



Perilous Profiteering

The companies building nuclear arsenals and their financial backers.



ICAN
International Campaign to
Abolish Nuclear Weapons

Utrecht, November 2021

There remains a marked lack of official information available in the public domain about the use, production, transfer and stockpiling of nuclear weapons. We strived to achieve the highest level of accuracy in reporting. The information in this report reflects official information available in the public domain. We welcome comments, clarifications, and corrections from governments, companies, financial institutions and others, in the spirit of dialogue, and in the common search for accurate and reliable information on this important subject. If you believe you have found an inaccuracy in our report, or if you can provide additional information, please contact: info@dontbankonthebomb.com

Principal Author: Susi Snyder

Primary Researchers

Susi Snyder (PAX, The Netherlands)

Jeroen Walstra (Profundo, the Netherlands)

Our thanks:

Joseph Rowntree Charitable Trust, Jubitz Family Foundation, CoreLab, Maaïke Beenes, Roelien Donker, Vicki Elson, Beatrice Fihn, Venessa Hanson, Daniel Högsta, Hans M. Kristensen, Cor Oudes, Grethe Østern, Lucero Oyarzún, Gem Romuld, Alicia Sanders-Zakre, Seth Shelden, Frank Slijper, Max Tegmark, Michel Uiterwaal, Timmon Wallis, and Tim Wright.

And all those who work tirelessly to stigmatize, outlaw, and eliminate nuclear weapons.

Notes:

Certain figures in this report may not tally exactly due to rounding. All figures are presented in U.S.D (unless otherwise indicated). Commas (,) are used as thousands separators.

This document, as well as any data and any map included herein, are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

About PAX

PAX means peace. Together with people in conflict areas and concerned citizens worldwide, PAX works to build just and peaceful societies across the globe. PAX brings together people who have the courage to stand for peace. Everyone who believes in peace can contribute. We believe that all these steps, whether small or large, truly matter and will contribute to a just and peaceful world. PAX is an ICAN partner.

About ICAN

ICAN is a global campaign coalition working to mobilize people in all countries to inspire, persuade and pressure their governments to sign and ratify the Treaty on the Prohibition of Nuclear Weapons. ICAN is comprised of more than 600 partner organisations in over 100 countries. More information about ICAN can be found at: www.ICANw.org

About Profundo

Profundo is an economic research consultancy analysing commodity chains, financial institutions and corporate social responsibility issues. It works predominantly for environmental, human rights and development organisations in the Netherlands and abroad. www.profundo.nl

© Don't Bank on the Bomb

Permission is granted for non-commercial reproduction, copying, distribution, and transmission of this publication or parts thereof so long as full credit is given to the coordinating project organization, editor, and relevant authors; the text is not altered, transformed, or built upon; and for any reuse or distribution, these terms are made clear to others.

Cover image: Daniel Lloyd Blunk-Fernández on Unsplash (<https://unsplash.com/photos/vrSKrUEZsDY>)

Nuclear weapons are prohibited by international law, yet 25 companies remain heavily involved in their production, manufacture and development. These companies are supported by 160 banks that lend them money or underwrite bonds, while another 186 institutions seek to profit from holding shares or bonds. Altogether 338 financial institutions made more than \$685 billion available to the nuclear weapon industry since 2019.

In January 2021, the Treaty on the Prohibition of Nuclear Weapons (TPNW) entered into force. The treaty explicitly prohibits the manufacture, production and development of nuclear weapons, as well as assistance with those prohibited acts. Financial institutions are divesting from their nuclear weapon related holdings, the number of total investors continues to drop with every Don't Bank on the Bomb publication.

Nuclear weapons are controlled by governments, but their production is often contracted to private companies. This is the situation in about half of the nuclear armed countries, though in bringing together materials to develop, test, produce, manufacture or stockpile nuclear weapons it is safe to assume there is a great deal of private sector involvement along the supply chain. Companies in China, France, India, Russia, the United Kingdom, and the United States, are listed in this report along with information about the key components they produce for nuclear arsenals.

Nearly every country in the world has undertaken a legally binding agreement to, at a minimum, negotiate the disarmament of nuclear arsenals. Many countries worked together to fulfil this obligation by negotiating the TPNW, yet the nine nuclear armed countries are doing the opposite. They are spending upwards of 100,000 per minute on a new nuclear arms race.

This report looks at those with vested interests to keep a nuclear arms race going. The companies that want to get contracts to build weapons of mass destruction, and the private sector financiers and investors that want to generate a profit without apparent concern for the devastating potential consequences of any use of the products they support. It is only by knowing those who seek to maintain the status quo that we can engage and shift their behaviour.

These profiteers can and do change their behaviours. A combination of the emerging norm against nuclear weapons, the growing strength and membership of the TPNW, and the increasing stigma against weapons designed for mass destruction are leading companies away from harmful contracts and investors to consider alternatives.

Susi Snyder.

Utrecht November 2021

Key findings



\$685 billion invested

\$685,164 million was made available to the 25 nuclear weapons producing companies between January 2019 and July 2021, a \$44 billion increase from the previous year. The increase can be attributed to \$80 billion more underwriting in 2021 compared to 2020. The financial sector helped the nuclear weapon industry sell pieces of its debt. Shareholding values dropped by \$67 billion, and bondholding value by \$2 billion.



52 fewer financial institutions invest

338 institutions have financing or investment relationships with the 25 nuclear weapon producing companies, down from 390 institutions the previous year.



25 Companies producing nuclear weapons

Companies from China, France, India, Italy, the Netherlands, the Russian Federation, the United Kingdom and the United States are significantly involved in the production of nuclear weapons. Many of the companies involved have multi-year production contracts, totalling at least \$200 billion and continuing for decades.

Northrop Grumman is the biggest single nuclear weapons profiteer, with at least \$24 billion in contracts, not including consortium and joint venture revenues. Raytheon Technologies and Lockheed Martin also hold multi-billion-dollar contracts to produce new nuclear weapon systems.

The list of companies profiled in this report and the arsenals to which they contribute are:

1. Aerojet Rocketdyne (United Kingdom, United States);
2. Airbus (France);
3. BAE Systems (France, United Kingdom, United States);
4. Bechtel (United States);
5. Bharat Dynamics (India);
6. Boeing (United Kingdom, United States);
7. China Aerospace Science and Technology (China);
8. Constructions Industrielles de la Méditerranée (France);
9. Fluor (United States);
10. General Dynamics (United Kingdom, United States);
11. Honeywell International (United States);
12. Huntington Ingalls Industries (United States);
13. Jacobs Engineering (United States);
14. L3 Harris Technologies (United States);
15. Larsen & Toubro (India);
16. Leidos (United States);
17. Leonardo (France);
18. Lockheed Martin (United Kingdom, United States);
19. Northrop Grumman (United Kingdom, United States);
20. Raytheon Technologies (United States);
21. Rostec (Russian Federation);
22. Safran (France);
23. Textron (United States);
24. Thales (France), and;
25. Walchandnagar Industries Limited (India).

Contents

Key findings	4
Introduction.....	7
25 Nuclear weapon producing companies.....	11
Changes from previous reports.....	12
Watchlist.....	14
Joint ventures	17
Submarines	18
Nuclear weapon producer profiles.....	19
1. Aerojet Rocketdyne Holdings, Inc (United States)	20
2. Airbus Group (The Netherlands).....	23
3. BAE Systems plc (United Kingdom).....	26
4. Bechtel (United States)	29
5. Bharat Dynamics Limited (India).....	30
6. Boeing (United States).....	31
7. China Aerospace Science and Technology (CASC)	34
8. Constructions Industrielles de la Méditerranée (CNIM) (France).....	35
9. Fluor (United States).....	36
10. General Dynamics (United States)	38
11. Honeywell International (United States).....	41
12. Huntington Ingalls Industries (United States).....	43
13. Jacobs Engineering (United States).....	47
14. L3 Harris Technologies (United States).....	49
15. Larsen & Toubro (India)	52
16. Leidos (United States)	54
17. Leonardo (Italy)	56
18. Lockheed Martin (United States).....	58
19. Northrop Grumman (United States).....	60
20. Raytheon Technologies Corporation (United States).....	63
21. Rostec (Russian Federation).....	65
22. Safran (France).....	66
23. Textron (United States).....	68
24. Thales (France).....	70
25. Walchandnagar Industries (India).....	72
Investors	74
Key findings.....	75
Analysis	77
Full investment table.....	80
Conclusion	112
Endnotes.....	113

Introduction

Nuclear weapons remain the worst weapon ever deployed. They are designed to cause mass murder, mayhem and catastrophe. The primary ideology behind the retention of nuclear weapons in the arsenals of nine countries, or the security strategies of their allies, is one of deterrence. An idea predicated on breaking the laws of war, an ever-present threat to civilisation as we know it.

Nuclear weapons cannot be used without breaking international law. These bombs are designed to destroy cities in a flash. Nuclear weapons development, production and testing has left a contaminating legacy that will remain for hundreds of generations. If a nuclear bomb is dropped in your neighbourhood, there is no help coming. That is why most countries have rejected nuclear weapons. Even though advanced nuclear programmes were developed in several dozen countries, only ten crossed the threshold and possess nuclear weapons now.

The consequences of nuclear weapons cannot be controlled in time nor space, so governments negotiated the Treaty on the Prohibition of Nuclear Weapons (TPNW). The treaty entered into force in January 2021. The treaty explicitly prohibits the manufacture, production and development of nuclear weapons, as well as assistance with those prohibited acts.

Despite global calls for restraint and nuclear disarmament, new nuclear weapons are being developed in all nuclear armed countries. The report includes information about the nuclear weapon programmes of the five countries legally obligated under the nuclear Non Proliferation Treaty to negotiate the disarmament of their arsenals, as well as the nuclear programme of India. New nuclear weapons systems, including the U.S. Ground Based Strategic Deterrent and Long-Range Standoff weapons, the French ASMPA-successor the ASN4G, and the Indian efforts to expand to submarine launched ballistic missiles are also presented in this report. Several of the nuclear armed countries are also investing in developing hypersonic missile technologies, but at this stage of the research and development it is still unclear whether those new missiles will carry a nuclear or conventional payload.

Impact of the Treaty on the Prohibition of Nuclear Weapons

The nuclear industry is changing. The re-nationalization of the UK's Atomic Weapons Establishment- removing Serco from the list of publicly traded companies involved in the production and maintenance of nuclear arsenals is one example. The sale of all government related contracts of another long-term nuclear weapon associated company (AECOM) so that it is no longer involved in any aspect of nuclear weapon development or stockpiling is another. These changes removed these companies from their association with the production of nuclear weapons, as well as several investor blacklists.

More than 100 financial institutions divested from the nuclear weapon industry in the last year. Several of these are from states that joined the TPNW. This includes the Bank of Ireland and AIB (Ireland), and Investec (South Africa). While other institutions made new investments, these are predominantly from countries not yet a member of the TPNW.

Nuclear weapon producing companies

For a company to be included in the list of nuclear weapon producers, it must be open to private investment and produce goods or services that specifically contribute to nuclear weapon development, testing, production, manufacture, possession, stockpiling or use. These activities are outlawed under the Treaty on the Prohibition of Nuclear Weapons.

Northrop Grumman is the biggest nuclear weapons profiteer, with at least \$24 billion in outstanding contracts, not including the consortium and joint venture revenues. Raytheon Technologies and Lockheed Martin also hold multi-billion-dollar contracts to produce new nuclear weapon systems.

The consortiums and joint ventures involved in producing nuclear arsenals also have multi-year multi-billion-dollar contracts. For example, National Technology and Engineering Solutions of Sandia (NTESS), a wholly owned subsidiary of Honeywell, has a \$40.6 billion contract for the management and operation of Sandia National Laboratories (SNL) where new warheads for the U.S. arsenal are built. Or the millions paid each year by the French government to the MBDA joint venture between BAE Systems, Airbus and Leonardo to build the next generation nuclear weapons for France.

There are changes in the number of nuclear weapon associated companies. Some companies, like Serco, had long-term contracts government contracts revoked. Others, like AECOM, have chosen to end their involvement in the nuclear weapon industry. The industry itself is getting smaller, with companies acquiring or merging together. Raytheon and United Technologies is one example, Northrop Grumman's acquisition of Orbital ATK is another.

Mergers and acquisitions have always been a way to gain advantage when competing for contracts, and the same holds true in the nuclear weapon industry. By buying up key suppliers of specific technologies, the ability of others to compete is reduced. In 2021, Lockheed Martin will do the same, as it in the process of acquiring Aerojet Rocketdyne.

The reduction in the number of contractors in the nuclear weapon industry makes it easier for financial institutions and other investors to exclude them from investments. Instead of tracking down hundreds, or even thousands of contributors to catastrophic threats, it's simply a matter of exiting a few relationships.

Renationalization of the Atomic Weapons Establishment- an illustration of increased risk

The UK Atomic Weapons Establishment's involvement with Trident missiles covers the entire life cycle, from initial concept to assessment, design, component manufacture and assembly, in-service support and decommissioning and disposal.¹ In February 2020, the UK Defence Secretary announced to UK Parliament the start of a new project for new nuclear warheads, to be built at AWE facilities.² The consortium AWE-ML comprised of Serco, Jacob's Engineering and Lockheed Martin had a 25 year-long non-revocable contract to run the AWE which was meant to expire in March 2025.³ However, in November 2020, the UK decided to nationalize its nuclear weapons facilities, taking back control from the AWE-ML consortium.⁴

This is an illustration of the risks faced by any company taking contracts for nuclear weapon related work. Each of these companies already knows that there are some risks from government contracting, they state as much in each annual report. However, until recently, the idea that long-term nuclear weapon related contracts might be terminated was not given much credit. Now that the weapons are prohibited under international law, an additional level of risk- especially for those relying on materials from a supply chain in states inside the treaty- which could halt those shipments to reduce any risks of assisting in the production, manufacture, or development of nuclear weapons.

China's nuclear weapon development- the new missile silos and the need to address nuclear weapon infrastructure

This report provides a snapshot of the private sector involvement in the nuclear weapon industry. One of the challenges in reporting is providing the same level of information for each of the nuclear armed countries. It is very difficult to get reliable information on the companies involved in the arsenals of China, Russia, North Korea and Pakistan. However, the increased monitoring of construction activity in China, including through open-source satellite investigation, provides information on locations that can help track down company

involvement in key facilities. The gaps in information about the critical infrastructure necessary to support nuclear weapon production, development and stockpiling remains a challenge.

Chinese industries are also reaching out more externally to finance debt. Combined with the request for more transparency by investors from companies engaged in the Silk Road initiative, there is scope to include more Chinese companies in future reporting. China Aerospace Science and Technology (CASC), at the group level, is included in this report because of this increase in available information.

Financiers and Profiteers

Governments hire companies to build the key components for nuclear weapons and to manage and operate the facilities in which nuclear weapons are produced. To secure those contracts, companies need to raise capital through loans or by issuing bonds. Many of the companies involved in nuclear weapon production are also publicly traded, so both individuals and institutions share profits (and losses).

Companies involved in producing nuclear weapons spend enormous amounts to get contracts, many of which run for multiple years. Nevertheless, even when contracts are in place, every producer also includes notes to their shareholders about the risk of taking on government contracts. Political and regulatory change can cause contracts to be terminated, and companies to report losses on their balance sheets. Reduced appetite for risk, including regulatory and reputational risk, can cause financiers and investors to stay away from companies connected to prohibited weapons.

Financiers that provide loans or underwrite bond issuances do expend effort to influence the direction of a company by limiting the scope of what their financing can be used for. Sometimes they claim they've been given guarantees that the money they provide will not be put towards any nefarious purpose, or they solely invest in specific projects. However, as most financing of the nuclear weapon companies listed is for "general corporate purposes". That means these are un-earmarked funds, and there is no way to guarantee they don't free resources to facilitate nuclear weapon production.

Investors, such as those that own or manage shares or bonds, have other ways to influence a company direction. In 2021, investors brought shareholder resolutions to both Northrop Grumman and Lockheed Martin's annual meetings raising concerns about the company's regulatory risk in light of the entry into force of the Treaty on the Prohibition of Nuclear Weapons.

The most potent way for an investor, or a financier, to share their concerns about nuclear weapon production with the companies involved is to divest, and to do so publicly. That's what Ireland's sovereign wealth fund did in early 2021 when it dropped €6 million shares of nuclear weapon related stock.⁵

Nuclear weapon producing companies included in this financial analysis present a significant, but not exhaustive review of the nuclear weapon industry. The 25 companies included are all publicly traded and have multi-year contracts for key components or services that contribute to activities prohibited under the Treaty on the Prohibition of Nuclear Weapons, including development, testing, production, manufacture, possession, stockpiling or use.

What this report does

This report profiles the companies most heavily involved in the nuclear weapon industry. It provides information about the contracts they have for producing key components for nuclear arsenals. This report also provides information on the financial actors financing the companies most heavily involved in the nuclear industry- the ones providing loans other corporate financial services. Lastly, it offers a snapshot of those who seek to profit from the companies which are complicit in the nuclear industry.

What it doesn't do

This report is not designed to draw a line between every rivet and the nuclear missiles they hold together. Rather, the report illustrates the key actors with contracts for nuclear weapon production, manufacture and development. This report does not offer any investment advice, but many may choose to use the identified list of corporate actors as a guide for their own responsible investing.



25 Nuclear weapon producing companies

The report includes information about known contracts for key components necessary to maintain the lethality of these nuclear weapons. Where available, information about contract duration and total estimated value is included. For some arsenals, the availability of this information is relatively straightforward, but not for all. For a company to be included in this list, it must be open to private investment and produce goods or services that specifically contribute to nuclear weapon development, testing, production, manufacture, possession, stockpiling or use. These activities are outlawed under the Treaty on the Prohibition of Nuclear Weapons.

Some nuclear bombs are dropped from airplanes (like the ones used on Hiroshima and Nagasaki or immortalised in the classic film *Dr. Strangelove*). However, most nuclear weapons in the arsenals of the nine countries that possess them are designed to be delivered by missiles launched from the ground, airplanes, or submarines. It is for this reason that this report includes companies involved in producing key components for not only the nuclear warheads but also the missiles designed specifically for nuclear weapon use. However, the contracts for airplanes (like the B52-Stratofortress) or submarines (like the UK's Vanguard class of ships), even though they might be dedicated to missions designed to use nuclear weapons companies producing them exclusively are excluded from the full profiles in this report. However, as some financial institutions are now excluding nuclear armed submarine producers from their investments, a summary profiles are included for reference purposes.

Nuclear armed countries have dedicated facilities to nuclear weapon production, manufacture, testing, stockpiling and development. In several situations, the management and operations of those facilities are outsourced to the private sector, and where information has been found, those companies are also included in this report.

There are always companies changing name or changing hands. This report includes updated information about those changes as well. In addition to noting in the main company profiles, there is also a section included describing the tangled web of joint ventures and consortiums.

The goal of this research is to provide information about the many actors involved in perpetuating nuclear weapons. These nuclear weapons associated companies are already appearing on the exclusion lists of numerous financial institutions as well as some indices. The hope is that this report provides further information for those who choose to avoid supporting the companies that support indefinite nuclear weapon retention.

Changes from previous reports

The list of companies in the nuclear weapon industry is comprehensive, but not exhaustive. Other companies may still be involved in the development, testing, production, manufacture and stockpiling of nuclear weapons systems. This report provides full profiles of 25 companies and includes a watchlist with additional information about others connected to the nuclear weapons enterprise.

No longer listed

AECOM

AECOM was part of the consortium that managed and operated a U.S. nuclear weapons laboratory. The Lawrence Livermore National Security, LLC comprises Bechtel National, University of California, BWX Technologies, and AECOM. Lawrence Livermore National Laboratory is responsible for the nuclear explosives package in nuclear weapons. The management and operation contract was originally awarded in May 2007 and was supposed to extend until September 2026 with a potential value of \$55 billion.⁶ However, in January 2020, Aecom completed the sale of its management services division to a new company called Amentum.⁷ The new company will take over activities, including contracts with the National Nuclear Security Administration throughout 2020. Livermore lab is responsible for the life extension of the W78/88-1 warhead (meant to be usable in both Air Force and Navy nuclear weapons systems) and the W80 (the Air Force Long-Range Standoff missile) among other activities to support the full U.S. arsenal.⁸ Amentum is not publicly traded.

BWX Technologies

BWX Technologies (“BWXT”), formerly known as Babcock & Wilcox Company, supplies nuclear components and fuel to the U.S. government and components and services for the commercial nuclear power industry.⁹ In the financial year ending 31 December 2020, BWXT reported revenues of \$ 2.1 billion.¹⁰ BWXT received a \$2.2 billion contract for naval nuclear fuel for the U.S. Navy, including for nuclear armed submarines.¹¹ BWXT was formerly involved in U.S. nuclear weapons infrastructure, and intends to bid on future management and operations contracts.¹² BWXT was formerly involved in Tritium production for the U.S. nuclear arsenal, however those contracts have expired.

Orbital ATK

As it was acquired by Northrop Grumman, all activities are now included in the Northrop Grumman profile.

Rockwell Collins

Rockwell Collins was included in the 2013 and 2014 reports, but then contracts concluded. However, new contracts have emerged. Also, Rockwell Collins was acquired by United Technologies Corporation, which subsequently merged with Raytheon Technologies. The Raytheon subsidiary is called Collins Aerospace Systems, and relevant contracts are now included in the Raytheon profile.

Serco

The United Kingdom has decided to nationalize its nuclear weapons facilities, taking back control from the AWE-ML consortium. The plan is to complete this activity in June 2021. That removes Serco from our list of nuclear weapon producers (unless new contracts emerge). However, the other members of the consortium-Jacob’s Engineering and Lockheed Martin are involved in other nuclear weapon associated contracts.¹³

New full profiles in this report

Bharat Dynamics Limited (India)

This company is included in this report due to new information found linking the company to the Indian arsenal.

China Aerospace Science and Technology (CASC) (China)

CASC appears to be preparing for non-state investment, and more information about its involvement in the Chinese arsenal has become available, which is why it is included in this report.

Constructions Industrielles de la Méditerranée (CNIM) (France)

This company is responsible for the missile compartments on French submarines designed to launch M51 nuclear missiles. It is also developing key components to allow non-explosive nuclear testing for the French arsenal. Additional information about the contract awards from the French government has been made available, which is why they are now included in this report.

Leidos (U.S.)

This company has been monitored for some time due to their role as a minority partner of Consolidated Nuclear Services LLC, involved in the management and operations of the Y-12 National Security Complex in Tennessee and the Pantex Plant in Texas. Additional information has become available about nuclear weapon production activities at these facilities, and that brings Leidos onto the producers list.

Rostec (Russia)

Rostec is seeking broader engagement with the wider financial market, including by taking steps like signing up to the UN Global Compact. It is seeking non-state financing and appears to be preparing for other forms of external investment. It is involved in the Russian nuclear arsenal.

Watchlist

This report includes a new feature- a watchlist. This full profiles in the report focus on the production of key components for nuclear weapons, but there are other companies involved in activities that are prohibited by the Treaty on the Prohibition of Nuclear Weapons (including building facilities to allow any stationing, installation, or deployment of nuclear weapons on national territory). There are also several companies that are not currently publicly traded, and while these fall outside the scope of the report, some information may be of interest.

