Stock Plan (incorporated by reference to Exhibit 10.2 to Form 10-Q for the quarter ended March 31, 2021, filed April 29, 2021, File No. 001-16411)
 - (xii) 2021 Restricted Performance Stock Rights Grant Agreement Granted Under the 2011 Long-Term Incentive Stock Plan (incorporated by reference to Exhibit 10.3 to Form 10-Q for the quarter ended March 31, 2021, filed April 29, 2021, File No. 001-16411)
 - (xiii) 2021 Restricted Stock Rights Grant Agreement Granted to Blake Larson Under the 2011 Long-Term Incentive Stock Plan (incorporated by reference to Exhibit 10.4 to Form 10-Q for the quarter ended March 31, 2021, filed April 29, 2021, File No. 001-16411)
- +10(g) Northrop Grumman 2011 Long-Term Incentive Stock Plan (As Amended Through December 4, 2014) (incorporated by reference to Exhibit 10(h) to Form 10-K for the year ended December 31, 2014, filed February 2, 2015, File No. 001-16411)

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- (i) Summary of Non-Employee Director Award Terms Under the 2011 Long-Term Incentive Stock Plan effective December 21, 2011 (incorporated by reference to Exhibit 10(j)(ii) to Form 10-K for the year ended December 31, 2011, filed February 8, 2012, File No. 001-16411)
- (ii) Northrop Grumman Corporation Equity Grant Program for Non-Employee Directors under the Northrop Grumman 2011 Long-Term Incentive Stock Plan, Amended and Restated Effective January 1, 2015 (incorporated by reference to Exhibit 10(h)(ii) to Form 10-K for the year ended December 31, 2014, filed February 2, 2015, File No. 001-16411)
- +10(h) Northrop Grumman Supplemental Plan 2 (Amended and Restated Effective as of January 1, 2014) (incorporated by reference to Exhibit 10(l) to Form 10-K for the year ended December 31, 2013, Filed February 3, 2014, File No. 001-16411)
 - (i) Appendix B to the Northrop Grumman Supplemental Plan 2: ERISA Supplemental Program 2 (Amended and Restated Effective as of January 1, 2014) (incorporated by reference to Exhibit 10(l)(i) to Form 10-K for the year ended December 31, 2013, filed February 3, 2014, File No. 001-16411)
 - (ii) Appendix G to the Northrop Grumman Supplemental Plan 2: Officers Supplemental Executive Retirement Program (Amended and Restated Effective as of January 1, 2012) (incorporated by reference to Exhibit 10(k)(iv) to Form 10-K for the year ended December 31, 2011, filed February 8, 2012, File No. 001-16411)
 - (iii) Appendix I to the Northrop Grumman Supplemental Plan 2: Officers Supplemental Executive Retirement Program II (Amended and Restated January 1, 2014) (incorporated by reference to Exhibit 10(k)(iv) to Form 10-K for the year ended December 31, 2015, filed February 1, 2016, File No. 001-16411)
 - (iv) First Amendment to the Northrop Grumman Supplemental Plan 2, dated December 20, 2017 (Effective as of December 31, 2017) (incorporated by reference to Exhibit 10(j)(v) to Form 10-K for the year ended December 31, 2017, filed January 29, 2018, File No. 001-16411)
 - (v) First Amendment to Appendix F to the Northrop Grumman Supplemental Plan 2, CPC Supplemental Executive Retirement Program, effective December 30, 2019 (incorporated by reference to Exhibit 10(h)(v) to Form 10-K for the year ended December 31, 2019, filed January 30, 2020, File No. 001-16411)
- +10(i) Northrop Grumman Supplementary Retirement Income Plan (formerly TRW Supplementary Retirement Income Plan) (Amended and Restated Effective January 1, 2014) (incorporated by reference to Exhibit 10(m) to Form 10-K for the year ended December 31, 2013, filed February 3, 2014, File No. 001-16411)
- +10(j) Severance Plan for Elected and Appointed Officers of Northrop Grumman Corporation (Amended and Restated Effective December 31, 2019) (incorporated by reference to Exhibit 10(j) to Form 10-K for the year ended December 31, 2019, filed January 30, 2020, File No. 001-16411)
- +10(k) Non-Employee Director Compensation Term Sheet, effective May 20, 2020 (incorporated by reference to Exhibit 10.1 to Form 10-Q for the quarter ended June 30, 2020, filed July 30, 2020, File No. 001-16411)
- +10(l) Non-Employee Director Compensation Term Sheet, effective May 19, 2021 (incorporated by reference to Exhibit 10.1 to Form 10-Q for the quarter ended June 30, 2021, filed July 29, 2021, File No. 001-16411)
- +10(m) Form of Indemnification Agreement between Northrop Grumman Corporation and its directors and executive officers (incorporated by reference to Exhibit 10.3 to Form 10-Q for the quarter ended March 31, 2012, filed April 25, 2012, File No. 001-16411)
- +10(n) Northrop Grumman Deferred Compensation Plan (Amended and Restated Effective as of April 1, 2016) (incorporated by reference to Exhibit 10.3 to Form 10-Q for the quarter ended March 31, 2016, filed April 27, 2016, File No. 001-16411)