The watchlist are companies for which we've identified clear ties to the nuclear weapons enterprise, but who act as subcontractors or for whom the specific details of their involvement are not available. For financial institutions and others seeking to implement comprehensive exclusions from any nuclear weapon associated company, the watchlist should, at a minimum, trigger additional due diligence.

The following profiles are not a comprehensive review of companies of this nature, rather they are an example of the types of companies also involved in the nuclear weapon industry.

Advanced Testing Technologies Inc

Advanced Testing Technologies Inc is a manufacturer based in New York, U.S.A. Since at least 2016 it's had contracts with the U.S. Government for Minuteman III Propulsion System Rocket Engine Test (MPTS) Maintenance Support. The contracts, including all their modifications are for approximately U.S. \$2.36 million. Contracts are for maintenance support as well as service and repair. Advanced Testing Technologies is not publicly traded; therefore a full profile is not included.

Amentum

Amentum is the U.S. government services company that spun off from AECOM. It is part of the team managing and operating the Lawrence Livermore National Lab¹⁴ and the Los Alamos National Lab for U.S. nuclear warhead production and maintenance.¹⁵ Amentum also has contracts to support missile testing for U.S. nuclear weapon programmes.¹⁶ The company is also involved in nuclear waste storage at several facilities in the U.S. and UK, as well as environmental remediation. Amentum is not publicly traded and is a privately held company where the equity firms American Securities and Lindsay Goldberg are equal partners.¹⁷

Atlantic CommTech Corp

Atlantic CommTech Corp was awarded a \$36 million (€32 million) contract by the U.S. Air Force in 2016 "to modernize the Weapon Storage and Security System (WS3)" at bases in Europe. The original contract award indicated work would take place at the bases in which the U.S. deploys nuclear weapons, notably: Aviano AB, Italy; Büchel AB, Germany; Ghedi AB, Italy; Incirlik AB, Turkey; Kleine Brogel AB, Belgium; and Volkel AB, Netherlands, however the description was later modified to remove facility names on the U.S. DOD website. This activity is meant to conclude by September 2022.¹⁸

Banda Group International

Banda Group was awarded a contract valued up to \$6.5 million in January 2019 for nuclear explosive safety by the U.S. Department of Energy. The contract description indicates that it includes efforts to maintain and enhance the safety, security, and reliability of the U.S. nuclear weapons stockpile.¹⁹ Banda Group's responsibilities have not been assessed to provide key components to facilitate nuclear weapon use, but rather to provide trainings and safety controls to ensure that nuclear weapons are not accidentally detonated.²⁰

Battelle Memorial Institute

Battelle is involved at both the Lawrence Livermore National Laboratory and the Los Alamos National Laboratory.²¹ Battelle accepts numerous contracts, but is established as a non-profit organisation. They are involved in a number of activities directly related to nuclear weapon modernisation and new warhead production, however as they are not externally or privately financed, they are out of the scope of this report.

Booz Allen Hamilton Holding Corp (United States)

Booz Allen Hamilton is a teaming subcontractor for the Consolidated Nuclear Security (CNS) Joint Venture, and involved in a contract for design and construction of a Uranium Processing Facility (UPF) at the Y-12 National Security Complex and an option for Savannah River Tritium Operations at the Savannah River Site in South Carolina.²² Most of the activities conducted by Booz Allen Hamilton Holding Corp, in regards to other contracts, appear to be not related to the production of key components for weapons. Therefore, a full profile is not included in this report.

Charles Stark Draper Laboratory (United States)

Charles Stark Draper Laboratory (“Draper”) is a U.S.-based non-profit research and development organization. It was founded as a teaching laboratory in the 1930s and since the 1950s, it has been involved in the intercontinental ballistic missiles (ICBM) development of the United States. Draper is a non-profit research and development organisation and not open to external investors, however, they are included here for their significant involvement in research and design for U.S. and UK Trident II (D5) missiles.²³

Draper has at least three outstanding contracts related to the Trident II (D5) nuclear armed missile. According to the U.S. Department of Defense “CSDL possesses the unique knowledge of the total Trident Guidance system including its design and use on the Trident II weapon system.”²⁴ There are several outstanding contracts between the U.S. and Charles Stark Draper Laboratory for Trident related components. These contracts are paid by both the U.S. and the UK governments and estimated total values of the contracts exceeds \$1 billion, and will include work through at least 2023.²⁵

China National Nuclear Corporation (China)

China National Nuclear Corporation (CNNC) provides key components for the Chinese nuclear arsenal. The China Council for the Promotion of International Trade (CCPIT) promotes CNNC as the *core of China’s nuclear deterrence*.” CNNC developed atomic and hydrogen weapons [...] CNNC is the main part of China’s nuclear science and technology advancement, the core of State nuclear deterrence and the major force of nuclear power development”.²⁶ CNNC is a state owned enterprise, and therefore does not have full profile.

Cray (United States)

Cray, Inc received a \$600 million contract to build an exascale high-performance supercomputer—El Capitan— by 2022. The system will be built to assess U.S. nuclear warheads viability and reliability without nuclear testing. The system will provide new and faster 3D simulation and modelling capabilities. It will also offer advanced computational tools for scientists and weapon designers to study the use of new materials and components.²⁷

HDT Global (United States)

HDT Expeditionary Systems, Inc, a subsidiary of HDT Global, was awarded a contract in May 2013 to contribute to the Minuteman III Transporter Erector

Replacement Programme. The contract is worth up to \$98.6 million and is meant to finish in July 2022.²⁸ While these products contribute to the overall missile arsenal maintenance and modernisation efforts, there is debate as to whether or not they are considered specially designed key components for the nuclear armed missiles.

Kratos Defense and Security Solutions (United States)

Kratos will provide vehicle transporters for the new Ground Based Strategic Deterrent for U.S. arsenal, though Northrop Grumman remains the prime contractor.²⁹ The subcontract value is unknown.

Merrick & Company (United States)

Merrick, along with Strategic Management Solutions, provides support for the Triad National Security joint venture at the Los Alamos National Laboratory.³⁰ Their work is primarily associated with large scale infrastructure, as they are primarily an engineering and architecture firm. They are listed here for information purposes as they are directly associated with the Los Alamos Nuclear Laboratory, responsible for U.S. nuclear weapon modernisation and stockpile retention, however the services they provide appear to be outside the scope of this report. In 2019, Merrick & Company opened an office to support activities at the Savannah River Site as well, yet the bulk of activities appear not to be specific to nuclear weapons.³¹

Minsk Automobile Plant (Russian Federation)

Minsk Automobile Plant is the only manufacturer of the mobile launchers for the Russian Topol-M intercontinental ballistic missile (ICBM). It is a state operated enterprise, which is why a full profile is not included in this report.

Moog, Inc. (United States)

Moog has an outstanding contract with the U.S. Department of Defence to replace the arm/disarm switches on the Minuteman III weapon system.³² Moog includes information on its website about producing electrohydraulic TVC systems for the Trident system, but no new contracts were identified, and this part is also usable in devices that are not specifically designed for nuclear weapons.³³ However, this part falls outside of the scope of this report, so a full profile is not included. Some financial institutions choose to exclude Moog Inc for this and for the legacy involvement in the Trident D5 system the company advertises on its website.³⁴

N3B Los Alamos (United States)

N3B is a limited liability company owned by HII Nuclear, as subsidiary of Huntington Ingalls Industries, and BWX Technologies, joined critical subcontractors Longenecker and Associates and Tech2 Solutions. It holds a contract to for environmental remediation services at the Los Alamos National Laboratory, a U.S. nuclear weapons lab.³⁵ While it is not a nuclear weapon producer, it is listed here to illustrate the complexity around some nuclear weapon associated contracts. This joint venture is involved in clean-up, but also involves companies engaged in production of key components.

Parsons (United States)

Parsons is part of the Northrop Grumman team working to design the next U.S. intercontinental ballistic missile- the Ground Based Strategic Deterrence. Parsons is involved in engineering, procurement, and construction. While it is part of the Northrop Grumman team working on this new nuclear weapon, it is not known whether this technology is specifically designed for the nuclear weapons.³⁶

Peraton (United States)

Peraton is involved in the maintenance and development of for the Trident II (D5) for the U.S. arsenal. In 2015, it was awarded a contract for up to \$ 78.3 million for system assessment and vulnerability testing on the Trident II (D5) missile system.³⁷ Peraton is a private company, not publicly traded, and is therefore not listed with a full profile.

SOC LLC (United States)

SOC provides Safeguards, Security, and Emergency Services for the Y-12 & Pantex sites in the U.S.³⁸ SOC LLC is a Day & Zimmerman company, providing a range of security services. As a security service provider, the company is outside the scope of this research.

Strategic Management Solutions (United States)

Strategic Management Solutions provides support for the Los Alamos National Laboratory management and operations contractor Triad National Security (a consortium).³⁹ The role played by this company is primarily one of project management. However, its involvement in the efforts to develop an integration approach with LANL's weapons certification and surety program, does warrant a note about their involvement in efforts to maintain the U.S. nuclear weapons stockpile, though not a full profile.⁴⁰

Systems Planning and Analysis Inc. (United States)

Systems Planning and Analysis Inc. (SPA) was awarded a contract for planning and support services related to the Trident II (D5) programme in 2016. The contract has a potential value of \$12.1 million and is expected to be completed by October 2021.⁴¹ However, Systems Planning and Analysis Inc. is a private company, putting it outside the scope of this report.⁴²

Tanner Research, Inc (United States)

Tanner Research was awarded a \$3 million contract for electronic arm/disarm switches for the Minuteman III system. Work should be completed at the end of September 2022.⁴³ These switches are not known to be specifically designed components.

Joint ventures

There are numerous joint ventures and consortiums operating across the global nuclear weapons industry. Each of these are named in the various producer profiles, but this section provides a listing showing their composite parts.

Joint Venture/ Consortium name	Companies involved	Contracted for
Ariane Group	Airbus, Safran	M51 (France)
Consolidated Nuclear Security (CNS)	Bechtel, Leidos, ATK Launch Systems (part of Northrop Grumman), SOC, Booz Allen Hamilton	NNSA Production Office (NPO) Pantex Plant and Y-12 National Security Complex
i2S2—Integrated ICBM Support Services LLC	Leidos, Amentum and Apex Systems	Support collaboration during the Minuteman III to GBSD transition ⁴⁴
Lawrence Livermore National Security partnership	Bechtel National, University of California, BWX Technologies, Amentum and teaming subcontractor Battelle Memorial Institute. ⁴⁵	Lawrence Livermore National Laboratory, including the life extension program of the B61 nuclear bomb ⁴⁶ and of the W80-1 nuclear warhead for air-launched cruise missiles ⁴⁷
MBDA	Airbus, BAE Systems and Leonardo	ASMPA (France) ASN4G (France)
National Technology and Engineering Solutions	Wholly owned subsidiary of Honeywell International.	Management and operations of Sandia National Laboratories (U.S.), involved in modernisation of at least the W88 Alt 37 warhead ⁴⁸ and the W76-1 warhead ⁴⁹ (both used for arming the submarine launched Trident II (D5) missiles), the new W80-4 warheads for the Long Range Standoff missiles ⁵⁰ , and the new B61-12 gravity bomb. ⁵¹
Roxel	MBDA Safran subsidiary Safran Ceramics	ASMPA (France)
Savannah River Nuclear Solutions (SRNS)	Fluor Honeywell International Newport News Nuclear (part of Huntington Ingalls Industries)	Tritium extraction, plutonium pit production (U.S.)
Triad National Security LLC	Battelle Memorial Institute, the Regents of the University of California and, the Regents of Texas A&M University	Los Alamos National Laboratory (U.S.), includes nuclear design and engineering of the B61, W76, W78, and W88 warheads. It also manages the life extension and alteration programs affecting the W76 warhead, the B61-12 bomb, and the W88 warhead ⁵²

Submarines

Submarines are outside the scope of this report. However, several of the companies involved in producing key components for nuclear arsenals are also involved in producing nuclear armed submarines.

Babcock International

Babcock International produces submarines for the UK. It has a £3.5 billion, 5-year contract with the UK Ministry of Defence for naval base operations including at the HMNB Clyde, where the UK nuclear armed submarines are stationed.⁵³ The group also announced contracts in 2016⁵⁴ for design and development work on the Trident nuclear submarine replacement programme. In June 2020, Babcock was subcontracted by General Dynamics for additional support for both the UK Dreadnought and the U.S. Columbia class submarines, designed to be armed with Trident nuclear weapons.⁵⁵

Naval Group

Naval Group is a prime contractor for the French Navy and is currently developing a third-generation nuclear armed submarine for France.⁵⁶ Naval group is also involved in the overhaul of the French nuclear armed submarines. This includes equipping the submarines with the M51 missiles. The first nuclear submarine to be equipped with the M51 was *Le Terrible* in 2010, followed by the other new-generation submarines, *Le Vigilant*, delivered in 2013, *Triomphant*, delivered in 2015, and most recently *Le Téméraire*.⁵⁷ Naval Group, formerly known as DCNS⁵⁸, works in conjunction with the French defence procurement agency (DGA) and the Fleet Support Service (SSF).⁵⁹ In June 2020, an M51 missile (without the nuclear warhead) was test launched from *Le Téméraire*.⁶⁰ Delivery platforms such as submarines fall outside the scope of this report.

Northrop Grumman

Northrop Grumman is also contracted to produce key components for the U.S. Columbia and UK Dreadnought class submarines. As Northrop is also producing several other nuclear weapon systems, a full profile is included below.

Rolls Royce

Rolls Royce is known to be involved in producing key components for the new Dreadnought submarines that comprise the UK nuclear weapons system. In 2019, the UK government awarded Rolls-Royce Submarines with a contract worth nearly £480 million for nuclear propulsion power plants. Rolls-Royce is also part of the Dreadnought Alliance, a joint management team between the SDA, BAE Systems and

Rolls-Royce.⁶¹ While these submarines are specifically designed for the UK nuclear arsenal, submarines remain outside the scope of this report.

TechnicAtome

TechnicAtome, along with Naval Group, are working on the early design phases of the new French nuclear ballistic missile submarine programme (SNLE 3G).⁶² While submarines fall outside the scope of this report, this note is included to provide a broad picture of the private sector involvement with nuclear arsenals. TechnicAtome is also involved in the Laser Megajoule programme, simulating French nuclear testing.⁶³

Walchandnagar Industries Limited

Walchandnagar has a full profile below, but is also involved in India's first indigenous nuclear powered ballistic missile submarine, the INS Arihant, and for the new SSBN the Arighat. Walchandnagar has been involved in the engineering, manufacture, and on-board installation of weapon systems for the Indian strategic naval weapons programme.⁶⁴

Nuclear weapon producer profiles

This section includes a company-by-company review.

For an overview per weapon system, see the Executive Summary.

Included in each section:

Company profile

Contact information

Nuclear Weapons

Investors table

1.	Aerojet Rocketdyne Holdings, Inc (United States)	37
2.	Airbus Group (The Netherlands)	41
3.	BAE Systems plc (United Kingdom)	45
4.	Bechtel (United States)	50
5.	Bharat Dynamics Limited (India)	52
6.	Boeing (United States)	53
7.	China Aerospace Science and Technology (CASC)	58
8.	Constructions Industrielles de la Méditerranée (CNIM) (France)	59
9.	Fluor (United States)	61
10.	General Dynamics (United States)	65
11.	Honeywell International (United States)	70
12.	Huntington Ingalls Industries (United States)	73
13.	Jacobs Engineering (United States)	78
14.	L3 Harris Technologies	81
15.	Larsen & Toubro (India)	85
16.	Leidos (United States)	87
17.	Leonardo (Italy)	91
18.	Lockheed Martin (United States)	94
19.	Northrop Grumman (United States)	98
20.	Raytheon Technologies Corporation (United States)	102
21.	Rostec (Russian Federation)	106
22.	Safran (France)	107
23.	Textron (United States)	111
24.	Thales (France)	115
25.	Walchandnagar Industries (India)	117

1. Aerojet Rocketdyne Holdings, Inc (United States)

Company profile

Aerojet Rocketdyne (AR) Holdings, Inc, formerly GenCorp, based in the U.S., is engaged in aerospace and military (through subsidiary Aerojet Rocketdyne) and real estate (Easton Real Estate).⁶⁵ As of 31 December 2020, the relevant subsidiary of Aerojet Rocketdyne- Aerospace and Defence- had \$6.7 billion in outstanding contracts. Aerojet Rocketdyne Holdings Inc is involved in design, development and production of land and sea-based nuclear ballistic missile systems for the U.S. and UK arsenals. In the financial year ending 31 December 2020, Aerojet Rocketdyne Holdings, Inc reported net sales of \$2,072.7 million, resulting in a net income of \$137.7 million.⁶⁶

In December 2020, Aerojet Rocketdyne entered into a merger agreement with Lockheed Martin. The merger is expected to be completed in the fourth quarter of 2021, making Aerojet Rocketdyne Holdings, Inc a wholly owned subsidiary of Lockheed Martin.⁶⁷ Until the merger is completed (or abandoned) there are limitations on what contracts or new business might be pursued.⁶⁸

Aerojet Rocketdyne Holdings, Inc is the name of the parent company, it also borrows money under the names Gencorp Inc and Aerojet.

Contact

Aerojet Rocketdyne Holdings Inc.

222 N. Pacific Coast Hwy, Suite 500

El Segundo, CA 90245

1-310-252-8100

Website: www.aerjetrocketdyne.com/

Facebook: www.facebook.com/AerojetRdyne

Instagram: https://www.instagram.com/Aerojet_Rocketdyne/

LinkedIn: <https://www.linkedin.com/company/aerojet-rocketdyne>

Twitter: www.twitter.com/AerojetRdyne

YouTube: www.youtube.com/user/AerojetRocketdyne

Nuclear weapons

Aerojet Rocketdyne builds solid boost propulsion systems used in the land and sea-based nuclear ballistic missile systems for the U.S. and UK arsenals. It has powered every U.S. intercontinental ballistic missile (ICBM) ever fielded, including Trident II D5 missiles and the Minuteman III.⁶⁹

Aerojet Rocketdyne will develop the large solid rocket motor and the post-boost propulsion system and will also be responsible for testing of post-boost system components for the new U.S. Ground Based Strategic Deterrent, the contract value has not been disclosed.⁷⁰ It has an additional 5-year contract to produce solid boost technology for next generation U.S. nuclear weapon systems, under a \$20 million contract awarded in 2018.⁷¹

Aerojet Rocketdyne is also involved in a billion-dollar strategic agreement with Raytheon for propulsion for a range of missiles, including further hypersonic missile developments.⁷²

Aerojet Rocketdyne is also contracted to manufacture the Post Boost Control System Gas Generator Units for the Trident II D5 program.⁷³

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Country	Bondholding	Loans	Shareholding	Grand Total
Alpine Associates Management	United States			\$64.6	\$64.6
Apollo Global Management	United States		\$50.0		\$50.0
AQR Capital Management	United States			\$23.7	\$23.7
ARP Americas	United States			\$57.8	\$57.8
Bank of America	United States		\$612.0	\$32.7	\$644.7
Bank of New York Mellon	United States		\$30.0	\$22.9	\$52.9
Beach Point Capital Management	United States		\$50.0		\$50.0
BlackRock	United States			\$526.8	\$526.8
Capital One Financial	United States		\$45.6		\$45.6
Cathay General Bancorp	United States		\$37.2		\$37.2
Charles Schwab	United States			\$26.5	\$26.5
Citizens Financial Group	United States		\$82.5		\$82.5
Deutsche Bank	Germany			\$21.2	\$21.2
Dimensional Fund Advisors	United States			\$81.4	\$81.4
Equitable Holdings	United States			\$19.7	\$19.7
Falcon Edge Capital	United States			\$26.1	\$26.1
Fidelity International	Bermuda			\$140.3	\$140.3
Fidelity Investments	United States			\$60.6	\$60.6
Fifth Third Bancorp	United States		\$82.5		\$82.5
Franklin Resources	United States			\$64.7	\$64.7
Gabelli Funds	United States			\$218.8	\$218.8
Gamco Investments	United States			\$30.1	\$30.1
Geode Capital Holdings	United States			\$54.0	\$54.0
Goldman Sachs	United States			\$35.7	\$35.7
Grantham Mayo Van Otterloo & Co	United States			\$66.3	\$66.3
Hudson Bay Capital Management	United States			\$34.5	\$34.5
JPMorgan Chase	United States		\$82.5		\$82.5
KeyCorp	United States		\$82.5		\$82.5
M&T Bank	United States		\$36.9		\$36.9
Magnetar Capital	United States			\$143.2	\$143.2
Millennium Management	United States			\$38.5	\$38.5
Mitsubishi UFJ Financial	Japan		\$82.5		\$82.5
Morgan Stanley	United States		\$36.9	\$45.9	\$82.8
New York Life Insurance	United States			\$21.5	\$21.5
NewSouth Capital Management	United States			\$64.3	\$64.3
Northern Trust	United States			\$36.6	\$36.6
Nuance Investments	United States			\$29.2	\$29.2
Opus Corporate Finance LLP	United Kingdom		\$37.2		\$37.2
P. Schoenfeld Asset Management	United States			\$56.4	\$56.4
Principal Financial Group	United States			\$24.0	\$24.0

Investor	Country	Bondholding	Loans	Shareholding	Grand Total
Regions Financial	United States		\$82.5		\$82.5
Reinhart Partners	United States			\$38.0	\$38.0
Royal Bank of Canada	Canada		\$82.5		\$82.5
SMBC Group	Japan		\$37.2		\$37.2
Spring Creek Capital	United States			\$44.4	\$44.4
State Street	United States			\$157.5	\$157.5
Steel Partners Holdings	United States			\$185.5	\$185.5
Thrivent Financial	United States	\$9.4			\$9.4
Truist Financial	United States		\$119.4		\$119.4
Two Sigma Investments	United States			\$52.0	\$52.0
US Bancorp	United States		\$82.5		\$82.5
Vanguard	United States			\$352.2	\$352.2
Water Island Capital	United States			\$28.8	\$28.8
Wells Fargo	United States		\$82.5		\$82.5
Westchester Capital Management	United States			\$31.9	\$31.9
Zions Bancorporation	United States		\$45.6		\$45.6
Grand Total		\$9.4	\$1,880.0	\$2,958.2	\$4,847.6

Table 1: Investments in Aerojet Rocketdyne Holdings, Inc

2. Airbus Group (The Netherlands)

Company profile

Airbus, headquartered in the Netherlands, is involved in the commercial aircraft, helicopter, defence, security and space sectors.⁷⁴ Airbus is the exclusive provider of ballistic missiles used in the French nuclear arsenal through its participation in ArianeGroup and MBDA.⁷⁵ ArianeGroup is a joint venture with the French company Safran and MBDA is a joint venture between BAE Systems (37.5%), Airbus (37.5%) and Leonardo (25%).⁷⁶ In the year ending 31 December 2020, Airbus Group generated revenues of € 49.9 billion.⁷⁷

Contact

Airbus Group SE

PO Box 32008

2303 DA Leiden

The Netherlands

Website: <https://www.airbus.com/>

Facebook: <https://www.facebook.com/airbus/>

Instagram: <https://www.instagram.com/weareairbus/>

LinkedIn: <https://www.linkedin.com/company/airbusgroup/>

Twitter: <https://twitter.com/AirbusDefence>

YouTube: <https://www.youtube.com/user/airbusds>

Nuclear weapons

MBDA France is the prime contractor for the ASMPA medium-range air-to ground nuclear armed missile, part of the French nuclear arsenal.⁷⁸