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- +10(o) The 2002 Incentive Compensation Plan of Northrop Grumman Corporation, As Amended and Restated effective January 1, 2009 (incorporated by reference to Exhibit 10.6 to Form 10-Q for the quarter ended March 31, 2009, filed April 22, 2009, File No. 001-16411)
- +10(p) Northrop Grumman 2006 Annual Incentive Plan and Incentive Compensation Plan, as amended and restated effective January 1, 2022 (incorporated by reference to Exhibit 10.2 to Form 10-Q for the quarter ended June 30, 2021, filed July 29, 2021, File No. 001-16411)
- +10(q) Northrop Grumman Innovation Systems Nonqualified Deferred Compensation Plan, as amended and restated January 1, 2019 (incorporated by reference to Exhibit 10(r) to Form 10-K for the year ended December 31, 2018, filed January 31, 2019, File No. 001-16411)
- +10(r) Northrop Grumman Savings Excess Plan (Amended and Restated Effective as of January 1, 2020) (incorporated by reference to Exhibit 10(s) to Form 10-K for the year ended December 31, 2019, filed January 30, 2020, File No. 001-16411)
- +10(s) Northrop Grumman Officers Retirement Account Contribution Plan (Amended and Restated Effective as of January 1, 2019) (incorporated by reference to Exhibit 10(v) to Form 10-K for the year ended December 31, 2018, filed January 31, 2019, File No. 001-16411)
- +10(t) Northrop Grumman Innovation Systems Defined Benefit Supplemental Executive Retirement Plan, as amended and restated effective January 1, 2019 (incorporated by reference to Exhibit 10(x) to Form 10-K for the year ended December 31, 2018, filed January 31, 2019, File No. 001-16411)
 - (i) First Amendment to Northrop Grumman Innovation Systems Defined Benefit Supplemental Executive Retirement Plan, effective December 31, 2019 (incorporated by reference to Exhibit 10(v)(i) to Form 10-K for the year ended December 31, 2019, filed January 30, 2020, File No. 001-16411)
- +10(u) Northrop Grumman Innovation Systems Defined Contribution Supplemental Executive Retirement Plan, as amended and restated effective January 1, 2019 (incorporated by reference to Exhibit 10(y) to Form 10-K for the year ended December 31, 2018, filed January 31, 2019, File No. 001-16411)
- +10(v) Executive Basic Life Insurance and Accidental Death and Dismemberment Insurance Policy dated January 1, 2019 (incorporated by reference to Exhibit 10.4 to Form 10-Q for the quarter ended March 31, 2019, filed April 24, 2019, File No. 001-16411)
- +10(w) Executive Long-Term Disability Insurance Policy dated January 1, 2019 (incorporated by reference to Exhibit 10.5 to Form 10-Q for the quarter ended March 31, 2019, filed April 24, 2019, File No. 001-16411)
- +10(x) Executive Supplemental Individual Disability Insurance Plan dated June 30, 2014 (incorporated by reference to Exhibit 10(z) to Form 10-K for the year ended December 31, 2017, filed January 29, 2018, File No. 001-16411)
- +10(y) Group Personal Excess Liability Policy effective as of January 1, 2021 (incorporated by reference to Exhibit 10.1 to Form 10-Q for the quarter ended March 31, 2021, filed April 29, 2021, File No. 001-16411)
- +10(z) Letter dated January 10, 2018 from Northrop Grumman Corporation to Blake Larson regarding compensation effective June 6, 2018 (incorporated by reference to Exhibit 10.3 to Form 10-Q for quarter ended June 30, 2018, filed July 25, 2018, File No. 001-16411)
- +10(aa) Letter dated February 3, 2020 from Northrop Grumman Corporation to David Keffer regarding compensation effective February 17, 2020 (incorporated by reference to Exhibit 10.4 to Form 10-Q for the quarter ended March 31, 2020, filed April 29, 2020, File No. 001-16411)
- *21 Subsidiaries
- *23 Consent of Independent Registered Public Accounting Firm
- *24 Power of Attorney
- *31.1 Certification of Kathy J. Warden pursuant to Section 302 of the Sarbanes-Oxley Act of 2002