MBDA is also contracted by the French government for work related to development of the ASMPA-successor ASN4G, to be operational in 2035.⁷⁹

Airbus is the main contractor for the M51 submarine launched ballistic missiles, as part of ArianeGroup.⁸⁰

ArianeGroup states that its role in the M51 production “covers upstream research, design, development and production of the missiles, the land-based operating infrastructure and the command and control system on board the submarines. ArianeGroup is also responsible for the system support in service as well as end-of-life disposal”.⁸¹

Airbus is also contracted for the development of the third version of the ballistic missile, M51.3, to be completed around 2025.⁸²

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
ANZ	Australia		\$75.6			\$75.6
Banco Bilbao Vizcaya Argentaria (BBVA)	Spain		\$1,103.3		\$290.7	\$1,394.0
Bank of America	United States		\$481.8		\$68.1	\$549.9
Bank of China	China		\$406.2			\$406.2
Barclays	United Kingdom		\$404.6			\$404.6
BayernLB	Germany		\$253.5			\$253.5
BlackRock	United States			\$4,792.4		\$4,792.4
BNP Paribas	France		\$404.6		\$811.5	\$1,216.1
Capital Group	United States			\$8,239.2		\$8,239.2
Citigroup	United States		\$632.9			\$632.9
Commerzbank	Germany		\$1,036.9		\$118.1	\$1,155.0
Commonwealth Bank of Australia	Australia		\$75.6			\$75.6
Crédit Agricole	France		\$1,778.2	\$1,054.4	\$811.5	\$3,644.1
Crédit Mutuel CIC Group	France		\$559.6			\$559.6
Credit Suisse	Switzerland		\$253.5			\$253.5
Danske Bank	Denmark		\$75.6			\$75.6
DBS	Singapore		\$253.5			\$253.5
Deka Group	Germany			\$495.8		\$495.8
Deutsche Bank	Germany		\$1,266.4	\$452.1	\$70.9	\$1,789.4
Development Bank of Japan	Japan		\$300.0			\$300.0
DZ Bank	Germany		\$253.5			\$253.5
European Investment Bank	Luxembourg		\$1,668.0			\$1,668.0
Fidelity Investments	United States			\$884.9		\$884.9
Goldman Sachs	United States		\$481.8		\$68.1	\$549.9
Groupe BPCE	France		\$1,225.9		\$290.7	\$1,516.6
HSBC	United Kingdom		\$404.6		\$811.5	\$1,216.1
Industrial and Commercial Bank of China	China		\$253.5			\$253.5
ING Group	Netherlands		\$253.5			\$253.5
Invesco	United States			\$878.3		\$878.3
JPMorgan Chase	United States		\$326.8		\$811.5	\$1,138.3
KfW	Germany		\$253.5			\$253.5
Landesbank Baden-Württemberg (LBBW)	Germany		\$75.6			\$75.6
Landesbank Hessen-Thüringen	Germany		\$75.6			\$75.6

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Lloyds Banking Group	United Kingdom		\$795.9		\$70.9	\$866.8
Lone Star Funds	United States		\$163.2			\$163.2
MassMutual Financial	United States	\$59.8				\$59.8
Mitsubishi UFJ Financial	Japan		\$404.6			\$404.6
Mizuho Financial	Japan		\$1,266.4		\$219.8	\$1,486.3
Morgan Stanley	United States		\$952.2		\$189.0	\$1,141.2
NatWest	United Kingdom		\$1,489.4		\$257.1	\$1,746.5
New York Life Insurance	United States	\$63.1				\$63.1
Pacific Century Group	Hong Kong	\$719.4				\$719.4
Primecap Management	United States			\$1,071.1		\$1,071.1
Royal Bank of Canada	Canada		\$326.8		\$290.7	\$617.5
Santander	Spain		\$1,225.9		\$314.3	\$1,540.2
Skandinaviska Enskilda Banken	Sweden		\$253.5			\$253.5
SMBC Group	Japan		\$1,103.3		\$121.9	\$1,225.2
Sociedad Estatal de Participaciones Industriales	Spain			\$3,861.5		\$3,861.5
Société Générale	France		\$404.6	\$912.7	\$811.5	\$2,128.8
Standard Chartered	United Kingdom		\$75.6			\$75.6
T. Rowe Price	United States			\$748.2		\$748.2
TIAA	United States			\$466.9		\$466.9
Toronto-Dominion Bank	Canada		\$253.5			\$253.5
UBS	Switzerland		\$75.6			\$75.6
UniCredit	Italy		\$1,389.0		\$264.3	\$1,653.3
Vanguard	United States			\$1,687.1		\$1,687.1
Wellington Management	United States			\$888.4		\$888.4
Westpac	Australia		\$75.6			\$75.6
White Mountains Insurance	Bermuda	\$95.0				\$95.0
Grand Total		\$937.3	\$24,888.9	\$26,433.1	\$6,692.0	\$58,951.3

Table 2: Investments in Airbus Group

3. BAE Systems plc (United Kingdom)

Company profile

BAE Systems, based in the UK, is a defence company operating in the air, maritime, land and cyber domains.⁸³ BAE Systems produces key components for the French, UK and U.S. nuclear arsenals. BAE Systems is involved in the MBDA joint venture with Airbus and Leonardo.⁸⁴ In the financial year ending 31 December 2020, BAE Systems reported revenues of £ 19.3 billion, resulting in an operating profit of £ 1,930 million.⁸⁵

Contact

BAE Systems PLC Headquarters

PO Box 87 Aerospace Centre,

Farnborough GU14 6YU

United Kingdom

+44 (0) 1252 373232

baesystemsinfo@baesystems.com

Website: <https://www.baesystems.com/en/home>

Facebook: <https://www.facebook.com/BAESystemsplc>

Instagram: <https://www.instagram.com/baesystems/>

LinkedIn: <https://www.linkedin.com/company/bae-systems>

Twitter: <https://twitter.com/baesystemsplc>

YouTube: <https://www.youtube.com/BAESystemsplc>

Nuclear weapons

BAE Systems is involved in three nuclear weapon arsenals- those of France, the United Kingdom and the United States.

BAE Systems is part of the MBDA joint venture, and MBDA France is the prime contractor for the ASMPA medium-range air-to ground nuclear armed missile, part of the French nuclear arsenal.⁸⁶

MBDA is also contracted by the French government for work related to development of the ASMPA-successor ASN4G, to be operational in 2035.⁸⁷

BAE Systems is the prime contractor for the U.S. Minuteman III Intercontinental Ballistic Missile (ICBM) system engineering/technical assistance support, training, and development. The contract is valued at around \$1.1 billion and is expected to run through January 2022.⁸⁸

BAE is contracted by the U.S. government for its work on the U.S. and UK Trident II D5 strategic weapon systems under several contracts valued at up to \$72 million. BAE Systems provides supply support and information technology services for the Trident II (D5) Strategic Weapon System (SWS) Program and the SSGN Attack Weapon System (AWS) Program.⁸⁹ In 2020, BAE received more than \$70 million in contract modifications for Trident work.⁹⁰

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Aegon	Netherlands			\$98.9		\$98.9
Affiliated Managers Group	United States			\$1,213.0		\$1,213.0
Allstate	United States	\$90.7				\$90.7
American Century Investments	United States			\$123.8		\$123.8
Ameriprise Financial	United States	\$34.0		\$439.0		\$473.0
ANZ	Australia		\$90.5			\$90.5
Artisan Partners	United States			\$330.1		\$330.1
Aviva	United Kingdom	\$41.9		\$126.7		\$168.6
AXA	France			\$1,066.5		\$1,066.5
Baird	United States	\$27.7				\$27.7
Bank of America	United States		\$475.5		\$285.7	\$761.2
Bank of New York Mellon	United States			\$451.0		\$451.0
Barclays	United Kingdom		\$475.5	\$848.9	\$285.7	\$1,610.1
Black Creek Investment Management	Canada			\$97.8		\$97.8
BlackRock	United States			\$3,039.4		\$3,039.4
BNP Paribas	France		\$90.5		\$285.7	\$376.2
Capital Group	United States			\$1,461.8		\$1,461.8
Citigroup	United States		\$1,147.7		\$285.7	\$1,433.4
Commerzbank	Germany		\$90.5		\$216.7	\$307.2
Crédit Agricole	France		\$90.5			\$90.5
Crédit Mutuel CIC Group	France		\$90.5			\$90.5
Deutsche Bank	Germany		\$90.5		\$216.7	\$307.2
Equitable Holdings	United States	\$27.0				\$27.0
First Abu Dhabi Bank	United Arab Emirates		\$901.3			\$901.3
Franklin Resources	United States	\$29.8		\$1,293.7		\$1,323.5
Geode Capital Holdings	United States			\$97.5		\$97.5
Goldman Sachs	United States		\$90.5		\$216.7	\$307.2
Guggenheim Capital	United States	\$123.0				\$123.0
Hengistbury Investment Partners	United Kingdom			\$158.9		\$158.9
Invesco	United States			\$1,066.7		\$1,066.7
JPMorgan Chase	United States		\$90.5			\$90.5
Jupiter Fund Management	United Kingdom			\$180.9		\$180.9
Legal & General	United Kingdom			\$387.4		\$387.4
Lloyds Banking Group	United Kingdom		\$90.5		\$216.7	\$307.2
LSV Asset Management	United States			\$150.6		\$150.6
M&G	United Kingdom			\$188.5		\$188.5
Macquarie Group	Australia	\$115.3				\$115.3

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Majedie Asset Management	United Kingdom			\$233.7		\$233.7
Manulife Financial	Canada	\$28.2				\$28.2
Marathon Asset Management (UK)	United Kingdom			\$93.8		\$93.8
MetLife	United States	\$30.4				\$30.4
Mitsubishi UFJ Financial	Japan		\$1,171.5			\$1,171.5
Mizuho Financial	Japan		\$90.5			\$90.5
Morgan Stanley	United States		\$90.5		\$216.7	\$307.2
NatWest	United Kingdom		\$90.5		\$216.7	\$307.2
Northern Trust	United States		\$810.8			\$810.8
Northwestern Mutual	United States	\$32.4				\$32.4
Royal Bank of Canada	Canada		\$475.5		\$285.7	\$761.2
Royal London Group	United Kingdom			\$98.6		\$98.6
Schroders	United Kingdom			\$125.3		\$125.3
Silchester International Investors	United Kingdom			\$642.0		\$642.0
Skandinaviska Enskilda Banken	Sweden		\$90.5			\$90.5
SMBC Group	Japan		\$90.5			\$90.5
Société Générale	France		\$90.5		\$285.7	\$376.2
Standard Life Aberdeen	United Kingdom			\$297.0		\$297.0
State Farm	United States	\$86.5				\$86.5
State Street	United States			\$307.5		\$307.5
TIAA	United States	\$105.8				\$105.8
Toronto-Dominion Bank	Canada		\$90.5	\$94.6		\$185.1
Trinity Street Asset Management	United Kingdom			\$89.7		\$89.7
Unum Group	United States	\$30.0				\$30.0
Vanguard	United States			\$747.1		\$747.1
Wellington Management	United States	\$29.8		\$94.3		\$124.2
Wells Fargo	United States		\$475.5		\$285.7	\$761.2
White Mountains Insurance	Bermuda	\$88.2				\$88.2
Grand Total		\$920.9	\$7,381.4	\$15,644.6	\$3,300.0	\$27,246.9

Table 3: Investments in BAE Systems

4. Bechtel (United States)

Company profile

Bechtel Group operates as an engineering, construction and project management company.⁹¹ Bechtel manages and operates the Lawrence Livermore National Laboratory (with Battelle and Texas A&M University), the primary mission of which is supporting the U.S. nuclear weapons capabilities.⁹² In the financial year 2020, Bechtel Group reported revenues of \$17.6 billion.⁹³

Contact

12011 Sunset Hills Road

Reston, VA 20190-5918

U.S.A

Tel: +1 571 392 6300

Website: <https://www.bechtel.com/>

Facebook: <https://www.facebook.com/bechtelcorp/>

GooglePlus: <https://plus.google.com/+bechtel>

LinkedIn: <https://www.linkedin.com/company/bechtel-corporation>

Twitter: <https://twitter.com/bechtel>

YouTube: <https://www.youtube.com/user/BechtelCorporation>

Nuclear weapons

Bechtel is contracted to provide launch system design, construction, and integration during the next development phase for the new U.S. Ground-Based Strategic Deterrent (ICBM).⁹⁴

Bechtel is part of the Lawrence Livermore National Security, LLC consortium, which has the management and operation contract for the lab. The contract was originally awarded in May 2007, and currently extends until at least September 2026 with a potential value of over \$58.8 billion.⁹⁵

Bechtel is also part of Consolidated Nuclear Security, LLC which is managing the Pantex Plant and the Y-12 National Security Complex under a single contract.⁹⁶ CNS was awarded the initial contract in July 2014.⁹⁷ Several modifications later, the contract is now extended until September 2024 with a potential value of more than \$30.7 billion.⁹⁸ CNS is “fully responsible for high-hazard enriched uranium, special nuclear material (SNM), high-explosive and nuclear weapon assembly/disassembly functions”.⁹⁹

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Country	Loans	Grand Total
ANZ	Australia	\$225.0	\$225.0
Bank of America	United States	\$469.0	\$469.0
BNP Paribas	France	\$554.9	\$554.9
CIBC	Canada	\$225.0	\$225.0
Citigroup	United States	\$469.0	\$469.0
Crédit Agricole	France	\$294.0	\$294.0
Crédit Mutuel CIC Group	France	\$225.0	\$225.0
HSBC	United Kingdom	\$225.0	\$225.0
JPMorgan Chase	United States	\$225.0	\$225.0
Mitsubishi UFJ Financial	Japan	\$294.0	\$294.0
SMBC Group	Japan	\$294.0	\$294.0
Grand Total		\$3,500.0	\$3,500.0

Table 4: Investments in Bechtel

5. Bharat Dynamics Limited (India)

Company Profile

Bharat Dynamics Limited (BDL) is “a public sector undertaking of the Government of India under the Ministry of Defense.¹⁰⁰ However, it is traded NSE (India) stock exchange.¹⁰¹ Bharat Dynamic Limited produces missiles designed to deliver Indian nuclear warheads. In the financial year ending 31 March 2021, BDL generated revenues of Rp 19.13 billion.¹⁰²

Contact

Bharat Dynamics Limited,

Corporate office, Plot No. 38-39,

TSFC Building (Near ICICI Towers), Financial District, Gachibowli, Hyderabad,

Telangana(State) - 500032.

bdbdl@bdl-india.in

Website: <http://www.bdl-india.in/>

Facebook: <https://www.facebook.com/Bharat-Dynamics-Limited-136105196949368/>

Twitter: <https://twitter.com/VUBhaskarCMDbdI>

Nuclear Weapons

BDL is the prime production agency for the Indian Integrated Guided Missile Development Programme. It is involved in several new missile production programmes, including the Prithvi and Agni systems, as well as providing support for life extension programmes.¹⁰³ BDL is building new warhead production facilities to reduce the need for imported components for missile production.¹⁰⁴

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Country	Underwriting	Grand Total
Elara Capital	United Kingdom	\$41.2	\$41.2
IDBI Bank	India	\$41.2	\$41.2
Yes Bank	India	\$41.2	\$41.2
Grand Total		\$123.5	\$123.5

Table 5: Investments in Bharat Dynamics Limited

6. Boeing (United States)

Company profile

Boeing is a manufacturer of commercial and military aircraft, satellites, weapons, electronic and defence systems, launch systems, advanced information and communication systems, and performance-based logistics and training.¹⁰⁵ Boeing is involved in the production of Minuteman III and Trident II (D5) missiles as well as B61-12 gravity bombs. Boeing also has contracts related to the Long-Range Standoff missiles for the U.S. In the financial year ending 31 December 2020, Boeing reported \$58.1 billion in revenues.¹⁰⁶

Contact

Boeing Corporate Offices

100 North Riverside

Chicago, Illinois 60606

+1.312.544.2000

Website: <http://www.boeing.com/>

Facebook: <https://www.facebook.com/boeing>

Instagram: <http://instagram.com/boeing>

LinkedIn: <https://www.linkedin.com/company/boeing>

Twitter: <http://www.twitter.com/Boeing>

YouTube: <http://www.youtube.com/user/Boeing>

Nuclear weapons

Boeing is remanufacturing the warhead arming device for the Air Launched Cruise Missiles of the U.S. arsenal, under contracts extending until at least October 2022 and worth over \$42.8 million.¹⁰⁷

Boeing holds the contract for the guided tail-kit of the B61-12 upgrade. The contract is valued around Boeing has received several contracts related to this weapon modernisation since at least 2014. Currently, the face value of the contract is more than \$155.2 million, and work is expected to be completed by December 2023.¹⁰⁸

Boeing has a \$250 million contract for the Long-Range Standoff weapon system. The contract includes aircraft and missile carriage equipment development and modification, engineering, testing, software development, training, facilities, and support necessary to fully integrate the Long Range Stand-Off Cruise Missile on the B-52H bomber platform, and work is expected to be completed by December 2024.¹⁰⁹

Since 1958, Boeing has been responsible for the development and production of the U.S. Minuteman Intercontinental Ballistic Missiles (ICBM) systems.¹¹⁰ Boeing is contracted to provide engineering and other services for the Minuteman III under a \$757 million contract through 2024.¹¹¹

Boeing holds several contracts for maintenance, repair, and rebuilding as well as technical services in support of the navigation subsystem for the Trident II (D5) missile system.¹¹²

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Abu Dhabi Investment Council	United Arab Emirates		\$50.0			\$50.0
Academy Securities	United States				\$248.5	\$248.5
ANZ	Australia		\$318.3		\$410.2	\$728.5
Apto Partners	United States				\$63.6	\$63.6
Arab Banking Corporation (Bank ABC)	Bahrain		\$118.3			\$118.3
Banco Bilbao Vizcaya Argentaria (BBVA)	Spain		\$970.8		\$1,194.8	\$2,165.6
Bancroft Capital (PA)	United States				\$13.0	\$13.0
Bancroft Group (VI)	United Kingdom				\$20.3	\$20.3
Bancroft Holding (MA)	United States				\$11.1	\$11.1
Bank of America	United States		\$2,805.1	\$717.7	\$4,256.2	\$7,779.0
Bank of China	China		\$308.5			\$308.5
Bank of New York Mellon	United States		\$118.3			\$118.3
Barclays	United Kingdom		\$572.2		\$739.4	\$1,311.6
BayernLB	Germany		\$158.5			\$158.5
BlackRock	United States			\$6,049.7		\$6,049.7
Blaylock Beal Van	United States				\$61.3	\$61.3
BMO Financial Group	Canada				\$300.0	\$300.0
BNP Paribas	France		\$1,636.0		\$2,421.1	\$4,057.1
Cabrera Capital	United States				\$70.2	\$70.2
Canara Bank	India		\$10.0			\$10.0
Capital Group	United States			\$1,578.4		\$1,578.4
CastleOak Securities	United States				\$57.6	\$57.6
Charles Schwab	United States			\$705.6		\$705.6
Citigroup	United States		\$7,100.7		\$4,315.2	\$11,415.9
CL King & Associates	United States				\$66.0	\$66.0
Commerzbank	Germany		\$1,136.9		\$1,438.3	\$2,575.2
Crédit Agricole	France		\$1,043.6		\$1,479.4	\$2,523.1
Credit Suisse	Switzerland		\$378.7		\$981.3	\$1,360.0
DBS	Singapore		\$790.9			\$790.9
Deutsche Bank	Germany		\$1,836.0		\$2,474.5	\$4,310.5
Drexel Hamilton	United States				\$57.6	\$57.6
Fidelity Investments	United States			\$2,638.9		\$2,638.9
First Abu Dhabi Bank	United Arab Emirates		\$241.8			\$241.8
Geode Capital Holdings	United States			\$2,034.8		\$2,034.8
Goldman Sachs	United States		\$867.6		\$3,004.5	\$3,872.0
Great Pacific Securities	United States				\$62.2	\$62.2
Groupe BPCE	France			\$2,967.9		\$2,967.9

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Guzman & Co	United States				\$66.0	\$66.0
ICICI Bank	India		\$327.8			\$327.8
IFS Group	United States				\$19.0	\$19.0
Industrial and Commercial Bank of China	China		\$308.5		\$345.8	\$654.3
Intesa Sanpaolo	Italy		\$198.3		\$252.2	\$450.5
JPMorgan Chase	United States		\$3,988.2		\$4,555.5	\$8,543.7
Lloyds Banking Group	United Kingdom		\$358.5		\$423.0	\$781.5
Loop Capital	United States				\$248.5	\$248.5
MBS	United States				\$57.9	\$57.9
MFR	United States				\$63.6	\$63.6
Mischler Financial Group	United States				\$48.1	\$48.1
Mitsubishi UFJ Financial	Japan		\$1,237.2		\$1,447.5	\$2,684.8
Mizuho Financial	Japan		\$1,906.3		\$2,563.1	\$4,469.4
Morgan Stanley	United States		\$1,038.6	\$1,072.6	\$2,986.1	\$5,097.3
Newport Group	United States			\$11,753.9		\$11,753.9
Northern Trust	United States		\$288.4	\$947.4		\$1,235.8
Penserra Capital Management	United States				\$90.6	\$90.6
PNC Financial Services	United States				\$230.2	\$230.2
R. Seelaus & Co	United States				\$73.0	\$73.0
Riyad Bank	Saudi Arabia		\$550.4			\$550.4
Royal Bank of Canada	Canada		\$1,636.0		\$2,552.3	\$4,188.3
Santander	Spain		\$954.3		\$1,254.8	\$2,209.1
SAR Holdings	United States				\$54.1	\$54.1
Shank Williams Cisneros & Co	United States				\$116.3	\$116.3
SMBC Group	Japan		\$1,836.0		\$2,453.9	\$4,289.9
Société Générale	France		\$990.9	\$961.9	\$1,276.9	\$3,229.6
Standard Chartered	United Kingdom		\$318.3		\$410.2	\$728.5
State Bank of India	India		\$318.3			\$318.3
State Street	United States		\$241.6	\$6,855.4		\$7,097.0
Stern Brothers & Co	United States				\$63.6	\$63.6
T. Rowe Price	United States			\$1,127.3		\$1,127.3
Telsey Advisory Group	United States				\$90.6	\$90.6
TIAA	United States			\$702.4		\$702.4
Tribal Capital Markets	United States				\$56.1	\$56.1
Truist Financial	United States		\$150.0		\$404.1	\$554.1
UBS	Switzerland		\$30.2	\$734.7		\$764.9
US Bancorp	United States		\$445.3		\$406.1	\$851.4
Vanguard	United States	\$388.1		\$10,805.5		\$11,193.6
Wells Fargo	United States		\$2,305.1		\$4,307.2	\$6,612.3
Westpac	Australia		\$632.1		\$410.2	\$1,042.3
Williams Capital Group	United States				\$52.4	\$52.4
Grand Total		\$388.1	\$40,522.7	\$51,653.9	\$51,125.0	\$143,689.8