NORTHROP GRUMMAN CORPORATION

- *31.2 Certification of David F. Keffer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
- **32.1 Certification of Kathy J. Warden pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
- **32.2 Certification of David F. Keffer pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
- *101 Northrop Grumman Corporation Annual Report on Form 10-K for the fiscal year ended December 31, 2021, formatted as inline XBRL (Extensible Business Reporting Language); (i) the Cover Page, (ii) the Consolidated Statements of Earnings and Comprehensive Income, (iii) Consolidated Statements of Financial Position, (iv) Consolidated Statements of Cash Flows, (v) Consolidated Statements of Changes in Shareholders' Equity, and (vi) Notes to Consolidated Financial Statements. The instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.
- *104 Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101)
- + Management contract or compensatory plan or arrangement
- * Filed with this Report
- ** Furnished with this Report

Item 16. Form 10-K Summary

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized, on the 26th day of January 2022.

NORTHROP GRUMMAN CORPORATION

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

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed on behalf of the registrant this the 26th day of January 2022, by the following persons and in the capacities indicated.

<u>Signature</u>	<u>Title</u>
Kathy J. Warden*	Chairman, Chief Executive Officer and President (Principal Executive Officer), and Director
David F. Keffer*	Corporate Vice President and Chief Financial Officer (Principal Financial Officer)
Michael A. Hardesty	Corporate Vice President, Controller and Chief Accounting Officer
David P. Abney*	Director
Marianne C. Brown*	Director
Donald E. Felsing*	Director
Ann M. Fudge*	Director
William H. Hernandez*	Director
Madeleine A. Kleiner*	Director
Karl J. Krapek*	Director
Graham N. Robinson*	Director
Gary Roughead*	Director
Thomas M. Schoewe*	Director
James S. Turley*	Director
Mark A. Welsh III*	Director

*By: /s/ Jennifer C. McGarey
 Jennifer C. McGarey
 Corporate Vice President and Secretary
 Attorney-in-Fact
 pursuant to a power of attorney

Use Of Non-GAAP Financial Measures

This Annual Report contains non-GAAP (accounting principles generally accepted in the United States of America) financial measures, as defined by Securities and Exchange Commission (SEC) Regulation G. While we believe investors and other users of our financial statements may find these non-GAAP financial measures useful in evaluating our financial performance and operational trends, they should be considered as supplemental in nature and therefore, should not be considered in isolation or as a substitute for financial information prepared in accordance with GAAP. Definitions and reconciliations for the non-GAAP financial measures contained in this Annual Report are provided below. Other companies may define these measures differently or may utilize different non-GAAP financial measures.

Organic Sales:

Total sales excluding sales attributable to the Company's IT services divestiture. This measure may be useful to investors and other users of our financial statements as a supplemental measure in evaluating the Company's underlying sales growth as well as in providing an understanding of our ongoing business and future sales trends by presenting the Company's sales before the impact of divestiture activity.

(\$M)	2021	2020	2019
Total sales	\$35,667	\$36,799	\$33,841
Total IT services sales	(162)	(2,329)	(2,305)
Total organic sales	\$35,505	\$34,470	\$31,536
Space Systems sales	\$10,608	\$8,744	\$7,425
Space Systems IT services sales	(16)	(182)	(180)
Space Systems total organic sales	\$10,592	\$8,562	\$7,245

Segment Operating Income and Segment Operating Margin Rate:

Segment operating income, as reconciled in the table below, and segment operating margin rate (segment operating income divided by sales) reflect the combined operating income of our four segments less the operating income associated with intersegment sales. Segment operating income includes pension expense allocated to our sectors under FAR and CAS and excludes FAS pension service expense and unallocated corporate items (certain corporate-level expenses, which are not considered allowable or allocable under applicable FAR and CAS requirements, and costs not considered part of management's evaluation of segment operating performance). These non-GAAP measures may be useful to investors and other users of our financial statements as supplemental measures in evaluating the financial performance and operational trends of our sectors. These measures may not be defined and calculated by other companies in the same manner and should not be considered in isolation or as alternatives to operating results presented in accordance with GAAP.