Table 6: Investments in Boeing

7. China Aerospace Science and Technology (CASC)

Company profile

CASC is part of the China's space industry and defence sector. CASC has 8 large R&D and production complexes, 11 specialized companies, 13 listed companies and a number of directly affiliated units. It is engaged in space products and strategic and tactical missile systems. CASC is the only broadcast and communications satellite operator in China.¹¹³ CASC generated \$36.2 billion in revenue in 2020.¹¹⁴

Contact

16 Fucheng Road,
Haidian District,
Beijing 100048,
PRC

Website: <http://english.spacechina.com/n16421/index.html>

E-mail: casc@spacechina.com

Nuclear Weapons

China is developing new types of intermediate and long-range ballistic missiles for its nuclear arsenal, notably building the DF-26.¹¹⁵ CASC states that it is the only manufacturer of intercontinental strategic nuclear missiles in China.¹¹⁶

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Investor Country	Underwriting	Grand Total
China Merchants Group	China	\$745.9	\$745.9
CSC Financial	China	\$157.1	\$157.1
Donghai Securities	China	\$103.9	\$103.9
First Capital Securities	China	\$51.1	\$51.1
Hankou Bank	China	\$103.9	\$103.9
Hubei Bank	China	\$103.9	\$103.9
Shenwan Hongyuan Group	China	\$103.9	\$103.9
Grand Total		\$1,369.9	\$1,369.9

Table 7 Investments in CASC

8. Constructions Industrielles de la Méditerranée (CNIM) (France)

Company Profile

(CNIM) is a French equipment manufacturer and industrial contractor. It supplies products and services to major public and private sector organizations, local authorities and national governments in the Environment, Energy, military, and high technology markets.¹¹⁷ CNIM produces key components for the submarine launched nuclear missiles in the French arsenal.¹¹⁸ In the financial year ending 31 December 2020, CNIM reported revenues of € 632.9 million.¹¹⁹

Contact

Head Office and General Management

35, rue de Bassano 75008 Paris, France

Tel: +33(0)1 44 31 11 00

E-mail: contact@cnim.com

Website : <https://cnim.com/en/group>

LinkedIn : <https://fr.linkedin.com/company/cnim>

Twitter: https://twitter.com/cnim_group

YouTube: <https://www.youtube.com/GroupeCNIM>

Nuclear Weapons

CNIM states that it is “a leading player in France’s nuclear deterrent programs since 1961.” CNIM is the sole supplier of missile launch systems for nuclear submarines and does the M51 missile integration.¹²⁰ CNIM has also been involved in large-scale experiments of the Laser Mégajoule, designed as a substitute for full-scale nuclear testing.¹²¹

Testing nuclear weapons

In 1996 France ended full scale explosive nuclear testing and instead “launched the Laser Mégajoule project (LMJ) to extend the life of its nuclear deterrent by simulating explosions of nuclear weapons”.¹²² The nuclear test simulations are managed by CEA/DAM (Military Applications Directorate of France’s Atomic and Alternative Energy Authority).¹²³ CNIM states that it has been involved since 1999 with the manufacture of high-precision mechanical and optical devices for the LMJ.¹²⁴ The Laser Mégajoule is designed to “validate theoretical models of nuclear weapon detonations, and therefore plays an important role in France’s nuclear simulation program.”¹²⁵

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Country	Loans	Shareholding	Grand Total
BNP Paribas	France	\$10.7		\$10.7
Commerzbank	Germany	\$10.7		\$10.7
Crédit Agricole	France	\$72.5		\$72.5
Groupe BPCE	France	\$21.5		\$21.5
HSBC	United Kingdom	\$10.7		\$10.7
Quaero Capital	Switzerland		\$0.7	\$0.7
Société Générale	France	\$21.5		\$21.5
Grand Total		\$147.7	\$0.7	\$148.5

Table 8: Investments in Constructions Industrielles de la Méditerranée (CNIM)

9. Fluor (United States)

Company profile

Fluor, based in the U.S., provides complex engineering, procurement, construction, and maintenance projects for commercial and government clients.¹²⁶ Fluor provides support to the U.S. Department of Energy and National Nuclear Security Administration that includes management, mission operations, environmental remediation, decommissioning, engineering and construction services at legacy and operational nuclear sites. In the year ending December 2020, Fluor reported \$15.6 billion in revenue.¹²⁷

Contact

Fluor Corporation

6700 Las Colinas Blvd Irving, TX 75039 U.S.A.

Tel: +1.469.398.7000

Fax: +1.469.398.7255

Website: <https://www.fluor.com/>

Facebook: <https://www.facebook.com/FluorCorp/>

LinkedIn: <https://www.linkedin.com/company/fluor>

Twitter: <https://twitter.com/fluorcorp>

YouTube: <https://www.youtube.com/user/FluorCorporation>

Nuclear weapons

Fluor is the lead partner in Savannah River Nuclear Solutions (SRNS), a joint venture with Honeywell and Newport News Nuclear (part of Huntington Ingalls).¹²⁸ Since 2008, SRNS remains responsible for the management and operation of the Department of Energy's Savannah River Site and Savannah River National Laboratory which produces nuclear components for nuclear weapons.¹²⁹ The contract¹³⁰ has a potential value of \$16.8 billion and is expected to run through at least September 2022.¹³¹

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Country	Bondholding	Loans	Shareholding	Grand Total
American National Insurance	United States	\$14.3			\$14.3
ANZ	Australia		\$70.0		\$70.0
Auto-Owners Insurance	United States	\$14.6			\$14.6
Bank of America	United States		\$1,383.8		\$1,383.8
Bank of New York Mellon	United States			\$110.7	\$110.7
Barclays	United Kingdom		\$145.0		\$145.0
BlackRock	United States			\$356.7	\$356.7
BMO Financial Group	Canada		\$100.0		\$100.0
BNP Paribas	France		\$1,383.8		\$1,383.8
Boston Private	United States			\$68.0	\$68.0
Brandywine Global Investment Management	United States			\$58.7	\$58.7
Charles Schwab	United States			\$34.9	\$34.9
Cincinnati Financial	United States	\$15.0			\$15.0
Citigroup	United States		\$800.5		\$800.5
Comerica	United States		\$50.0		\$50.0

Investor	Country	Bondholding	Loans	Shareholding	Grand Total
Crédit Agricole	France		\$185.0		\$185.0
D.E. Shaw & Co.	United States			\$42.5	\$42.5
Dimensional Fund Advisors	United States			\$30.2	\$30.2
Eaton Vance	United States			\$59.9	\$59.9
Fidelity Investments	United States			\$136.1	\$136.1
Geode Capital Holdings	United States			\$49.9	\$49.9
Goldman Sachs	United States		\$150.0		\$150.0
Hotchkis & Wiley Capital Management	United States			\$197.4	\$197.4
HSBC	United Kingdom		\$145.0		\$145.0
Impala Asset Management	United States			\$35.7	\$35.7
ING Group	Netherlands		\$476.7		\$476.7
Intesa Sanpaolo	Italy		\$100.0		\$100.0
Lazard	Bermuda			\$47.5	\$47.5
Lloyds Banking Group	United Kingdom		\$185.0		\$185.0
Loews Corporation	United States	\$14.5			\$14.5
Lord, Abbett & Co	United States	\$40.5			\$40.5
Mitsubishi UFJ Financial	Japan		\$1,283.8		\$1,283.8
Mizuho Financial	Japan		\$70.0		\$70.0
Morgan Stanley	United States			\$29.6	\$29.6
National Western Life Group	United States	\$30.0			\$30.0
Neuberger Berman	United States			\$18.9	\$18.9
Nierenberg Investment Management	United States			\$19.9	\$19.9
Northern Trust	United States			\$41.9	\$41.9
OneAmerica Asset Management	United States	\$14.0			\$14.0
PenderFund Capital Management	Canada	\$13.3			\$13.3
Regions Financial	United States		\$441.7		\$441.7
Renaissance Technologies	United States			\$18.1	\$18.1
Royal Bank of Canada	Canada			\$13.5	\$13.5
Santander	Spain		\$145.0		\$145.0
Scotiabank	Canada		\$185.0		\$185.0
SMBC Group	Japan		\$310.0		\$310.0
Standard Chartered	United Kingdom		\$285.0		\$285.0
State Farm	United States	\$55.7			\$55.7
State Street	United States			\$99.5	\$99.5
TIAA	United States			\$15.2	\$15.2
Towle & Co	United States			\$48.2	\$48.2
Tredje AP-Fonden (AP-3)	Sweden			\$13.9	\$13.9
Two Sigma Investments	United States			\$57.7	\$57.7
US Bancorp	United States		\$245.0		\$245.0
Van Eck Global	United States	\$13.0			\$13.0
Vanguard	United States			\$291.6	\$291.6
Victory Capital	United States			\$23.6	\$23.6
Wellington Management	United States			\$53.5	\$53.5

Investor	Country	Bondholding	Loans	Shareholding	Grand Total
Wells Fargo	United States		\$410.0		\$410.0
Westpac	Australia		\$100.0		\$100.0
Grand Total		\$224.9	\$8,650.0	\$1,973.3	\$10,848.2

Table 9: Investments in Fluor

10. General Dynamics (United States)

Company profile

General Dynamics is a global aerospace and military company. It produces business jets, combat vehicles, command and control systems and nuclear submarines.¹³² General Dynamics is involved in producing components for the U.S. and UK Trident II (D5) nuclear armed submarine launched ballistic missiles. In the financial year ending 31 December 2020, General Dynamics reported revenues of \$ 37.9 billion.¹³³

Contact

General Dynamics

11011 Sunset Hills Road

Reston, Virginia 20190

+1.703.876.3000

Website: <http://www.gd.com/>

LinkedIn: <https://www.linkedin.com/company/general-dynamics/>

Twitter: <https://twitter.com/generaldynamics>

Nuclear weapons

General Dynamics is responsible for integrating Trident nuclear weapons in the new U.S. Columbia-class program and the United Kingdom Dreadnought-class submarines. General Dynamics receives contracts through the U.S. contract system, but sometimes for work only on UK weapons. An example of this is a \$64.8 million five-year contract awarded in August 2019 for work on the UK Dreadnought-class nuclear armed submarine system.¹³⁴

General Dynamics is also building the new nuclear armed submarines (Columbia class) for the U.S. navy, under a \$16 billion, 14-year contract through 2031.¹³⁵

General Dynamics subsidiary General Dynamics Mission Systems has a \$303.6 million contract for U.S. and United Kingdom Trident II (D-5) Fleet Ballistic Missile Submarines Fire Control System and other support through December 2024.¹³⁶

General Dynamics is part of the Northrop Grumman Ground Based Strategic Deterrent (GBSD) team, working on command-and-control systems for the new nuclear missiles.¹³⁷

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Academy Securities	United States				\$40.0	\$40.0
ANZ	Australia		\$21.8			\$21.8
Apple Financial Holdings	United States		\$100.4			\$100.4
Aristotle Capital Management	United States			\$753.0		\$753.0

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Banco Bilbao Vizcaya Argentaria (BBVA)	Spain		\$1,288.2		\$400.0	\$1,688.2
Banco de Sabadell	Spain		\$33.3			\$33.3
Bank of America	United States		\$3,407.3	\$950.9	\$640.0	\$4,998.1
Bank of East Asia	China		\$59.1			\$59.1
Bank of New York Mellon	United States		\$228.5	\$290.9		\$519.4
Bank of Philippine Islands	Philippines		\$33.3			\$33.3
Barclays	United Kingdom		\$33.3			\$33.3
BlackRock	United States			\$1,929.1		\$1,929.1
Blaylock Beal Van	United States				\$20.0	\$20.0
Caisse de dépôt et placement du Québec	Canada			\$686.9		\$686.9
Caixa Geral de Depósitos	Portugal		\$33.3			\$33.3
Capital Group	United States			\$1,976.2		\$1,976.2
Capital One Financial	United States		\$251.8			\$251.8
Cathay General Bancorp	United States		\$8.1			\$8.1
Chang Hwa Commercial Bank	Taiwan		\$20.1			\$20.1
Citigroup	United States		\$183.5			\$183.5
Citizens Financial Group	United States		\$106.9			\$106.9
Crédit Mutuel CIC Group	France		\$199.6			\$199.6
CTBC Financial Holding	Taiwan		\$33.3			\$33.3
Drexel Hamilton	United States				\$20.0	\$20.0
E.SUN Financial	Taiwan		\$33.3			\$33.3
Empresas Juan Yarur	Chile		\$19.7			\$19.7
Fidelity Investments	United States			\$710.3		\$710.3
Fifth Third Bancorp	United States		\$278.7			\$278.7
First Abu Dhabi Bank	United Arab Emirates		\$21.8			\$21.8
First Financial Holding	Taiwan		\$32.1			\$32.1
First Trust Advisors	United States			\$272.1		\$272.1
FirstMerit	United States		\$33.3			\$33.3
Franklin Resources	United States			\$358.9		\$358.9
Fuyo General Lease	Japan		\$190.0			\$190.0
Geode Capital Holdings	United States			\$639.7		\$639.7
Goldman Sachs	United States		\$183.5			\$183.5
Government Pension Fund Global	Norway			\$388.0		\$388.0
Groupe BPCE	France			\$653.3		\$653.3
Hua Nan Financial	Taiwan		\$46.2			\$46.2
Iberia Bank	United States		\$20.1			\$20.1
Invesco	United States			\$618.1		\$618.1
Janus Henderson	United Kingdom			\$371.6		\$371.6
JPMorgan Chase	United States		\$1,689.1	\$965.7	\$560.0	\$3,214.9

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Lloyds Banking Group	United Kingdom		\$590.8		\$240.0	\$830.8
Mega Financial	Taiwan		\$60.2			\$60.2
Mitsubishi UFJ Financial	Japan		\$1,090.8		\$240.0	\$1,330.8
Mizuho Financial	Japan		\$1,520.3		\$360.0	\$1,880.3
NatWest	United Kingdom		\$21.8			\$21.8
Newport Group	United States			\$3,378.7		\$3,378.7
Norges Bank	Norway			\$398.8		\$398.8
Northern Trust	United States		\$387.3	\$297.3		\$684.6
Northwestern Mutual	United States	\$75.0				\$75.0
Orix Corporation	Japan			\$479.7		\$479.7
People's United Financial	United States		\$73.5			\$73.5
Perpetual	Australia			\$541.8		\$541.8
PNC Financial Services	United States		\$300.5		\$40.0	\$340.5
Raven's Wing Asset Management	United States			\$5,454.4		\$5,454.4
Raymond James Financial	United States		\$275			\$275
Regions Financial	United States		\$241.1			\$241.1
Riyad Bank	Saudi Arabia		\$21.8			\$21.8
Royal Bank of Canada	Canada		\$1,750.4	\$384.4	\$360.0	\$2,494.8
Scotiabank	Canada		\$472.3		\$120.0	\$592.3
SMBC Group	Japan		\$300.5		\$160.0	\$460.5
State Bank of India	India		\$113.7			\$113.7
State Street	United States			\$2,091.4		\$2,091.4
Stifel Financial	United States		\$3.9			\$3.9
Toronto-Dominion Bank	Canada		\$182.5		\$40.0	\$222.5
Truist Financial	United States		\$278.7			\$278.7
Union Bankshares	United States		\$6.8			\$6.8
US Bancorp	United States		\$300.5		\$40.0	\$340.5
Vanguard	United States			\$3,689.2		\$3,689.2
Wellington Management	United States			\$2,808.7		\$2,808.7
Wells Fargo	United States		\$2,972.1	\$1,078.1	\$720.0	\$4,770.2
Woodforest Financial	United States		\$66.8			\$66.8
Grand Total		\$75.0	\$19,373.9	\$32,167.3	\$4,000.0	\$55,616.1

Table 10: Investments in General Dynamics

11. Honeywell International (United States)

Company Profile

Honeywell International is involved in aerospace, building technologies, performance materials & technologies, and safety & productivity solutions.¹³⁸ Honeywell builds key components for the U.S. nuclear arsenal and is also involved in management and operations of several U.S. nuclear weapon production facilities. In the financial year ending 31 December 2020, Honeywell International announced sales of \$32,637 million.¹³⁹

Contact

Honeywell International

300 S Tryon St Suite 500,

Charlotte, NC 28202,

United States

Website: <https://www.honeywell.com/>

Facebook: <https://www.facebook.com/honeywell>

Instagram: <https://www.instagram.com/honeywell>

LinkedIn: <https://www.linkedin.com/company/honeywell>

Twitter: <https://twitter.com/honeywell>

YouTube: <https://www.youtube.com/user/honeywell>

Nuclear weapons

Honeywell will work on guidance and missile electronics in developing the new Ground Based Strategic Deterrent.¹⁴⁰ This contract amounts are not currently available.

Honeywell is the original equipment manufacturer of the Pendulous Integrating Gyroscopic Accelerometer guidance instrument for the Minuteman III, and identified as the only possible producer of this key nuclear missile component. The current contract has a potential value of more than \$ 88.5 million and will run through at least October 2022.¹⁴¹

Honeywell Federal Manufacturing & Technologies manages and operates the National Security Campus (NSC) (formerly Kansas City Plant), the National Nuclear Security Administration (NNSA) facility responsible for producing an estimated 85% of the non-nuclear components for U.S. nuclear weapons.¹⁴² This includes production of the gas transfer system and the arming, fuzing, and firing subsystem of the W88 Alt 370 warhead for the Trident II submarine launched ballistic missiles.¹⁴³ This warhead upgrade has an estimated cost of \$2.7 billion.¹⁴⁴

Honeywell has held the management and operations contract for this facility, a ten-year contract set to expire in 2025 with an estimated value of \$11.7 billion.¹⁴⁵

Sandia National Laboratory is directly involved in the nuclear weapon modernisation programmes of at least the W88 Alt 37 warhead¹⁴⁶ and the W76-1 warhead¹⁴⁷ (both used for arming the submarine launched Trident II (D5) missiles), the new W80-4 warheads for the Long Range Standoff missiles¹⁴⁸, and the new B61-12 gravity bomb.¹⁴⁹ National Technology and Engineering Solutions of Sandia (NTES), a wholly owned subsidiary of Honeywell, has the contract for the management and operation of Sandia National Laboratories (SNL). The contract runs until April 2027 with a potential total value of \$40.6 billion.¹⁵⁰ Northrop Grumman and Universities Research Association¹⁵¹ support NTES in the performance of this contract.¹⁵²

Fluor is the lead partner in Savannah River Nuclear Solutions (SRNS), a joint venture with Honeywell and Newport News Nuclear (part of Huntington Ingalls)¹⁵³ that operates the Savannah River Site, where plutonium and tritium are processed for nuclear warheads.¹⁵⁴ The contract has a potential value of up to \$16.8 billion and runs through September 2022.¹⁵⁵

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Country	Bondholding	Loans	Underwriting	Grand Total
Academy Securities	United States			\$27.0	\$27.0
ANZ	Australia		\$164.0		\$164.0
Banco Bilbao Vizcaya Argentaria (BBVA)	Spain		\$324.0	\$27.0	\$351.0
Bank of America	United States		\$1,524.8	\$444.8	\$1,969.6
Bank of China	China		\$164.0		\$164.0
Barclays	United Kingdom		\$1,071.7	\$326.5	\$1,398.2
BayernLB	Germany		\$140.0		\$140.0
BNP Paribas	France		\$674.0	\$531.3	\$1,205.3
CIBC	Canada		\$164.0		\$164.0
Citigroup	United States		\$4,800.4	\$444.8	\$5,245.1
Crédit Agricole	France		\$264.0	\$75.0	\$339.0
Danske Bank	Denmark		\$164.0		\$164.0
DBS	Singapore		\$324.0		\$324.0
Deutsche Bank	Germany		\$1,524.8	\$1,217.3	\$2,742.1
Goldman Sachs	United States		\$1,421.7	\$926.5	\$2,348.2
HSBC	United Kingdom		\$324.0	\$27.0	\$351.0
Industrial and Commercial Bank of China	China		\$324.0	\$27.0	\$351.0
Intesa Sanpaolo	Italy		\$140.0		\$140.0
JPMorgan Chase	United States		\$1,666.8	\$917.3	\$2,584.1
Mitsubishi UFJ Financial	Japan		\$919.5		\$919.5
Mizuho Financial	Japan		\$777.1	\$724.5	\$1,501.6
Morgan Stanley	United States		\$605.3	\$1,217.3	\$1,822.6
NatWest	United Kingdom		\$324.0	\$27.0	\$351.0
Northern Trust	United States		\$324.0		\$324.0
Royal Bank of Canada	Canada		\$324.0	\$27.0	\$351.0
Santander	Spain		\$614.0	\$252.0	\$866.0
Scotiabank	Canada		\$164.0		\$164.0
SMBC Group	Japan		\$777.1	\$424.5	\$1,201.6
Société Générale	France		\$624.0	\$222.0	\$846.0
Standard Chartered	United Kingdom		\$324.0	\$27.0	\$351.0
Toronto-Dominion Bank	Canada		\$674.0	\$252.0	\$926.0
UniCredit	Italy		\$614.0	\$531.3	\$1,145.3
US Bancorp	United States		\$549.0	\$177.0	\$726.0
Vanguard	United States	\$106.0			\$106.0
Wells Fargo	United States		\$1,524.8	\$917.3	\$2,442.1
Westpac	Australia		\$680.7		\$680.7
Williams Capital Group	United States			\$27.0	\$27.0
Grand Total		\$106.0	\$25,000.0	\$9,817.1	\$34,923.1

Table 11: Investments in Honeywell International

12. Huntington Ingalls Industries (United States)

Company profile

Huntington Ingalls Industries (“HII”), designs, constructs and maintains nuclear and non-nuclear ships for the U.S. Navy and Coast Guard and provides other services including nuclear and environmental services.¹⁵⁶ Huntington Ingalls Industries is involved in several facilities involved in the production, development and stockpiling of U.S. nuclear weapons. In the financial year ending 31 December 2020, HII generated revenues of \$ 9.4 billion.¹⁵⁷

Contact

Huntington Ingalls Industries

4101 Washington Ave.

Newport News, VA 23607

Telephone: +1 (757) 380-2000

Website: <https://www.huntingtoningalls.com/>

Facebook: <http://www.facebook.com/HuntingtonIngallsIndustries>

Instagram: <https://www.instagram.com/huntingtoningalls/>

LinkedIn: <https://www.linkedin.com/company/huntingtoningalls>

Twitter: <https://twitter.com/hiindustries>

YouTube: <https://www.youtube.com/c/huntingtoningalls>

Nuclear weapons

The Los Alamos National Laboratory Los Alamos is responsible for the nuclear design and engineering and life extension programmes for of U.S. nuclear warheads.¹⁵⁸ Huntington Ingalls Industries provides “personnel, systems, tools and corporate reachback in the areas of pit production, plutonium manufacturing, production scale-up and nuclear operations and manufacturing” for the Los Alamos Laboratory.¹⁵⁹

Formerly known as the Nevada Test Site, the Nevada National Security Site maintains facilities related to nuclear weapon modernisation and stockpiling. It retains the capability to resume full- scale nuclear testing within a couple years, at the direction of the U.S. President.¹⁶⁰ Mission Support and Test Services LLC (MSTS) manages and operates the site. MSTS is a limited liability company consisting of Honeywell International Inc., Jacobs Engineering Group Inc., and Stoller Newport News Nuclear, Inc. (part of Huntington Ingalls Industries).¹⁶¹ The ten-year contract is worth \$9 billion and is set to expire in November 2027.¹⁶²

Huntington Ingalls Industries is also involved in the joint venture managing and operating the Savannah River Site and Savannah River National Laboratory which produces nuclear components for nuclear weapons.¹⁶³ The contract¹⁶⁴ has a potential value of \$16.8 billion and is expected to run through at least September 2022.¹⁶⁵

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Affiliated Managers Group	United States			\$127.4		\$127.4
AGF Management	Canada			\$142.5		\$142.5
Allianz	Germany	\$40.0				\$40.0

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Alyeska Investment Group	United States			\$43.7		\$43.7
American Equity	United States	\$16.0				\$16.0
American Financial Group	United States	\$18.0				\$18.0
AQR Capital Management	United States			\$125.8		\$125.8
Baird	United States	\$34.3				\$34.3
Bank of America	United States		\$281.3	\$249.3	\$283.3	\$813.9
Bank of New York Mellon	United States			\$253.7		\$253.7
BlackRock	United States	\$19.0		\$1,863.4		\$1,882.5
BrightSphere Investment Group	United States			\$71.9		\$71.9
Cacti Asset Management	United States			\$82.6		\$82.6
Capital Group	United States			\$1,344.2		\$1,344.2
Capital One Financial	United States		\$52.1			\$52.1
Charles Schwab	United States			\$175.0		\$175.0
CI Financial	Canada			\$124.4		\$124.4
Cooke & Bieler	United States			\$93.4		\$93.4
Deutsche Bank	Germany	\$9.0				\$9.0
Dimensional Fund Advisors	United States			\$247.7		\$247.7
Eaton Vance	United States			\$239.8		\$239.8
Empyrean Capital Partners	United States			\$136.6		\$136.6
Equitable Holdings	United States			\$295.9		\$295.9
Eurazeo	France			\$49.7		\$49.7
Fairfax Financial	Canada	\$40.6				\$40.6
Fidelity Investments	United States			\$466.0		\$466.0
Findlay Park Partners	United Kingdom			\$246.1		\$246.1
First Horizon	United States		\$52.1		\$83.3	\$135.4
Focus Financial Partners	United States			\$66.2		\$66.2
Foresters Financial	Canada			\$50.2		\$50.2
Franklin Resources	United States			\$278.1		\$278.1
Geode Capital Holdings	United States			\$439.2		\$439.2
Goldman Sachs	United States			\$115.1		\$115.1
Guardian Life Insurance Company of America	United States	\$9.3				\$9.3
Hancock Whitney	United States				\$83.3	\$83.3
Hoover Financial Advisors	United States			\$56.5		\$56.5
Invesco	United States			\$185.1		\$185.1
JPMorgan Chase	United States		\$281.3		\$283.3	\$564.6

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Lagan Holding Company	United States			\$113.4		\$113.4
Legal & General	United Kingdom			\$193.8		\$193.8
Lord, Abnett & Co	United States	\$36.5				\$36.5
LSV Asset Management	United States			\$278.1		\$278.1
Madison Asset Management	United States			\$83.8		\$83.8
Manulife Financial	Canada	\$122.9				\$122.9
Mirae Asset Financial Group	South Korea			\$46.2		\$46.2
Mitsubishi UFJ Financial	Japan		\$52.1		\$83.3	\$135.4
Mizuho Financial	Japan		\$281.2		\$283.3	\$564.6
Morgan Stanley	United States			\$41.9		\$41.9
Nationwide Mutual Insurance	United States	\$71.3				\$71.3
New York Life Insurance	United States	\$9.8				\$9.8
Ninety One	South Africa			\$200.3		\$200.3
Northern Trust	United States			\$171.9		\$171.9
Orix Corporation	Japan			\$157.0		\$157.0
Pacific Investments	United Kingdom	\$40.0				\$40.0
Perpetual	Australia			\$222.4		\$222.4
PNC Financial Services	United States		\$52.1		\$83.3	\$135.4
Primecap Management	United States			\$915.7		\$915.7
Principal Financial Group	United States	\$20.0		\$59.2		\$79.2
Prudential Plc	United Kingdom	\$19.5				\$19.5
Pzena Investment Management	United States			\$57.5		\$57.5
Royal Bank of Canada	Canada			\$77.4		\$77.4
Ruane, Cunniff & Goldfarb	United States			\$502.9		\$502.9
Samlyn Capital	United States			\$49.8		\$49.8
Schweizerische Nationalbank	Switzerland			\$64.4		\$64.4
Scotiabank	Canada		\$156.3		\$83.3	\$239.6
Select Equity Partners	United States			\$650.7		\$650.7
State Street	United States	\$21.5		\$1,756.3		\$1,777.8
Sumitomo Mitsui Trust	Japan			\$102.7		\$102.7
Sun Life Financial	Canada	\$20.5				\$20.5
T. Rowe Price	United States			\$755.0		\$755.0
Teacher Retirement System of Texas	United States			\$103.3		\$103.3
TIAA	United States	\$24.7		\$84.7		\$109.4
Toronto-Dominion Bank	Canada		\$52.1		\$83.3	\$135.4
Travelers	United States	\$9.7				\$9.7
Truist Financial	United States		\$52.1		\$83.3	\$135.4

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
US Bancorp	United States		\$281.3		\$283.3	\$564.6
Vanguard	United States	\$121.4		\$2,678.3		\$2,799.7
Wells Fargo	United States		\$156.3	\$326.2	\$283.3	\$765.8
Westchester	United States			\$55.4		\$55.4
Grand Total		\$703.9	\$1,750.0	\$17,318.0	\$2,000.0	\$21,771.9

Table 12: Investments in Huntington Ingalls Industries

13. Jacobs Engineering (United States)

Company profile

Jacobs Engineering Group, based in the U.S., provides professional, technical and construction services. Among its primary markets are intelligence, water, and infrastructure.¹⁶⁶ Jacobs Engineering completed its acquisition of another nuclear weapon component producer, CH2M Hill, in 2017.¹⁶⁷ In the financial year ending 27 September 2020, Jacobs Engineering generated revenues of \$13.5 billion.¹⁶⁸

Contact

1999 Bryan Street, Ste. 1200

Dallas, TX 75201 U.S.A

+1.214.583.8500

Website: <http://www.jacobs.com/>

Facebook: <https://www.facebook.com/JacobsConnects/>

Instagram: <https://www.instagram.com/jacobsconnects/>

LinkedIn: <https://www.linkedin.com/company/jacobs/>

Twitter: <https://twitter.com/JacobsConnects>

YouTube: <https://www.youtube.com/user/jacobsworldwide>

Nuclear weapons

Formerly known as the Nevada Test Site, the Nevada National Security Site maintains facilities related to nuclear weapon modernisation and stockpiling. It retains the capability to resume full- scale nuclear testing within a couple years, at the direction of the U.S. President.¹⁶⁹ Mission Support and Test Services LLC (MSTS) manages and operates the site. MSTS is a limited liability company consisting of Honeywell International Inc., Jacobs Engineering Group Inc., and Stoller Newport News Nuclear, Inc. (part of Huntington Ingalls Industries).¹⁷⁰ The ten-year contract is worth \$9 billion and is set to expire in November 2027.¹⁷¹

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Country	Bondholding	Loans	Grand Total
Aegon	Netherlands	\$60.0		\$60.0
American Equity	United States	\$42.0		\$42.0
Banco Bilbao Vizcaya Argentaria (BBVA)	Spain		\$134.5	\$134.5
Bank of America	United States		\$460.0	\$460.0
Barclays	United Kingdom		\$59.2	\$59.2
BlackRock	United States	\$6.5		\$6.5
BMO Financial Group	Canada		\$134.5	\$134.5
BNP Paribas	France		\$743.8	\$743.8
Citizens Financial Group	United States		\$134.5	\$134.5
Desjardins Group	Canada	\$2.8		\$2.8
Deutsche Bank	Germany	\$5.0		\$5.0
Fiera Capital	Canada	\$12.1		\$12.1
Franklin Resources	United States	\$27.0		\$27.0
HSBC	United Kingdom		\$193.7	\$193.7

Investor	Country	Bondholding	Loans	Grand Total
Industrial and Commercial Bank of China	China		\$134.5	\$134.5
JPMorgan Chase	United States		\$59.2	\$59.2
MetLife	United States	\$47.5		\$47.5
Mitsubishi UFJ Financial	Japan		\$193.7	\$193.7
Modern Woodmen of America	United States	\$10.0		\$10.0
Morgan Stanley	United States		\$193.7	\$193.7
NatWest	United Kingdom		\$59.2	\$59.2
Northern Trust	United States		\$59.2	\$59.2
OneAmerica Asset Management	United States	\$36.0		\$36.0
PNC Financial Services	United States		\$393.7	\$393.7
Principal Financial Group	United States	\$37.8		\$37.8
Prudential Financial (US)	United States	\$2.8		\$2.8
Scotiabank	Canada		\$193.7	\$193.7
Securian	United States	\$13.5		\$13.5
Southern Farm Bureau Life Insurance	United States	\$4.0		\$4.0
State Farm	United States	\$71.0		\$71.0
State Street	United States	\$12.1		\$12.1
TCW Group	United States	\$2.8		\$2.8
Toronto-Dominion Bank	Canada		\$193.7	\$193.7
Travelers	United States	\$15.0		\$15.0
Truist Financial	United States		\$59.2	\$59.2
UBS	Switzerland	\$2.8		\$2.8
US Bancorp	United States		\$193.7	\$193.7
Wells Fargo	United States		\$743.8	\$743.8
White Mountains Insurance	Bermuda	\$27.9		\$27.9
Grand Total		\$438.6	\$4,337.4	\$4,776.0

Table 13: Investments in Jacobs Engineering

14. L3 Harris Technologies (United States)

Company Profile

L3 Harris Technologies was established in 2019 through the merger of Harris Corporation and L3 Technologies. The company describes itself as an agile global aerospace and defence technology innovator, delivering end-to-end solutions that meet customers' mission-critical needs.¹⁷² L3 Harris Technologies is involved in the design and development of the new intercontinental ballistic missile system for the U.S., the Ground Based Strategic Deterrent as well as producing key components for the Trident II (D5) system. In the financial year ending December 31, 2020, L3 Harris generated revenues of \$18.2 billion.¹⁷³

Contact

1025 W. NASA Boulevard

Melbourne, FL 32919

Tel: +1 321-727-9100

Website: www.facebook.com/L3HarrisTechnologies/

Facebook: <http://www.facebook.com/L3HarrisTechnologies/>

Instagram: www.instagram.com/l3harristech/

LinkedIn: <https://www.linkedin.com/company/l3harris-technologies/>

Twitter: <https://twitter.com/L3HarrisTech>

YouTube: https://www.youtube.com/channel/UCENNhZ_O63zkKUHkj6bsIIQ

Nuclear weapons

L3 Harris is part of the team put together by Northrop Grumman to build the new Ground Based Strategic Deterrent, L3Harris will be designing training systems.¹⁷⁴

L3 Harris subsidiary Interstate Electronics Corporation also has a four-year \$ 50.2 million contract for flight test instrumentation support and services related to the Trident II (D5) nuclear missile through the end of 2021.¹⁷⁵

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Ally Financial	United States		\$52.5			\$52.5
American Century Investments	United States			\$413.8		\$413.8
Ameriprise Financial	United States	\$43.3				\$43.3
Bank of America	United States		\$353.8	\$266.7	\$2,643.9	\$3,264.4
Bank of New York Mellon	United States		\$57.1	\$291.9		\$349.1
Barclays	United Kingdom		\$191.7		\$113.8	\$305.4
BlackRock	United States			\$2,754.2		\$2,754.2
Brown Advisory	United States			\$484.9		\$484.9
California Public Employees' Retirement System (CalPERS)	United States			\$328.9		\$328.9
Capital Group	United States			\$3,031.3		\$3,031.3

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Citigroup	United States		\$230.0		\$129.0	\$359.0
Comerica	United States		\$57.1			\$57.1
Crédit Mutuel CIC Group	France		\$57.1			\$57.1
Deutsche Bank	Germany		\$274.2		\$131.5	\$405.7
Diamond Hill Investment Group	United States			\$248.1		\$248.1
Equitable Holdings	United States			\$317.8		\$317.8
Fidelity Investments	United States			\$294.1		\$294.1
First Abu Dhabi Bank	United Arab Emirates		\$125.0			\$125.0
Franklin Resources	United States			\$684.6		\$684.6
Geode Capital Holdings	United States			\$606.4		\$606.4
Government Pension Fund Global	Norway			\$360.1		\$360.1
GQG Partners	United States			\$406.2		\$406.2
HSBC	United Kingdom		\$287.1		\$113.8	\$400.9
Janus Henderson	United Kingdom			\$1,604.1		\$1,604.1
JPMorgan Chase	United States		\$230.0		\$137.8	\$367.8
Legal & General	United Kingdom			\$243.9		\$243.9
Lord, Abbett & Co	United States	\$81.2				\$81.2
Macquarie Group	Australia	\$35.1				\$35.1
MetLife	United States	\$65.8				\$65.8
Mitsubishi UFJ Financial	Japan		\$191.7			\$191.7
Mizuho Financial	Japan		\$125.0			\$125.0
Morgan Stanley	United States		\$634.3		\$2,652.7	\$3,286.9
Neuberger Berman	United States			\$319.4		\$319.4
New York Life Insurance	United States	\$42.0				\$42.0
Norges Bank	Norway			\$372.4		\$372.4

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Northern Trust	United States		\$205.0	\$284.2		\$489.2
Northill Capital	United Kingdom			\$790.1		\$790.1
Northwestern Mutual	United States	\$119.7				\$119.7
Pendal Group	Australia			\$311.2		\$311.2
Power Financial Corporation	Canada	\$135.9				\$135.9
Royal Bank of Canada	Canada		\$105.0			\$105.0
Scotiabank	Canada		\$296.7		\$43.5	\$340.2
Shank Williams Cisneros & Co	United States				\$16.5	\$16.5
SMBC Group	Japan		\$274.2		\$43.5	\$317.7
State Street	United States			\$1,767.9		\$1,767.9
Sun Life Financial	Canada			\$408.2		\$408.2
T. Rowe Price	United States			\$730.4		\$730.4
TIAA	United States	\$78.0				\$78.0
Toronto-Dominion Bank	Canada		\$205.0		\$43.5	\$248.5
Truist Financial	United States		\$181.0			\$181.0
US Bancorp	United States		\$296.7		\$131.5	\$428.2
Vanguard	United States	\$153.9		\$3,573.3		\$3,727.2
Wells Fargo	United States		\$296.7	\$957.6	\$129.0	\$1,383.2
White Mountains Insurance	Bermuda	\$48.9				\$48.9
Grand Total		\$803.8	\$4,726.8	\$21,851.7	\$6,329.9	\$33,712.1

Table 14: Investments in L3 Harris Technologies

15. Larsen & Toubro (India)

Company profile

Larsen & Toubro Limited (L&T), based in India, is a technology, engineering, construction, manufacturing and financial services conglomerate.¹⁷⁶ Mindtree, a group excluded by at least 14 financial institutions for a connection with nuclear and/or controversial weapons, is a subsidiary of Larsen & Toubro.¹⁷⁷ Larsen & Toubro is also the parent company to around 120 subsidiaries, including joint ventures with European arms producing companies MBDA (L&T MBDA Missile Systems Limited) and Thales (L&T Thales Technology Services Private Limited). In the financial year ending 31 March 2021, Larsen & Toubro generated revenues of ₹135,979 crore, or \$1.59 billion.¹⁷⁸

Contact

Larsen & Toubro Limited
L&T House, Ballard Estate

P. O. Box: 278,
Mumbai 400 001,

India

+91 22 6177 4200

Website: <http://www.larsentoubro.com/>

Nuclear weapons

Larsen and Toubro operate a Strategic Systems Complex (SSC) in Maharashtra, in which series production and testing of Strategic Weapons Platforms takes place.¹⁷⁹ It also operates the facility at Visakhapatnam for India's strategic weapons programme. The precision machining, fabrication, electromechanical integration and testing facility at Coimbatore is capable of serially producing and testing missile subsystems.¹⁸⁰

L&T states it has designed and produced the launching system for the Dhanush nuclear capable short range ballistic missile.¹⁸¹ It also produces weapon launch systems for a number of missiles, including land-based missiles.¹⁸²

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Country	Loans	Underwriting	Grand Total
A.K. Group	India		\$336.3	\$336.3
Allahabad Bank	India	\$10.0		\$10.0
Axis Bank	India	\$64.6	\$780.8	\$845.4
Bank of Baroda	India	\$10.0	\$45.9	\$55.9
Barclays	United Kingdom	\$60.7	\$412.3	\$473.0
BNP Paribas	France	\$41.1		\$41.1
Cathay Financial	Taiwan	\$23.4		\$23.4
Citigroup	United States	\$31.1	\$68.4	\$99.5
Compagnie Financière Tradition	Switzerland		\$23.4	\$23.4
Credit Suisse	Switzerland		\$45.9	\$45.9
DBS	Singapore	\$41.1		\$41.1
Dena Bank	India	\$10.0		\$10.0
Deutsche Bank	Germany	\$68.9		\$68.9
Edelweiss Financial Services	India		\$336.3	\$336.3
Federal Bank	India	\$10.0		\$10.0
First Abu Dhabi Bank	United Arab Emirates	\$50.7		\$50.7
Genev Capital	India		\$141.3	\$141.3
HDFC Bank	India	\$49.2	\$432.7	\$482.0
HSBC	United Kingdom		\$334.1	\$334.1
ICICI Bank	India		\$190.4	\$190.4
JM Financial	India		\$267.6	\$267.6
LKP Group	India		\$56.8	\$56.8
Passionate Investment Management	India		\$45.9	\$45.9
Punjab & Sind Bank	India	\$10.0		\$10.0
SMBC Group	Japan	\$23.4		\$23.4
Standard Chartered	United Kingdom		\$105.9	\$105.9
State Bank of India	India	\$126.5	\$374.4	\$500.9
Tamilnad Mercantile Bank	India	\$10.0		\$10.0
Trust Group	India		\$450.0	\$450.0
UBS	Switzerland		\$45.9	\$45.9
Union Bank of India	India	\$10.0		\$10.0
Vijaya Bank	India	\$10.0		\$10.0
World Bank	United States	\$125.0		\$125.0
Yes Bank	India		\$95.7	\$95.7
Grand Total		\$786.1	\$4,589.9	\$5,376.0

Table 15: Investments in Larsen & Toubro

16. Leidos (United States)

Company Profile

Leidos is active in defence, intelligence, civil, and health markets.¹⁸³ Leidos defence sector activities include “enterprise and mission IT, large-scale intelligence systems, command and control, geospatial and data analytics, cybersecurity, logistics, training, and intelligence analysis and operations support.”¹⁸⁴ In the 2020 financial year, Leidos generated revenues of \$12.3. billion.¹⁸⁵

Contact

Leidos Holdings Inc.

11951 Freedom Dr

Reston, VA 20190

United States

+1 (571) 526-6000

Website: <https://www.leidos.com>

Facebook: <https://www.facebook.com/LeidosInc/>

Instagram: <https://www.instagram.com/leidosinc/>

LinkedIn: <https://www.linkedin.com/company/leidos/>

Twitter: <https://twitter.com/leidosinc>

YouTube: <https://www.youtube.com/user/LeidosInc>

Nuclear Weapons

Leidos is part of the Consolidated Nuclear Security, LLC joint venture that manages and operates the Pantex Plant and the Y-12 National Security Complex where U.S. nuclear weapons are assembled.¹⁸⁶ Under the \$30.7 billion contract, the joint venture is “fully responsible for high-hazard enriched uranium, special nuclear material (SNM), high-explosive and nuclear weapon assembly/disassembly functions”.¹⁸⁷

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Algemeen Burgerlijk Pensioenfonds (ABP)	Netherlands	\$19.9				\$19.9
Allianz	Germany	\$69.5				\$69.5
Baird	United States	\$135.2				\$135.2
Bank of America	United States		\$426.0		\$916.7	\$1,342.7
BlackRock	United States			\$812.9		\$812.9
BMO Financial Group	Canada		\$145.9			\$145.9
BNP Paribas	France		\$107.0			\$107.0
California Public Employees' Retirement System (CalPERS)	United States			\$100.4		\$100.4
Capital One Financial	United States		\$1,145.9			\$1,145.9
Causeway Capital Holdings	United States			\$96.5		\$96.5
Charles Schwab	United States			\$86.4		\$86.4
Citigroup	United States		\$1,144.0		\$916.7	\$2,060.7

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Cooke & Bieler	United States			\$216.5		\$216.5
Dimensional Fund Advisors	United States			\$174.1		\$174.1
Equitable Holdings	United States			\$127.0		\$127.0
Fifth Third Bancorp	United States		\$107.0			\$107.0
First Trust Advisors	United States			\$143.3		\$143.3
Franklin Resources	United States	\$25.0				\$25.0
Geode Capital Holdings	United States			\$212.8		\$212.8
Goldman Sachs	United States		\$280.1			\$280.1
Government Pension Fund Global	Norway	\$36.0		\$143.5		\$179.4
Guggenheim Capital	United States	\$68.9				\$68.9
Invesco	United States			\$84.3		\$84.3
Janus Henderson	United Kingdom			\$110.2		\$110.2
JPMorgan Chase	United States	\$46.1	\$319.0	\$1,322.7		\$1,687.8
Legal & General	United Kingdom			\$115.5		\$115.5
Lord, Abnett & Co	United States	\$18.2				\$18.2
Macquarie Group	Australia	\$55.5				\$55.5
Mitsubishi UFJ Financial	Japan		\$1,144.0		\$916.7	\$2,060.7
Mizuho Financial	Japan		\$220.9			\$220.9
Norges Bank	Norway			\$147.9		\$147.9
Northern Trust	United States		\$173.1	\$91.8		\$264.9
Orix Corporation	Japan			\$240.5		\$240.5
Pacific Investments	United Kingdom	\$20.0				\$20.0
PNC Financial Services	United States		\$252.9			\$252.9
Prudential Financial (US)	United Kingdom	\$20.1				\$20.1
Prudential Financial (US)	United States	\$55.3				\$55.3
Regions Financial	United States		\$107.0			\$107.0
Royal Bank of Canada	Canada		\$107.0			\$107.0
Scotiabank	Canada		\$394.0			\$394.0
SMBC Group	Japan		\$182.0			\$182.0
State Street	United States			\$517.2		\$517.2
Sumitomo Mitsui Trust	Japan			\$90.2		\$90.2
Sun Life Financial	Canada			\$122.5		\$122.5
T. Rowe Price	United States			\$380.7		\$380.7
Toronto-Dominion Bank	Canada		\$107.0			\$107.0
US Bancorp	United States		\$220.9			\$220.9
Vanguard	United States	\$41.7		\$1,392.5		\$1,434.2
Victory Capital	United States			\$221.4		\$221.4

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Wellington Management	United States	\$20.6		\$874.6		\$895.1
Wells Fargo	United States		\$426.0			\$426.0
Grand Total		\$632.0	\$7,010.1	\$7,825.3	\$2,750.0	\$18,217.3

Table 16: Investments in Leidos

17. Leonardo (Italy)

Company profile

Leonardo, based in Italy, develops products and services in the fields of aerospace, military and security.¹⁸⁸ The company changed its name from Finmeccanica to Leonardo S.p.a. in April 2016.¹⁸⁹ Leonardo has a 25% stake in the MBDA joint venture, which produces missiles for the French nuclear arsenal.¹⁹⁰ In the financial year ending 31 December 2020, Leonardo generated revenues of €13.4 billion.¹⁹¹