(\$M)	2021	2020	2019
Sales	\$35,667	\$36,799	\$33,841
Operating income	\$5,651	\$4,065	\$3,969
<i>Operating margin rate</i>	<i>15.8%</i>	<i>11.0%</i>	<i>11.7%</i>
Reconciliation to segment operating income			
FAS/CAS operating adjustment	(130)	(418)	(465)
Unallocated corporate (income) expense	\$(1,304)	\$541	\$474
Segment operating income	\$4,217	\$4,188	\$3,978
<i>Segment operating margin rate</i>	<i>11.8%</i>	<i>11.4%</i>	<i>11.8%</i>

Transaction-Adjusted EPS:

Diluted earnings per share excluding the per share impacts related to the company's IT services divestiture, including the gain on sale of the business, associated federal and state income tax expenses, transaction costs, and the make-whole premium for early debt redemption, as well as mark-to-market (MTM) benefit (expense) and related tax impacts. This measure may be useful to investors and other users of our financial statements as a supplemental measure in evaluating the company's underlying financial performance per share by presenting the company's diluted earnings per share results before the non-operational impact of the IT services divestiture and pension and OPB actuarial gains and losses. Transaction-adjusted EPS is reconciled below.

	2021	2020	2019
Diluted earnings per share	\$43.54	\$19.03	\$13.22
MTM (benefit) expense per share	(14.64)	6.17	10.59
MTM-related deferred state tax expense (benefit) per share	0.77	(0.32)	(0.48)
Federal tax expense (benefit) of items above per share	2.92	(1.23)	(2.12)
MTM adjustment per share, net of tax	(10.95)	4.62	7.99
Gain on sale of business per share	(12.31)	—	—
State tax impact per share	0.99	—	—
Transaction costs per share	0.20	—	—
Make-whole premium per share	0.34	—	—
Federal tax impact of items above per share	3.82	—	—
Transaction adjustment per share, net of tax	(6.96)	—	—
Transaction-adjusted EPS	\$25.63	\$23.65	\$21.21

General Information

Northrop Grumman Corporation on the Internet

Information on Northrop Grumman and its sectors, including press releases and this Annual Report and the Sustainability Report, can be found at

www.northropgrumman.com

Annual Meeting of Shareholders

Wednesday, May 18, 2022

8 a.m. EDT

The 2022 Annual Meeting of Shareholders of Northrop Grumman Corporation will be held on Wednesday, May 18, 2022 at 8 a.m. Eastern.

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

Independent Auditors

Deloitte & Touche LLP

Stock Listing

Northrop Grumman Corporation common stock is listed on the New York Stock Exchange (trading symbol NOC).

Transfer Agent, Registrar and Dividend Paying Agent

Computershare
P.O. Box 505000
Louisville, KY 40233-5000
(877) 498-8861

www.computershare.com/investor

Dividend Reinvestment Program

Registered owners of Northrop Grumman Corporation common stock are eligible to participate in the company's Automatic Dividend Reinvestment Plan. Under this plan, shares are purchased with reinvested cash dividends and voluntary cash payments of up to a specified amount per calendar year.

For information on the company's Dividend Reinvestment Service, contact our Transfer Agent and Registrar, Computershare.

Company Shareholder Services

Shareholders with questions regarding stock ownership should contact our Transfer Agent and Registrar, Computershare. Stock ownership inquiries may also be directed to Northrop Grumman's Shareholder Services via email at sharesrv@ngc.com.

Duplicate Mailings

Shareholders with more than one account or who share the same address with another shareholder may receive more than one Annual Report. To eliminate duplicate mailings or to consolidate accounts, contact Computershare. Separate dividend checks and proxy materials will continue to be sent for each account on our records.

Investor Relations

Securities analysts, institutional investors and portfolio managers should contact Northrop Grumman Investor Relations at investors@ngc.com.

Media Relations

Inquiries from the media should be directed to Northrop Grumman Corporate Communications at (703) 280-4456 or send an email to newsbureau@ngc.com.

Electronic Delivery of Future Shareholder Communications

If you would like to help conserve natural resources and reduce the costs incurred by Northrop Grumman Corporation in mailing proxy materials, you can consent to receiving all future proxy statements, proxy cards and Annual Reports electronically via e-mail or the Internet. To sign up for electronic delivery, registered shareholders may log onto www.computershare.com/investor.

Look for our other reports