Contact

Leonardo SpA

Registered Head Office:

Piazza Monte Grappa n. 4, 00195 Roma

+39 06.324731

Website: <https://www.leonardocompany.com/>

FlickrR: <https://www.flickr.com/photos/leonardocompany>

Instagram: https://www.instagram.com/leonardo_company/

LinkedIn: https://www.linkedin.com/company/leonardo_company

Twitter: http://twitter.com/Leonardo_live

YouTube: <https://www.youtube.com/c/LeonardoCompany>

Nuclear weapons

MBDA, of which Leonardo has a 25% stake, is engaged in ongoing work related to the ASMPA nuclear missiles for the French arsenal.¹⁹² MBDA is also involved in developing the new ASN4G replacement for the ASMPA. The new weapon is scheduled to enter service in 2035 with range exceeding 1,000km, double that of the ASMPA. The French Directorate General for Armaments indicated that the ASN4G will be a hypersonic missile.¹⁹³

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Anima	Italy	\$33.1				\$33.1
Banca d'Italia	Italy			\$39.2		\$39.2
Banca Popolare di Sondrio	Italy		\$70.9			\$70.9
Banco Bilbao Vizcaya Argentaria (BBVA)	Spain		\$111.2			\$111.2
Banco BPM	Italy		\$294.9		\$62.5	\$357.4
Bank of America	United States		\$164.5		\$167.5	\$332.0
Bank of China	China		\$50.5			\$50.5

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Barclays	United Kingdom		\$111.2		\$20.9	\$132.1
BlackRock	United States	\$34.8		\$157.1		\$191.9
BNP Paribas	France		\$452.4		\$62.5	\$514.9
BPER Banca	Italy		\$79.0			\$79.0
Cassa Depositi e Prestiti	Italy		\$221.3			\$221.3
Citigroup	United States		\$139.6		\$20.9	\$160.6
Commerzbank	Germany		\$164.5			\$164.5
Crédit Agricole	France		\$380.4		\$83.4	\$463.9
Crédit Mutuel CIC Group	France		\$50.5			\$50.5
Credit Suisse	Switzerland				\$20.9	\$20.9
Credito Valtellinese	Italy		\$20.4			\$20.4
Deutsche Bank	Germany		\$50.5			\$50.5
Dimensional Fund Advisors	United States			\$43.5		\$43.5
EFG International	Switzerland		\$50.5		\$62.5	\$113.0
European Investment Bank	Luxembourg		\$1,051.9			\$1,051.9
Goldman Sachs	United States				\$167.5	\$167.5
Government Pension Fund Global	Norway			\$39.5		\$39.5
Groupe BPCE	France		\$79.0			\$79.0
Guggenheim Capital	United States	\$15.0				\$15.0
HSBC	United Kingdom		\$327.0		\$62.5	\$389.5
Intesa Sanpaolo	Italy		\$668.3		\$83.4	\$751.7
JPMorgan Chase	United States		\$50.5		\$167.5	\$218.0
M&G	United Kingdom	\$30.1				\$30.1
Mediobanca Banca di Credito Finanziario	Italy		\$50.5			\$50.5
Mitsubishi UFJ Financial	Japan		\$164.5		\$20.9	\$185.5
Morgan Stanley	United States				\$20.9	\$20.9
NatWest	United Kingdom		\$266.4		\$62.5	\$328.9
Norges Bank	Norway			\$71.1		\$71.1
Pictet	Switzerland	\$29.2		\$31.5		\$60.7
Santander	Spain		\$111.2			\$111.2
SMBC Group	Japan		\$164.5			\$164.5
Société Générale	France		\$355.5		\$62.5	\$418.0
T. Rowe Price	United States			\$57.6		\$57.6
TIAA	United States	\$30.0				\$30.0
UniCredit	Italy		\$479.6		\$83.4	\$563.0
Vanguard	United States			\$81.4		\$81.4
Grand Total		\$172.2	\$6,181.3	\$520.9	\$1,232.4	\$8,106.8

Table 17: Investments in Leonardo

18. Lockheed Martin (United States)

Company profile

Lockheed Martin focuses on “research, design, development, manufacture, integration and sustainment of advanced technology systems, products and services.”¹⁹⁴ In the financial year ending 31 December 2020, Lockheed Martin reported net sales over \$65.3 billion.¹⁹⁵

Contact

6801 Rockledge Drive,

Bethesda, Maryland 20817-1877

United States

+1.301.897.6000

Website: <https://www.lockheedmartin.com/en-us/index.html>

Facebook: <http://www.facebook.com/lockheedmartin>

Instagram: <http://instagram.com/lockheedmartin>

LinkedIn: <http://www.linkedin.com/company/lockheed-martin/careers>

Twitter: <http://twitter.com/lockheedmartin>

YouTube: <http://www.youtube.com/user/LockheedMartinVideos>

Nuclear weapons

Lockheed Martin is producing command and control systems and missile payload integration for the U.S. Ground Based Strategic Deterrent as part of the Northrop Grumman team.¹⁹⁶

Lockheed Martin has been the principal designer, manufacturer and sustainer of Minuteman III re-entry systems since the 1960s and anticipates continuing through 2030.¹⁹⁷ Lockheed was awarded a 10-year contract in 2019 for the Minuteman re-entry systems, with a potential total value of \$465.7 million.¹⁹⁸

Lockheed Martin is also contracted to design and develop a fully functional prototype for the Airborne Launch Control System Replacement (ALCS-R) program, under a \$71.7 million contract. The contract states that “ALCS-R will deliver an affordable total system replacement of the legacy ALCS to support the Minuteman III intercontinental ballistic missile weapon system through estimated 2036 and provide a solution to meet the survivable launch platform – airborne fire control requirements for the ground based strategic deterrent weapon system through 2075”.¹⁹⁹

The U.S. Navy is also planning to use the Lockheed Martin C-130J-30 Hercules aircraft for nuclear command and communications, specifically in a Take Charge And Move Out (TACAMO) role.²⁰⁰

Lockheed Martin is responsible for the construction of the Trident II (D5) nuclear missiles for both the UK and the U.S.²⁰¹ Lockheed has several outstanding contracts related to Trident production, valued at more than \$2 billion and planned to continue through at least 2026, including one 2020 award of \$1.3 billion.²⁰²

In addition, some contracts, like the one awarded April 2019 for “engineering and technical support services and deliverable materials for the Trident II Fleet Ballistic Missile System”, were arranged by the U.S. Department of Defense, but the nearly \$18 million will be paid for by the UK Government.²⁰³ Or another four year \$43 million contract, in which the U.S. government which is awarding the contract even though it “cannot establish in advance or accurately forecast the following: The exact nature and extent of the work covered by this contact; The precise method of performing the work; and The cost of performing the work.”²⁰⁴

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Academy Securities	United States				\$2.9	\$2.9
Ameriprise Financial	United States			\$949.7		\$949.7
ANZ	Australia		\$50.0		\$17.3	\$67.3
Arrowstreet Capital	United States			\$590.8		\$590.8
Bank of America	United States		\$2,105.0	\$1,889.9	\$103.5	\$4,098.4
Barclays	United Kingdom		\$75.0		\$17.3	\$92.3
BlackRock	United States			\$4,459.8		\$4,459.8
Blaylock Beal Van	United States				\$2.9	\$2.9
Capital Group	United States			\$6,634.0		\$6,634.0
Charles Schwab	United States			\$1,482.6		\$1,482.6
Citigroup	United States		\$2,105.0		\$103.5	\$2,208.5
CL King & Associates	United States				\$2.9	\$2.9
Crédit Agricole	France		\$896.7		\$103.5	\$1,000.2
Crédit Mutuel CIC Group	France		\$50.0			\$50.0
Drexel Hamilton	United States				\$2.9	\$2.9
Franklin Resources	United States			\$900.8		\$900.8
Geode Capital Holdings	United States			\$1,530.2		\$1,530.2
Goldman Sachs	United States		\$254.2		\$34.5	\$288.7
JPMorgan Chase	United States		\$2,105.0		\$103.5	\$2,208.5
Lloyds Banking Group	United Kingdom		\$504.2		\$17.3	\$521.4
Macquarie Group	Australia	\$84.0				\$84.0
Mischler Financial Group	United States				\$2.9	\$2.9
Mitsubishi UFJ Financial	Japan		\$75.0			\$75.0
Mizuho Financial	Japan		\$2,105.0		\$235.8	\$2,340.8
Morgan Stanley	United States		\$75.0	\$1,132.6	\$235.8	\$1,443.3
Northern Trust	United States		\$300.0	\$677.9		\$977.9
Penserra Capital Management	United States				\$2.9	\$2.9
Prudential Financial (US)	United States	\$68.5				\$68.5
R. Seelaus & Co	United States				\$2.9	\$2.9
Riyad Bank	Saudi Arabia		\$466.7			\$466.7
Royal Bank of Canada	Canada		\$75.0		\$17.3	\$92.3
Shank Williams Cisneros & Co	United States				\$2.9	\$2.9
SMBC Group	Japan		\$50.0		\$34.5	\$84.5
State Street	United States		\$50.0	\$15,054.0		\$15,104.0
Sun Life Financial	Canada			\$962.6		\$962.6
TIAA	United States	\$154.8				\$154.8
Toronto-Dominion Bank	Canada		\$75.0		\$34.5	\$109.5

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
UBS	Switzerland			\$819.1		\$819.1
UniCredit	Italy		\$325.0		\$17.3	\$342.3
US Bancorp	United States		\$504.2		\$34.5	\$538.7
Vanguard	United States			\$7,937.5		\$7,937.5
Wellington Management	United States			\$3,849.0		\$3,849.0
Wells Fargo	United States		\$254.2	\$912.7	\$17.3	\$1,184.2
Grand Total		\$307.3	\$12,500.0	\$49,783.2	\$1,150.0	\$63,740.5

Table 18: Investments in Lockheed Martin

19. Northrop Grumman (United States)

Company profile

Northrop Grumman, is global aerospace, defence and security company, which conducts most of its business with the U.S. Department of Defence and intelligence community.²⁰⁵ In the financial year ending 31 December 2020, Northrop Grumman reported \$36,777 million in sales, including the \$13 billion deal with the U.S. for the new nuclear weapon system, the Ground Based Strategic Deterrent.²⁰⁶

In June 2018 Northrop Grumman acquired Orbital ATK and renamed it Northrop Grumman Innovation Systems.²⁰⁷ Orbital ATK and its subsidiary ATK Launch Systems held nuclear weapons contracts for the U.S. arsenal prior to the acquisition. By acquiring Orbital ATK, Northrop Grumman took over the GBSD, Minuteman III and Trident contracts of Orbital ATK and its subsidiary ATK Launch Systems.

Contact

Northrop Grumman Corporation

2980 Fairview Park Drive

Falls Church, VA 22042

+1.703.280.2900

Website: <http://www.northropgrumman.com/>

Facebook: <http://www.facebook.com/NorthropGrumman>

Instagram: @NorthropGrumman

LinkedIn: <http://www.linkedin.com/company/northrop-grumman-corporation>

Twitter: @NGCNews | @NorthropGrumman

YouTube: <http://www.youtube.com/user/northropgrummanmedia>

Nuclear weapons

Northrop Grumman subsidiary ATK Launch Systems is part of the Consolidated Nuclear Security, LLC joint venture that manages and operates the Pantex Plant and the Y-12 National Security Complex where U.S. nuclear weapons are assembled.²⁰⁸ Under the \$30.7 billion contract, the joint venture is “fully responsible for high-hazard enriched uranium, special nuclear material (SNM), high-explosive and nuclear weapon assembly/disassembly functions”.²⁰⁹

Northrop Grumman builds the fixed wing on the U.S. B61-12 gravity bomb under a \$54.9 million contract.²¹⁰

Northrop Grumman is building the Ground-based Strategic Deterrent the new intercontinental ballistic missile system for the U.S. under a \$13.3 billion 9-year contract awarded in 2020.²¹¹

Northrop was also awarded a \$52 million contract in November 2019 for “Strategic Automated Command and Control System Replacement (SACCS-R)”. The contract will run through July 2023.²¹² This is part of the replacement of the aging air-gapped hardware systems related to command, control and communications, including the infamous 8-inch floppy disks.²¹³

Northrop Grumman subsidiary Northrop Grumman Space & Mission Systems Corp was awarded a \$10.5 billion contract in December 1997 to continue Minuteman III sustainment support while a new contractor was found, the contract has been repeatedly extended until at least November 2021.²¹⁴

By acquiring Orbital ATK, Northrop Grumman took over the contracts of Orbital ATK and its subsidiary ATK Launch Systems. Orbital ATK was responsible for refurbishing all three solid propellant stages of the Minuteman III Intercontinental Ballistic Missile (ICBM) under the plan to keep the missiles operational until at least 2030.²¹⁵

ATK Launch Systems also has a was awarded a \$86.4 million contract for procurement of motor and component test, evaluation, engineering support, and disposal for all stages of Minuteman and Peacekeeper systems, which will run through 2026.²¹⁶

Orbital ATK Inc. (now part of Northrop Grumman), is part of Consolidated Nuclear Security, LLC which is managing the Pantex Plant and the Y-12 National Security Complex under a single contract.²¹⁷ CNS was awarded the initial contract in July 2014.²¹⁸ Several modifications later, the contract is now extended until September 2024 with a potential value of more than \$30.7 billion.²¹⁹ CNS is “fully responsible for high-hazard enriched uranium, special nuclear material (SNM), high-explosive and nuclear weapon assembly/disassembly functions”.²²⁰

Sandia National Laboratory is directly involved in the nuclear weapon modernisation programmes of at least the W88 Alt 37 warhead²²¹ and the W76-1 warhead²²² (both used for arming the submarine launched Trident II (D5) missiles), the new W80-4 warheads for the Long Range Standoff missiles²²³, and the new B61-12 gravity bomb.²²⁴ National Technology and Engineering Solutions of Sandia (NTESS), a wholly owned subsidiary of Honeywell, has the contract for the management and operation of Sandia National Laboratories (SNL). The contract runs until April 2027 with a potential total value of \$40.6 billion.²²⁵ Northrop Grumman and Universities Research Association²²⁶ support NTESS in the performance of this contract.²²⁷

Northrop Grumman produces propulsion systems for the Trident II (D5) missiles.²²⁸ Northrop has several outstanding contracts from both the U.S. and UK for work on the Trident missiles. These include a nine-year \$273.9 million contract awarded in 2015 for the underwater launcher systems.²²⁹

Under the U.S. Trident II (D5) programme, the U.S. Department of Defense awarded Northrop Grumman another five-year contract in March 2019 to work on the common missile compartment used for Trident missiles by both new UK Dreadnought and U.S. Columbia class submarines. The contract is listed with a total value of \$66.8 million, but according to sources has already been 288% funded, with \$273.4 million already set aside for payments.²³⁰

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Academy Securities	United States				\$33.8	\$33.8
Ameriprise Financial	United States			\$364.5		\$364.5
ANZ	Australia				\$33.8	\$33.8
Bank of America	United States		\$450.0	\$865.8	\$230.6	\$1,546.4
Bank of New York Mellon	United States				\$33.8	\$33.8
BlackRock	United States			\$2,292.8		\$2,292.8
BNP Paribas	France				\$90.0	\$90.0
Capital Group	United States			\$4,876.6		\$4,876.6
Citigroup	United States		\$1,350.0		\$230.6	\$1,580.6
Comerica	United States		\$16.7			\$16.7

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Credit Suisse	Switzerland				\$90.0	\$90.0
Fidelity Investments	United States			\$1,114.5		\$1,114.5
Fifth Third Bancorp	United States		\$16.7			\$16.7
Franklin Resources	United States			\$673.7		\$673.7
Geode Capital Holdings	United States			\$769.7		\$769.7
Goldman Sachs	United States				\$185.6	\$185.6
JPMorgan Chase	United States		\$450.0	\$1,206.6	\$675.0	\$2,331.6
KeyCorp	United States		\$16.7			\$16.7
Macquarie Group	Australia			\$719.7		\$719.7
Mischler Financial Group	United States				\$16.9	\$16.9
Mitsubishi UFJ Financial	Japan		\$25.0		\$90.0	\$115.0
Mizuho Financial	Japan				\$90.0	\$90.0
Morgan Stanley	United States			\$465.5		\$465.5
Northern Trust	United States			\$357.0		\$357.0
PNC Financial Services	United States		\$16.7			\$16.7
Power Financial Corporation	Canada			\$416.0		\$416.0
Scotiabank	Canada				\$33.8	\$33.8
Shank Williams Cisneros & Co	United States				\$16.9	\$16.9
SMBC Group	Japan		\$16.7		\$90.0	\$106.7
State Farm	United States	\$71.0				\$71.0
State Street	United States			\$5,111.7		\$5,111.7
Sun Life Financial	Canada			\$1,939.2		\$1,939.2
T. Rowe Price	United States			\$404.1		\$404.1
TIAA	United States			\$394.7		\$394.7
Truist Financial	United States		\$25.0			\$25.0
UniCredit	Italy		\$433.3		\$33.8	\$467.1
US Bancorp	United States		\$25.0		\$90.0	\$115.0
Vanguard	United States	\$132.6		\$3,997.4		\$4,129.9
Wellington Management	United States			\$3,110.6		\$3,110.6
Wells Fargo	United States		\$1,391.7		\$185.6	\$1,577.3
Grand Total		\$203.6	\$4,233.3	\$29,080.1	\$2,250.0	\$35,767.0

Table 19: Investments in Northrop Grumman

20. Raytheon Technologies Corporation (United States)

Company profile

Raytheon Technologies works across aviation, space and defence systems.²³¹ Raytheon reported sales over \$57.1 billion in 2020.²³² Raytheon and United Technologies merged in April 2020 to create Raytheon Technologies Corporation. The new company combines the aerospace business (including subsidiary Collins Aerospace) from United Technologies and Raytheon.²³³ This profile reflects the merger.

Contact

Raytheon

870 Winter Street

Waltham, MA 02451

+1.781.522.3000

Website: <https://www.raytheon.com/>

Facebook: <http://www.facebook.com/raytheon>

Instagram: <http://instagram.com/raytheoncompany>

LinkedIn: <http://www.linkedin.com/company/raytheon>

Twitter: <http://www.twitter.com/raytheon>

YouTube: <http://www.youtube.com/raytheoncompany>

Nuclear weapons

In July 2021, Raytheon Technologies received a \$2 billion, 6-year contract for continued development and manufacture of the U.S. Air Force Long Range Standoff (LRSO) weapons system.²³⁴

Collins Aerospace, one of the Raytheon Technologies units, will build the secondary launch platform-airborne system for the new U.S. Ground Based Strategic Deterrent. This key component for nuclear weapons command and control also works with the existing Minutemen III system.²³⁵

Raytheon was awarded a contract in 2013 for logistic support, installation, and sustainment of Minuteman MEECN (Minimum Essential Emergency Communication Network) programme and the Minuteman MEECN programme upgrade. The contract is valued at \$73.3 million and will run until at least December 2021.²³⁶

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Ameriprise Financial	United States			\$1,143.5		\$1,143.5
ANZ	Australia		\$128.3		\$35.0	\$163.3
Bank of America	United States		\$3,559.4	\$1,128.4	\$2,384.7	\$7,072.5
Bank of New York Mellon	United States		\$814.3		\$35.0	\$849.3
Barclays	United Kingdom		\$245.5			\$245.5
BlackRock	United States			\$5,455.0		\$5,455.0
BNP Paribas	France		\$270.5		\$148.0	\$418.5
Capital Group	United States			\$5,993.6		\$5,993.6
Charles Schwab	United States			\$984.5		\$984.5
Citigroup	United States		\$3,596.4		\$2,384.7	\$5,981.1

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Commerzbank	Germany		\$81.1			\$81.1
Crédit Agricole	France		\$278.2		\$35.0	\$313.2
Credit Suisse	Switzerland		\$253.3		\$35.0	\$288.3
Deutsche Bank	Germany		\$958.2		\$2,384.7	\$3,342.9
Dodge & Cox	United States			\$3,055.7		\$3,055.7
Fidelity Investments	United States			\$938.8		\$938.8
First Abu Dhabi Bank	United Arab Emirates		\$120.5			\$120.5
Franklin Resources	United States			\$3,005.7		\$3,005.7
Geode Capital Holdings	United States			\$1,734.4		\$1,734.4
Goldman Sachs	United States		\$1,871.1		\$2,287.7	\$4,158.8
Government Pension Fund Global	Norway	\$469.0		\$1,058.2		\$1,527.2
Gulf International Bank	Bahrain		\$39.4			\$39.4
HSBC	United Kingdom		\$1,762.7			\$1,762.7
Industrial and Commercial Bank of China	China		\$81.1			\$81.1
Intesa Sanpaolo	Italy		\$81.1			\$81.1
JPMorgan Chase	United States		\$2,236.7	\$1,879.5	\$2,384.7	\$6,500.9
KeyCorp	United States		\$45.0			\$45.0
Macquarie Group	Australia			\$732.1		\$732.1
Mitsubishi UFJ Financial	Japan		\$225.4			\$225.4
Mizuho Financial	Japan		\$320.0		\$148.0	\$468.0
Morgan Stanley	United States		\$814.4	\$1,616.3	\$2,287.7	\$4,718.3
NatWest	United Kingdom		\$45.0			\$45.0
Nordea	Finland		\$81.1			\$81.1
Norges Bank	Norway			\$1,089.3		\$1,089.3
Northern Trust	United States		\$164.4	\$788.1		\$952.4
Riyad Bank	Saudi Arabia		\$539.4			\$539.4
Royal Bank of Canada	Canada		\$170.0		\$35.0	\$205.0
Santander	Spain		\$81.1			\$81.1
Scotiabank	Canada		\$128.3		\$35.0	\$163.3
SMBC Group	Japan		\$270.5		\$148.0	\$418.5
Société Générale	France		\$81.1			\$81.1
Standard Chartered	United Kingdom		\$96.1			\$96.1
State Street	United States		\$45.0	\$10,918.2		\$10,963.2
Sun Life Financial	Canada			\$754.4		\$754.4
TIAA	United States			\$687.9		\$687.9
Truist Financial	United States		\$45.0			\$45.0
UBS	Switzerland			\$854.0		\$854.0
UniCredit	Italy		\$920.0		\$35.0	\$955.0
US Bancorp	United States		\$718.3		\$35.0	\$753.3
Vanguard	United States			\$9,827.6		\$9,827.6

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Wellington Management	United States			\$4,534.1		\$4,534.1
Wells Fargo	United States		\$432.6	\$772.0		\$1,204.6
Westpac	Australia		\$96.1			\$96.1
Grand Total		\$469.0	\$21,696.4	\$58,951.2	\$14,838.2	\$95,954.8

Table 20: Investments in Raytheon

21. Rostec (Russian Federation)

Company profile

Rostec produces high-tech industrial products in domestic and foreign markets. It is involved in engineering, manufacture, arms production, medical equipment, biotech and aircraft engineering, among other areas. Rostec has 10 core business subsidiaries, and 15 holding companies with over 800 entities under the broader Rostec management umbrella, including brands like Kalashnikov and Kamaz.²³⁷ Rostec reported 179.2 billion rubles in net profit in 2019 (the last date for which figures are available).²³⁸

Contact

24 Usacheva Street,
 Moscow,
 Russian Federation 119048
 Email: info@rostec.ru
 Website: <https://rostec.ru/en/>

Nuclear weapons

Rostec produces the Iskander-M missile system. SpecChemistry JSC, one of the Rostec entities, produces over 80% of necessary components for Russian missiles.²³⁹

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Country	Loans	Underwriting	Grand Total
Novikombank	Russia		\$37.1	\$37.1
Sovcombank	Russia		\$37.1	\$37.1
VTB Group	Russia	\$3,000.0		\$3,000.0
Grand Total		\$3,000.0	\$74.2	\$3,074.2

Table 21: Investments in Rostec

22. Safran (France)

Company profile

Safran, based in France, is a high-tech group with three key business areas: the aircraft propulsion and equipment, space and defence markets.²⁴⁰ In the financial year ending 31 December 2020, Safran reported revenues of € 16.4 billion.²⁴¹ Safran is a 50% owner of ArianeGroup, which has contracts for French nuclear weapon production.²⁴²

Contact

Safran

2, Boulevard du Général Martial Valin

75724 Paris Cedex 15 – France

Tel: +(33) 1 40 60 80 80

Fax: +(33) 1 40 60 81 02

Website: <https://www.safran-group.com/>

Facebook: <http://www.facebook.com/GroupeSafran>

Instagram: http://instagram.com/safran_group/

LinkedIn: <https://www.linkedin.com/company/safran>

Twitter: <http://twitter.com/SAFRAN>

YouTube: <https://www.youtube.com/user/GroupeSafran>

Nuclear weapons

ArianeGroup is responsible for the ongoing maintenance of the French M51 submarine launched ballistic missiles.²⁴³ ArianeGroup states that its role in the M51 production “covers upstream research, design, development and production of the missiles, the land-based operating infrastructure and the command and control system on board the submarines. ArianeGroup is also responsible for the system support in service as well as end-of-life disposal”.²⁴⁴ The French Ministry of Defence anticipates spending at least € 3.3 billion on the M51 modifications between 2019 – 2022, with ArianeGroup as the prime contractor.²⁴⁵

Safran’s subsidiary Safran Ceramics is involved in the design, development, manufacture and sale of solid propulsion systems and related equipment for all types of rockets and tactical and cruise missiles for air, sea and ground forces through a joint venture with MBDA called Roxel.²⁴⁶ Roxel is also involved in ASMP/ASMP-A missile production, providing boosters and additional devices.²⁴⁷

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Affiliated Managers Group	United States			\$340.3		\$340.3
American Equity	United States	\$20.0				\$20.0
Aviva	United Kingdom	\$60.0				\$60.0
Bank of America	United States		\$249.7		\$222.4	\$472.2
BlackRock	United States			\$5,261.9		\$5,261.9
BNP Paribas	France		\$484.8		\$658.0	\$1,142.8
Capital Group	United States			\$6,637.8		\$6,637.8

Children's Investment Fund Management	United Kingdom			\$2,911.2		\$2,911.2
Citigroup	United States		\$156.7			\$156.7
Clartan Associés	France	\$40.4				\$40.4
Commerzbank	Germany		\$156.7			\$156.7
Confédération Nationale du Crédit Mutuel	France	\$93.5				\$93.5
Crédit Agricole	France	\$71.6	\$484.8		\$658.0	\$1,214.4
Crédit Mutuel CIC Group	France		\$734.5		\$417.4	\$1,151.9
Deutsche Bank	Germany		\$406.4		\$95.3	\$501.7
European Investment Bank	Luxembourg		\$598.5			\$598.5
Fidelity Investments	United States			\$534.8		\$534.8
Groupe BPCE	France		\$484.8		\$289.5	\$774.2
Guardian Life Insurance Company of America	United States	\$35.0				\$35.0
HSBC	United Kingdom		\$406.4		\$289.5	\$695.9
ISALT	France			\$284.9		\$284.9
Macquarie Group	Australia	\$50.0				\$50.0
MassMutual Financial	United States	\$62.9				\$62.9
MetLife	United States	\$81.0				\$81.0
Mitsubishi UFJ Financial	Japan		\$484.8		\$431.1	\$915.9
Modern Woodmen of America	United States	\$20.0				\$20.0
National Life Group	United States	\$20.0				\$20.0
NatWest	United Kingdom		\$156.7			\$156.7
Northwestern Mutual	United States	\$77.0				\$77.0
Oddo BHF	France			\$289.8		\$289.8
Prudential Financial (US)	United States			\$676.0		\$676.0
Santander	Spain		\$484.8		\$304.0	\$788.8
SMBC Group	Japan		\$406.4		\$208.7	\$615.1
Société Générale	France		\$484.8	\$288.8	\$706.8	\$1,480.4
Standard Chartered	United Kingdom		\$406.4		\$208.7	\$615.1
Sun Life Financial	Canada	\$35.0				\$35.0
TIAA	United States	\$75.0				\$75.0
United Services Automobile Association	United States	\$20.0				\$20.0
Unum Group	United States	\$20.0				\$20.0
Vanguard	United States			\$1,377.9		\$1,377.9
Voya Financial	United States	\$20.0				\$20.0
Wellington Management	United States			\$603.9		\$603.9
WoodmenLife	United States	\$20.0				\$20.0
Grand Total		\$821.4	\$6,587.1	\$19,207.3	\$4,489.3	\$31,125.2

Table 22: Investments in Safran

23. Textron (United States)

Company profile

Textron is a U.S.-based multi-industry company engaged in aircraft, military, industrial and finance businesses. Textron brands include Cessna, Beechcraft, Bell, Artic Cat and more.²⁴⁸ In the financial year ending 31 December 2020, Textron reported revenues of \$11.7 billion.²⁴⁹

Contact

Textron World Headquarters

Textron Inc. (Corporate)

40 Westminster Street

Providence, RI 02903

U.S.A.

Phone: +1 (401) 421-2800

Website: <https://www.textron.com/>

Facebook: <https://www.facebook.com/#!/Textron.Inc>

Instagram: <https://instagram.com/textron/>

LinkedIn: <https://www.linkedin.com/company/textron>

Twitter: <https://twitter.com/Textron>

YouTube: <http://www.youtube.com/textroninc>

Nuclear weapons

Textron Systems was awarded a contract in 2014 for multiprobe antennas for the Minuteman missiles. The contract has a \$66.1 million potential value and is expected to continue until at least August 2029.²⁵⁰

Textron also has a contract for Mod 5F midsections for the Minuteman Missiles. Initially awarded in 2014, the contract is expected to continue until at least March 2024 with an estimated total value of about \$39.9 million.²⁵¹

Textron Systems will be involved in developing the missile payload integration for the Ground Based Strategic Deterrent. The contract value is unknown.²⁵²

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Allianz	Germany	\$23.7				\$23.7
American Century Investments	United States			\$131.9		\$131.9
Baird	United States	\$19.7				\$19.7
Bank of America	United States		\$283.5		\$163.6	\$447.2
Bank of China	China		\$82.5			\$82.5
Bank of New York Mellon	United States		\$112.5		\$22.2	\$134.7
BlackRock	United States			\$744.6		\$744.6
Charles Schwab	United States			\$91.6		\$91.6
Citigroup	United States		\$283.5		\$196.5	\$480.1
Dimensional Fund Advisors	United States			\$234.4		\$234.4

Investor	Country	Bondholding	Loans	Shareholding	Underwriting	Grand Total
Export-Import Bank of the United States	United States		\$350.0			\$350.0
Franklin Resources	United States	\$29.3				\$29.3
Gabelli Funds	United States			\$176.3		\$176.3
Geode Capital Holdings	United States			\$242.1		\$242.1
Goldman Sachs	United States		\$224.8		\$196.5	\$421.3
Groupe BPCE	France	\$125.0				\$125.0
Guggenheim Capital	United States	\$151.3				\$151.3
Invesco	United States			\$800.2		\$800.2
JPMorgan Chase	United States		\$283.5		\$181.8	\$465.3
Legal & General	United Kingdom			\$79.4		\$79.4
Loop Capital	United States				\$12.7	\$12.7
Lord, Abnett & Co	United States	\$76.4				\$76.4
LSV Asset Management	United States			\$240.8		\$240.8
Mitsubishi UFJ Financial	Japan		\$223.8		\$128.3	\$352.0
Morgan Stanley	United States		\$55.0		\$30.8	\$85.8
Northern Trust	United States		\$82.5	\$88.6		\$171.1
Orix Corporation	Japan			\$384.2		\$384.2
PNC Financial Services	United States		\$522.3		\$90.3	\$612.6
Power Financial Corporation	Canada	\$18.0				\$18.0
Primecap Management	United States			\$353.2		\$353.2
Prudential Plc	United Kingdom	\$18.4				\$18.4
Pzena Investment Management	United States			\$451.1		\$451.1
Shank Williams Cisneros & Co	United States				\$10.0	\$10.0
SMBC Group	Japan		\$306.4		\$214.0	\$520.4
State Street	United States			\$557.0		\$557.0
T. Rowe Price	United States			\$1,991.9		\$1,991.9
The Hartford	United States	\$21.5				\$21.5
TIAA	United States	\$103.0		\$105.6		\$208.6
US Bancorp	United States		\$224.8		\$122.2	\$346.9
Vanguard	United States			\$1,328.5		\$1,328.5
Victory Capital	United States			\$423.7		\$423.7
Wells Fargo	United States		\$165.0		\$75.6	\$240.6
Williams Capital Group	United States				\$5.4	\$5.4
Grand Total		\$586.2	\$3,200.0	\$8,425.2	\$1,450.0	\$13,661.4

Table 23: Investments in Textron

24. Thales (France)

Company Profile

Thales is a French-based company engaged in Big Data, artificial intelligence, cyber security and quantum technology. The French state (25.7%) and aircraft manufacturer Dassault Aviation (24.7%) are the main shareholders of Thales. In the financial year ending 31 December 2020, Thales generated revenues of € 17 billion.²⁵³

Thales has a 35% shareholding in Naval Group: “Naval Group is a French-law Public Limited Company; as at 31 December 2019 62.25% of its capital was held by the French State, 35% by Thales, 1.88% by current and former members of staff and 0.86% by the company itself”.²⁵⁴

Contact

Thales Headquarters

Tour Carpe Diem

31 Place des Corolles – CS 20001

92098 Paris La Defense Cedex, France

Phone: +33 (0) 1 57 77 80 00

Website: www.thalesgroup.com

Facebook: www.facebook.com/thalesgroup/

LinkedIn: www.linkedin.com/company/thales

Twitter: twitter.com/thalesgroup

YouTube: www.youtube.com/user/thethalesgroup

Pinterest: <https://www.pinterest.com/thalesgroup/>

Nuclear Weapons

According to the French Ministry of Defence, Thales is one of MBDA's subcontractors in the French ASMPA mid-life upgrade.²⁵⁵

Thales is also producing key components for the M51 system for the ocean component sector.²⁵⁶

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Country	Loans	Shareholding	Underwriting	Grand Total
ANZ	Australia	\$75.9			\$75.9
Banco Bilbao Vizcaya Argentaria (BBVA)	Spain	\$124.2			\$124.2
Barclays	United Kingdom	\$75.9			\$75.9
BlackRock	United States		\$155.2		\$155.2
BNP Paribas	France	\$340.6		\$135.2	\$475.8
Caisse de dépôt et placement du Québec	Canada		\$372.4		\$372.4
Citigroup	United States	\$75.9			\$75.9
Commerzbank	Germany	\$340.6		\$246.1	\$586.7
Crédit Agricole	France	\$340.6	\$100.1	\$357.7	\$798.3
Crédit Mutuel CIC Group	France	\$340.6		\$357.7	\$698.3
Deutsche Bank	Germany	\$340.6		\$135.2	\$475.8
Government Pension Fund Global	Norway		\$176.0		\$176.0
Groupe BPCE	France	\$292.3	\$370.1	\$246.1	\$908.5
HSBC	United Kingdom	\$340.6		\$135.2	\$475.8
JPMorgan Chase	United States	\$124.2			\$124.2
Norges Bank	Norway		\$176.3		\$176.3
Santander	Spain	\$340.6		\$246.1	\$586.7
SMBC Group	Japan	\$75.9		\$111.6	\$187.5
Société Générale	France	\$340.6		\$246.8	\$587.4
Standard Chartered	United Kingdom	\$75.9			\$75.9
T. Rowe Price	United States		\$514.8		\$514.8
UniCredit	Italy	\$340.6		\$246.8	\$587.4
Vanguard	United States		\$260.6		\$260.6
Grand Total		\$3,985.5	\$2,125.4	\$2,464.3	\$8,575.2

Table 24: Investments in Thales

25. Walchandnagar Industries (India)

Company profile

Walchandnagar Industries Limited (“WIL”), based in India, is a heavy engineering and high-tech manufacturing company with activities in the areas of nuclear power, aerospace, missile, defence, oil & gas, steam generation plants, independent power projects, turnkey cement, and sugar plants.²⁵⁷ In the financial year ending 31 March 2021, WIL reported a loss of INR 572.4 million.²⁵⁸

Contact

Walchandnagar Industries Ltd.

3 Walchand Terraces,

Tardeo Road,

Mumbai – 400 034,

India.

+91 (022) 23612195/96

wil@walchand.com

Website: <https://www.walchand.com/>

Nuclear weapons

Walchandnagar Industries Limited (“WIL”) produces the launching systems for India’s Agni missiles.²⁵⁹ Walchandnagar reports continued development in the missile sector, as well as for the Indian Navy’s nuclear weapon launch system.²⁶⁰

WIL also notes its involvement in India’s first indigenous nuclear powered ballistic missile submarine, the INS Arihant. The submarine was jointly developed by the Indian Navy, Bhabha Atomic Research Centre (BARC) and Defence Research and Development Organisation (DRDO).²⁶¹ The Arihant can be armed with nuclear-capable K-15 missiles in August 2018, sources indicate that the Arihant will primarily serve as a training vessel and technology demonstrator and will not be deployed for nuclear deterrence patrols as additional SSBNs come online.²⁶²

India’s second nuclear armed submarine, the Arighat is planned to be commissioned in early 2021, bringing to sea a second SSBN equipped with the 750-KM range K-15 missile, designed for retaliatory nuclear strikes.²⁶³ WIL has been involved in the engineering, manufacture, and onboard installation of weapon systems for the Indian strategic naval weapons programme.²⁶⁴

Investments

The following are those with outstanding investments for the period 1 January 2019- 1 October 2020. All figures are in USD millions.

Investor	Country	Loans	Grand Total
Bank of India	India	\$11.1	\$11.1
Kohlberg Kravis Roberts & Co	United States	\$36.3	\$36.3
State Bank of India	India	\$12.7	\$12.7
Grand Total		\$60.1	\$60.1

Table 25: Investments in Walchandnagar Industries



Investors

Nuclear weapon producing companies included in this financial analysis present a significant, but not exhaustive review of the nuclear weapon industry. The 25 companies included are all publicly traded and have multi-year contracts for key components or services that contribute to activities prohibited under the Treaty on the Prohibition of Nuclear Weapons, including development, testing, production, manufacture, possession, stockpiling or use.

Governments hire companies to build the key components for nuclear weapons and to manage and operate the facilities in which nuclear weapons are produced. To secure those contracts, companies need to raise capital through loans or by issuing bonds. Many of the companies involved in nuclear weapon production are also publicly traded, so both individuals and institutions share profits (and losses).

Companies involved in producing nuclear weapons spend enormous amounts to get contracts, many of which run for multiple years. Nevertheless, even when contracts are in place, every producer also includes notes to their shareholders about the risk of taking on government contracts. Political and regulatory change can cause contracts to be terminated, and companies to report losses on their balance sheets. Reduced appetite for risk, including regulatory and reputational risk, can cause financiers and investors to stay away from companies connected to prohibited weapons.

Nuclear weapon producing companies included in this financial analysis present a significant, but not exhaustive review of the nuclear weapon industry. The 25 companies included are all publicly traded and have multi-year contracts for key components or services that contribute to activities prohibited under the Treaty on the Prohibition of Nuclear Weapons, including development, testing, production, manufacture, possession, stockpiling or use.

For a company to be included in the list of nuclear weapon producers, it must be open to private investment and produce goods or services that specifically contribute to nuclear weapon development, testing, production, manufacture, possession, stockpiling or use. These activities are outlawed under the Treaty on the Prohibition of Nuclear Weapons.

The financial information included here comprises financial institutions participating in loans and underwriting deals since 1 January 2019, as well as those involved in loans which have been closed before that date but have not yet matured before 1 October 2020. When it comes to investments in shares or bonds of the weapons companies, a group-level threshold of at least 0.5% of the outstanding shares or bonds at most recent filing dates is applied per financial institution.

The report does not include investments made by governments, universities, or churches, only financial institutions. This selection of financial institutions is limited by a reporting threshold. Only share and bond holdings larger than 0.5% of the total number of outstanding shares of the nuclear weapon producing companies are listed.

Key findings

\$685 billion invested in 25 nuclear weapon producing companies.

\$685,164 million was made available to the nuclear weapons producing between January 2019 and July 2021. The total investments are split, with slightly more in share and bondholding than in loans and underwriting.

Total number of investors, countries of origin

There are a total of 338 investors with financial relationships to the nuclear weapon producing companies, from 31 countries. The significant majority of these investments comes from countries that either possess nuclear weapons of their own or otherwise endorse the use of nuclear weapons.

Investor parent country	Total investments (U.S. millions)	Percentage of total
Australia	\$ 6,654	0.97%
Bahrain	\$ 157	0.02%
Bermuda	\$ 448	0.07%
Canada	\$ 21,356	3.12%
Chile	\$ 20	0.00%
China	\$ 3,915	0.57%
Denmark	\$ 240	0.04%
Finland	\$ 81	0.01%
France	\$ 44,399	6.48%
Germany	\$ 20,908	3.05%
Hong Kong	\$ 719	0.10%
India	\$ 4,750	0.69%
Italy	\$ 8,107	1.18%
Japan	\$ 38,402	5.60%
Luxembourg	\$ 3,318	0.48%
Netherlands	\$ 909	0.13%
Norway	\$ 4,926	0.72%
Philippines	\$ 33	0.00%
Portugal	\$ 33	0.00%
Russia	\$ 3,074	0.45%
Saudi Arabia	\$ 1,578	0.23%
Singapore	\$ 1,409	0.21%
South Africa	\$ 200	0.03%
South Korea	\$ 46	0.01%
Spain	\$ 16,191	2.36%
Sweden	\$ 358	0.05%
Switzerland	\$ 4,882	0.71%
Taiwan	\$ 247	0.04%
United Arab Emirates	\$ 1,511	0.22%
United Kingdom	\$ 30,966	4.52%
United States	\$ 465,321	67.91%
Grand Total	\$ 685,164	

Table 26 Investors by country of origin

Top 10 investors

The top 10 investors all come from the United States. Their combined investments in the 25 nuclear weapon producing companies totals \$339,383 million, representing almost half of all outstanding investments.

Top 10 investors compared

Investor	Country	2021	2020	change
Vanguard	United States	\$50,971	\$61,252	-\$10,281
State Street	United States	\$45,564	\$46,770	-\$1,206
Capital Group	United States	\$41,773	\$62,394	-\$20,621
BlackRock	United States	\$40,711	\$44,792	-\$4,081
Bank of America	United States	\$38,405	\$33,088	\$5,317
Citigroup	United States	\$33,343	\$25,386	\$7,957
JPMorgan Chase	United States	\$30,407	\$17,119	\$13,288
Wells Fargo	United States	\$22,604	\$20,688	\$1,916
Morgan Stanley	United States	\$18,737	\$10,175	\$8,562
Wellington Management	United States	\$16,868	\$13,255	\$3,613
Total		\$339,383	\$334,920	\$4,463

Table 27 Top 10 investors in nuclear weapon producers compared. All figures in USD millions.

The top 10 investors, not including U.S. based investors hold a combined investment of \$105,402 million.

Investor	Country	Amount (U.S. millions)
Deutsche Bank	Germany	\$ 14,030
Mizuho Financial	Japan	\$ 13,307
Mitsubishi UFJ Financial	Japan	\$ 12,622
BNP Paribas	France	\$ 12,338
Crédit Agricole	France	\$ 10,938
SMBC Group	Japan	\$ 10,529
Société Générale	France	\$ 9,169
Royal Bank of Canada	Canada	\$ 9,095
Groupe BPCE	France	\$ 7,046
Santander	Spain	\$ 6,328

Table 28: Top 10 Non-U.S. investors, all figures in US millions

Analysis- a downward trend

There is a downtrend in the total number of investors, as well as in share and bondholding. Overall, there are 75 new financial institutions with investment in nuclear weapon producers, while 127 divested in the previous year, bringing the total number of investors down from 390 to 338. Divesting institutions came from the following countries: Bahamas (1), Belgium (2), Bermuda (2), Canada (1), China (2), Denmark (1), France (4), Germany (2), India (32), Ireland (2), Israel (1), Japan (2), Libya (1), Netherlands (2), Philippines (1), Singapore (1), South Africa (1), Spain (2), Switzerland (2), Taiwan (3), United Arab Emirates (1), United Kingdom (10), and the United States (51).

Investor	Country	Amount divested in US millions
Longview Asset Management	United States	\$5,765
Life Insurance Corporation of India	India	\$3,673
Legg Mason	United States	\$2,973
Yuanta Financial	Taiwan	\$2,433
SIG Susquehanna	United States	\$1,646
Soroban Capital Partners	United States	\$1,001
Indian Overseas Bank	India	\$813
Citadel	Bermuda	\$764
Larsen & Toubro	India	\$710
Kotak Mahindra Bank	India	\$514
Total		\$20,292

Table 29 Top 10 Divesting institutions 2020-2021

Compared to the previous year, there was a drop of more than \$140 billion shareholding value, and overall bondholding fell by \$3.5 billion to \$7.8 billion.

Total loans offered (not including underwriting) to the nuclear weapon producing companies has increased by more than \$40 billion, though the number of institutions offering loans has dropped. The top 10 financiers have mostly demonstrated a reduced appetite for these nuclear weapon companies. Total underwriting, or bond issuances, was the only type of investment to increase in the last year, from \$67.2 billion in 2020 to \$120 billion in 2021. The top six issuers were from the U.S., with German, French and Japanese banks rounding out the top ten.

Types of investment compared

	2021	2020	2019
Bondholding	\$7,819.7	\$9,180.4	\$25,552.6
Loans	\$211,398.8	\$180,778.3	\$142,606.5
Shareholding	\$345,919.2	\$413,339.9	\$544,704.6
Underwriting	\$120,045.8	\$42,751.9	\$35,576.7
Grand Total	\$685,183.6	\$646,050.5	\$748,440.4

Table 30 Types of investments compared 2021-2019, all figures in USD millions

Shareholding

Assessing changes in shareholding over time can be more of a reflection of the market than of the actual intention of owners- in some situations. With others, there is a clear effort to exit ownership of key holdings. A look at the top 10 shareholders shows a \$92 billion reduction in the total value of shares held in this group. Compared to the previous year, there was a drop of more than \$140 billion shareholding value.

Investor	Country	2021	2020	Change
Vanguard	United States	\$50,028	\$73,315	-\$23,287
State Street	United States	\$45,194	\$60,414	-\$15,220
Capital Group	United States	\$41,773	\$64,048	-\$22,275
BlackRock	United States	\$40,651	\$52,800	-\$12,149
Wellington Management	United States	\$16,817	\$16,766	\$51
Newport Group	United States	\$15,133	\$16,576	-\$1,443
Geode Capital Holdings	United States	\$8,411	\$11,334	-\$2,923
Fidelity Investments	United States	\$7,779	\$11,492	-\$3,713
Franklin Resources	United States	\$7,260	\$5,467	\$1,793
T. Rowe Price	United States	\$6,710	\$19,548	-\$12,838
Totals		\$239,756	\$331,759	-\$92,004

Table 31 Top 10 Shareholders compared, all figures in USD millions.

Bondholding

Bondholding values of the top 10 investors increased by \$2.4 billion between 2020 and 2021, while overall bondholding fell by \$3.5 billion to \$7.8 billion.

Investor	Country	2021	2020	Change
Vanguard	United States	\$944	\$395	\$549
Pacific Century Group	Hong Kong	\$719	\$0	\$719
TIAA	United States	\$571	\$730	-\$159
Government Pension Fund - Global	Norway	\$505	\$0	\$505
Guggenheim Capital	United States	\$358	\$6	\$352
Macquarie Group	Australia	\$340	\$194	\$146
Northwestern Mutual	United States	\$304	\$135	\$169
State Farm	United States	\$284	\$296	-\$12
White Mountains Insurance	Bermuda	\$260	\$273	-\$13
Lord, Abbett & Co	United States	\$253	\$64	\$189
Total		\$4,538	\$2,092	\$2,445

Table 32 Top 10 Bondholders compared, all figures in USD millions.

Loans

Total loans offered (not including underwriting) to the nuclear weapon producing companies has increased by about \$40 billion. The number of lenders has decreased.

Investor	Country	2020	2021	Change
Citigroup	United States	\$28,533	\$24,247	-\$4,286
Bank of America	United States	\$27,209	\$19,493	-\$7,716
JPMorgan Chase	United States	\$17,155	\$14,208	-\$2,947
Wells Fargo	United States	\$18,183	\$11,636	-\$6,547
Mitsubishi UFJ Financial Group	Japan	\$11,901	\$9,264	-\$2,637
Mizuho Financial	Japan	\$7,193	\$8,683	\$1,490
BNP Paribas	France	\$10,148	\$7,195	-\$2,953
Deutsche Bank	Germany	\$5,399	\$6,817	\$1,418

SMBC Group	Japan	\$5,388	\$6,519	\$1,131
Crédit Agricole	France	\$5,144	\$6,109	\$965

Table 33 Top 10 lenders compared, all figures in USD millions.

Issuances

Total underwriting, or bond issuances increased in the last year, from \$67.2 billion in 2020 to \$120 billion in 2021. The top six issuers were from the U.S., with German, French and Japanese banks rounding out the top ten.

Investor	Country	2021	2020	Change
Bank of America	United States	\$12,811	\$7,690	\$5,121
JPMorgan Chase	United States	\$10,778	\$2,855	\$7,923
Morgan Stanley	United States	\$9,837	\$6,680	\$3,157
Citigroup	United States	\$9,096	\$3,260	\$5,836
Goldman Sachs	United States	\$7,088	\$2,848	\$4,240
Wells Fargo	United States	\$6,921	\$3,132	\$3,789
Deutsche Bank	Germany	\$6,726	\$3,092	\$3,634
BNP Paribas	France	\$5,143	\$2,219	\$2,924
Mizuho Financial	Japan	\$4,624	\$1,943	\$2,681
SMBC Group	Japan	\$4,011	\$1,395	\$2,616
Total		\$77,035	\$35,115	\$41,921

Table 34 Top 10 Bond issuers compared, all figures in USD millions

Multi-year comparisons

As the list of producers changes slightly each year, taking a longer look at the same companies over time can offer a better illustration of the downward trend of investments. A comparative analysis over the last three years of financial relationships with 14 companies shows a \$200 billion drop.

Company	Country	2021	2020	2019
Aerjet Rocketdyne	United States	\$4,848	\$5,148	\$4,792
Airbus	Netherlands	\$58,951	\$31,265	\$44,455
BAE Systems	United Kingdom	\$27,247	\$22,666	\$22,814
Bechtel	United States	\$3,500	\$4,544	\$4,000
Boeing	United States	\$143,690	\$131,482	\$254,444
Fluor	United States	\$10,848	\$10,812	\$17,465
General Dynamics	United States	\$55,616	\$54,207	\$72,630
Honeywell	United States	\$34,923	\$78,024	\$78,397
Huntington Ingalls Industries	United States	\$21,772	\$19,408	\$12,568
Jacobs Engineering	United States	\$4,776	\$7,871	\$15,563
Lockheed Martin	United States	\$63,740	\$75,296	\$77,543
Northrop Grumman	United States	\$35,767	\$41,792	\$53,023
Safran	France	\$31,125	\$22,687	\$24,661
Thales	France	\$8,575	\$6,239	\$21,080
Total		\$505,379	\$511,440	\$703,434

Table 35 3 year comparison of investments in nuclear weapon producers.

Full investment table

The report does not include investments made by governments, universities, or churches, only financial institutions. This selection of financial institutions is limited by a reporting threshold. Only share and bond holdings larger than 0.5% of the total number of outstanding shares of the nuclear weapon producing companies are listed.

Investor	Investor Country	Grand Total	Aerojet Rocketdyne	Airbus	BAE Systems	Bechtel	Bharat Dynamics Limited	Boeing	China Aerospace Science and Technology (CASC)	Constructions Industrielles de la Méditerranée	Fluor	General Dynamics
A.K. Group	India	336.3										
Abu Dhabi Investment Council	UAE	50.0						50.0				
Academy Securities	U.S.A.	352.1						248.5				40.0
Aegon	Netherlands	158.9			98.9							
Affiliated Managers Group	U.S.A.	1,680.7			1,213.0							
AGF Management	Canada	142.5										
Algemeen Burgerlijk Pensioenfonds (ABP)	Netherlands	19.9										
Allahabad Bank	India	10.0										
Allianz	Germany	133.2										
Allstate	U.S.A.	90.7			90.7							
Ally Financial	U.S.A.	52.5										
Alpine Associates Management	U.S.A.	64.6	64.6									
Alyeska Investment Group	U.S.A.	43.7										
American Century Investments	U.S.A.	669.5			123.8							
American Equity	U.S.A.	78.0										
American Financial Group	U.S.A.	18.0										
American National Insurance	U.S.A.	14.3								14.3		
Ameriprise Financial	U.S.A.	2,974.1			473.0							

					336.3										
	27.0							2.9	33.8						
			60.0												
		127.4										340.3			
		142.5													
						19.9									
					10.0										
		40.0				69.5							23.7		
				52.5											
		43.7													
				413.8									131.9		
		16.0	42.0									20.0			
		18.0													
				43.3				949.7	364.5	1,143.5					

Investor	Investor Country	Grand Total	Aerojet Rocketdyne	Airbus	BAE Systems	Bechtel	Bharat Dynamics Limited	Boeing	China Aerospace Science and Technology (CASC)	Constructions Industrielles de la Méditerranée	Fluor	General Dynamics	
Anima	Italy	33.1											
ANZ	Australia	1,715.6		75.6	90.5	225.0		728.5			70.0	21.8	
Apollo Global Management	U.S.A.	50.0	50.0										
Apple Financial Holdings	U.S.A.	100.4										100.4	
Apto Partners	U.S.A.	63.6						63.6					
AQR Capital Management	U.S.A.	149.6	23.7										
Arab Banking Corporation (Bank ABC)	Bahrain	118.3						118.3					
Aristotle Capital Management	U.S.A.	753.0										753.0	
ARP Americas	U.S.A.	57.8	57.8										
Arrowstreet Capital	U.S.A.	590.8											
Artisan Partners	U.S.A.	330.1			330.1								
Auto-Owners Insurance	U.S.A.	14.6									14.6		
Aviva	UK	228.6			168.6								
AXA	France	1,066.5			1,066.5								
Axis Bank	India	845.4											
Baird	U.S.A.	216.8			27.7								
Banca d'Italia	Italy	39.2											
Banca Popolare di Sondrio	Italy	70.9											
Banco Bilbao Vizcaya Argentaria (BBVA)	Spain	5,968.6		1,394.0				2,165.6				1,688.2	
Banco BPM	Italy	357.4											
Banco de Sabadell	Spain	33.3										33.3	
Bancroft Capital (PA)	U.S.A.	13.0						13.0					
Bancroft Group (VI)	UK	20.3						20.3					

	Honeywell	Huntington Ingalls Industries	Jacobs Engineering	L3 Harris Technologies	Larsen & Toubro	Leidos	Leonardo	Lockheed Martin	Northrop Grumman	Raytheon Technologies Corp	Rostec	Safran	Textron	Thales	Walchandnagar Industries Limited
						33.1									
164.0								67.3	33.8	163.3				75.9	
		125.8													
								590.8							
												60.0			
					845.4										
	34.3					135.2							19.7		
							39.2								
							70.9								
351.0		134.5					111.2							124.2	
							357.4								

Investor	Investor Country	Grand Total	Aerojet Rocketdyne	Airbus	BAE Systems	Bechtel	Bharat Dynamics Limited	Boeing	China Aerospace Science and Technology (CASC)	Constructions Industrielles de la Méditerranée	Fluor	General Dynamics	
Bancroft Holding (MA)	U.S.A.	11.1						11.1					
Bank of America	U.S.A.	38,405.0	644.7	549.9	761.2	469.0		7,779.0			1,383.8	4,998.1	
Bank of Baroda	India	55.9											
Bank of China	China	1,011.7		406.2				308.5					
Bank of East Asia	China	59.1										59.1	
Bank of India	India	11.1											
Bank of New York Mellon	U.S.A.	2,872.9	52.9		451.0			118.3			110.7	519.4	
Bank of Philippine Islands	Philippines	33.3										33.3	
Barclays	UK	6,286.2		404.6	1,610.1			1,311.6			145.0	33.3	
BayernLB	Germany	552.0		253.5				158.5					
Beach Point Capital Management	U.S.A.	50.0	50.0										
Black Creek Investment Management	Canada	97.8			97.8								
BlackRock	U.S.A.	40,711.4	526.8	4,792.4	3,039.4			6,049.7			356.7	1,929.1	
Blaylock Beal Van	U.S.A.	84.2						61.3				20.0	
BMO Financial Group	Canada	680.4						300.0			100.0		
BNP Paribas	France	12,337.9		1,216.1	376.2	554.9		4,057.1		10.7	1,383.8		
Boston Private	U.S.A.	68.0									68.0		
BPER Banca	Italy	79.0											
Brandywine Global Investment Management	U.S.A.	58.7									58.7		
BrightSphere Investment Group	U.S.A.	71.9											
Brown Advisory	U.S.A.	484.9											
Cabrera Capital	U.S.A.	70.2						70.2					

	Honeywell	Huntington Ingalls Industries	Jacobs Engineering	L3 Harris Technologies	Larsen & Toubro	Leidos	Leonardo	Lockheed Martin	Northrop Grumman	Raytheon Technologies Corp	Rostec	Safran	Textron	Thales	Walchandnagar Industries Limited
	1,969.6	813.9	460.0	3,264.4		1,342.7	332.0	4,098.4	1,546.4	7,072.5		472.2	447.2		
					55.9										
	164.0						50.5						82.5		
															11.1
		253.7		349.1					33.8	849.3			134.7		
	1,398.2		59.2	305.4	473.0		132.1	92.3		245.5				75.9	
	140.0														
		1,882.5	6.5	2,754.2		812.9	191.9	4,459.8	2,292.8	5,455.0		5,261.9	744.6	155.2	
								2.9							
			134.5			145.9									
	1,205.3		743.8		411	107.0	514.9		90.0	418.5		1,142.8		475.8	
							79.0								
		71.9													
				484.9											

Investor	Investor Country	Grand Total	Aerojet Rocketdyne	Airbus	BAE Systems	Bechtel	Bharat Dynamics Limited	Boeing	China Aerospace Science and Technology (CASC)	Constructions Industrielles de la Méditerranée	Fluor	General Dynamics	
Cacti Asset Management	U.S.A.	82.6											
Caisse de dépôt et placement du Québec	Canada	1,059.3										686.9	
Caixa Geral de Depósitos	Portugal	33.3										33.3	
California Public Employees' Retirement System (CalPERS)	U.S.A.	429.3											
Canara Bank	India	10.0						10.0					
Capital Group	U.S.A.	41,773.1		8,239.2	1,461.8			1,578.4				1,976.2	
Capital One Financial	U.S.A.	1,495.4	45.6									251.8	
Cassa Depositi e Prestiti	Italy	221.3											
CastleOak Securities	U.S.A.	57.6						57.6					
Cathay Financial	Taiwan	23.4											
Cathay General Bancorp	U.S.A.	45.3	37.2									8.1	
Causeway Capital Holdings	U.S.A.	96.5											
Chang Hwa Commercial Bank	Taiwan	20.1										20.1	
Charles Schwab	U.S.A.	3,587.0	26.5					705.6			34.9		
Children's Investment Fund Management	UK	2,911.2											
China Merchants Group	China	745.9							745.9				
CI Financial	Canada	124.4											
CIBC	Canada	389.0				225.0							

Investor	Investor Country	Grand Total	Aerojet Rocketdyne	Airbus	BAE Systems	Bechtel	Bharat Dynamics Limited	Boeing	China Aerospace Science and Technology (CASC)	Constructions Industrielles de la Méditerranée	Fluor	General Dynamics	
Cincinnati Financial	U.S.A.	15.0									15.0		
Citigroup	U.S.A.	33,342.9		632.9	1,433.4	469.0		11,415.9			800.5	183.5	
Citizens Financial Group	U.S.A.	323.9	82.5									106.9	
CL King & Associates	U.S.A.	68.9						66.0					
Clartan Associés	France	40.4											
Comerica	U.S.A.	123.8									50.0		
Commerzbank	Germany	5,037.1		1,155.0	307.2			2,575.2		10.7			
Commonwealth Bank of Australia	Australia	75.6		75.6									
Compagnie Financière Tradition	Switzerland	23.4											
Confédération Nationale du Crédit Mutuel	France	93.5											
Cooke & Bieler	U.S.A.	309.9											
Crédit Agricole	France	10,938.2		3,644.1	90.5	294.0		2,523.1		72.5	185.0		
Crédit Mutuel CIC Group	France	3,082.6		559.6	90.5	225.0						199.6	
Credit Suisse	Switzerland	2,058.6		253.5				1,360.0					
Credito Valtellinese	Italy	20.4											
CSC Financial	China	157.1							157.1				
CTBC Financial Holding	Taiwan	33.3										33.3	
D.E. Shaw & Co.	U.S.A.	42.5									42.5		
Danske Bank	Denmark	239.6		75.6									
DBS	Singapore	1,409.5		253.5				790.9					
Deka Group	Germany	495.8		495.8									
Dena Bank	India	10.0											
Desjardins Group	Canada	2.8											

	Honeywell	Huntington Ingalls Industries	Jacobs Engineering	L3 Harris Technologies	Larsen & Toubro	Leidos	Leonardo	Lockheed Martin	Northrop Grumman	Raytheon Technologies Corp	Rostec	Safran	Textron	Thales	Walchandnagar Industries Limited
	5,245.1			359.0	99.5	2,060.7	160.6	2,208.5	1,580.6	5,981.1		156.7	480.1	75.9	
			134.5												
								2.9							
												40.4			
				57.1					16.7						
							164.5			81.1		156.7		586.7	
					23.4										
												93.5			
		93.4				216.5									
	339.0						463.9	1,000.2		313.2		1,214.4		798.3	
				57.1			50.5	50.0				1,151.9		698.3	
					45.9		20.9		90.0	288.3					
							20.4								
	164.0														
	324.0				41.1										
					10.0										
			2.8												

Investor	Investor Country	Grand Total	Aerojet Rocketdyne	Airbus	BAE Systems	Bechtel	Bharat Dynamics Limited	Boeing	China Aerospace Science and Technology (CASC)	Constructions Industrielles de la Méditerranée	Fluor	General Dynamics	
Deutsche Bank	Germany	14,029.9	21.2	1,789.4	307.2			4,310.5					
Development Bank of Japan	Japan	300.0		300.0									
Diamond Hill Investment Group	U.S.A.	248.1											
Dimensional Fund Advisors	U.S.A.	811.3	81.4								30.2		
Dodge & Cox	U.S.A.	3,055.7											
Donghai Securities	China	103.9							103.9				
Drexel Hamilton	U.S.A.	80.4						57.6				20.0	
DZ Bank	Germany	253.5		253.5									
E.SUN Financial	Taiwan	33.3										33.3	
Eaton Vance	U.S.A.	299.7									59.9		
Edelweiss Financial Services	India	336.3											
EFG International	Switzerland	113.0											
Elara Capital	UK	41.2					41.2						
Empresas Juan Yarur	Chile	19.7										19.7	
Empyrean Capital Partners	U.S.A.	136.6											
Equitable Holdings	U.S.A.	787.5	19.7		27.0								
Eurazeo	France	49.7											
European Investment Bank	Luxembourg	3,318.3		1,668.0									
Export-Import Bank of the United States	U.S.A.	350.0											
Fairfax Financial	Canada	40.6											
Falcon Edge Capital	U.S.A.	26.1	26.1										

	Honeywell	Huntington Ingalls Industries	Jacobs Engineering	L3 Harris Technologies	Larsen & Toubro	Leidos	Leonardo	Lockheed Martin	Northrop Grumman	Raytheon Technologies Corp	Rostec	Safran	Textron	Thales	Walchandnagar Industries Limited
	2,742.1	9.0	5.0	405.7	68.9		50.5			3,342.9		501.7		475.8	
				248.1											
		247.7				174.1	43.5						234.4		
										3,055.7					
								2.9							
		239.8													
					336.3										
							113.0								
		136.6													
		295.9		317.8		127.0									
		49.7													
							1,051.9					598.5			
													350.0		
		40.6													

Investor	Investor Country	Grand Total	Aerojet Rocketdyne	Airbus	BAE Systems	Bechtel	Bharat Dynamics Limited	Boeing	China Aerospace Science and Technology (CASC)	Constructions Industrielles de la Méditerranée	Fluor	General Dynamics	
Federal Bank	India	10.0											
Fidelity International	Bermuda	140.3	140.3										
Fidelity Investments	U.S.A.	7,779.0	60.6	884.9				2,638.9			136.1	710.3	
Fiera Capital	Canada	12.1											
Fifth Third Bancorp	U.S.A.	484.8	82.5									278.7	
Findlay Park Partners	UK	246.1											
First Abu Dhabi Bank	UAE	1,461.1			901.3			241.8				21.8	
First Capital Securities	China	51.1							51.1				
First Financial Holding	Taiwan	32.1										32.1	
First Horizon	U.S.A.	135.4											
First Trust Advisors	U.S.A.	415.4										272.1	
FirstMerit	U.S.A.	33.3										33.3	
Focus Financial Partners	U.S.A.	66.2											
Foresters Financial	Canada	50.2											
Franklin Resources	U.S.A.	7,371.2	64.7		1,323.5							358.9	
Fuyo General Lease	Japan	190.0										190.0	
Gabelli Funds	U.S.A.	395.1	218.8										
Gamco Investments	U.S.A.	30.1	30.1										
Genev Capital	India	141.3											
Geode Capital Holdings	U.S.A.	8,410.8	54.0		97.5			2,034.8			49.9	639.7	
Goldman Sachs	U.S.A.	13,063.6	35.7	549.9	307.2			3,872.0			150.0	183.5	

	Honeywell	Huntington Ingalls Industries	Jacobs Engineering	L3 Harris Technologies	Larsen & Toubro	Leidos	Leonardo	Lockheed Martin	Northrop Grumman	Raytheon Technologies Corp	Rostec	Safran	Textron	Thales	Walchandnagar Industries Limited
					10.0										
		466.0		294.1					1,114.5	938.8		534.8			
			12.1												
						107.0			16.7						
		246.1													
				125.0	50.7					120.5					
		135.4													
						143.3									
		66.2													
		50.2													
		278.1	27.0	684.6		25.0		900.8	673.7	3,005.7			29.3		
													176.3		
					141.3										
		439.2		606.4		212.8		1,530.2	769.7	1,734.4			242.1		
	2,348.2	115.1				280.1	167.5	288.7	185.6	4,158.8			421.3		

Investor	Investor Country	Grand Total	Aerojet Rocketdyne	Airbus	BAE Systems	Bechtel	Bharat Dynamics Limited	Boeing	China Aerospace Science and Technology (CASC)	Constructions Industrielles de la Méditerranée	Fluor	General Dynamics
Government Pension Fund Global	Norway	2,670.3										388.0
GQG Partners	U.S.A.	406.2										
Grantham Mayo Van Otterloo & Co	U.S.A.	66.3	66.3									
Great Pacific Securities	U.S.A.	62.2						62.2				
Groupe BPCE	France	7,046.0		1,516.6				2,967.9		21.5		653.3
Guardian Life Insurance Company of America	U.S.A.	44.3										
Guggenheim Capital	U.S.A.	358.2			123.0							
Gulf International Bank	Bahrain	39.4										
Guzman & Co	U.S.A.	66.0						66.0				
Hancock Whitney	U.S.A.	83.3										
Hankou Bank	China	103.9							103.9			
HDFC Bank	India	482.0										
Hengistbury Investment Partners	UK	158.9			158.9							
Hoover Financial Advisors	U.S.A.	56.5										
Hotchkis & Wiley Capital Management	U.S.A.	197.4								197.4		
HSBC	UK	6,200.4		1,216.1		225.0				10.7	145.0	
Hua Nan Financial	Taiwan	46.2										46.2
Hubei Bank	China	103.9							103.9			
Hudson Bay Capital Management	U.S.A.	34.5	34.5									
Iberia Bank	U.S.A.	20.1										20.1

	Honeywell	Huntington Ingalls Industries	Jacobs Engineering	L3 Harris Technologies	Larsen & Toubro	Leidos	Leonardo	Lockheed Martin	Northrop Grumman	Raytheon Technologies Corp	Rostec	Safran	Textron	Thales	Walchandnagar Industries Limited
				360.1		179.4	39.5			1,527.2				176.0	
				406.2											
							79.0					774.2	125.0	908.5	
		9.3										35.0			
						68.9	15.0						151.3		
										39.4					
		83.3													
					482.0										
		56.5													
	351.0		193.7	400.9	334.1		389.5			1,762.7		695.9		475.8	

Investor	Investor Country	Grand Total	Aerojet Rocketdyne	Airbus	BAE Systems	Bechtel	Bharat Dynamics Limited	Boeing	China Aerospace Science and Technology (CASC)	Constructions Industrielles de la Méditerranée	Fluor	General Dynamics
ICICI Bank	India	518.2						327.8				
IDBI Bank	India	41.2					41.2					
IFS Group	U.S.A.	19.0						19.0				
Impala Asset Management	U.S.A.	35.7									35.7	
Industrial and Commercial Bank of China	China	1,474.4		253.5				654.3				
ING Group	Netherlands	730.2		253.5							476.7	
Intesa Sanpaolo	Italy	1,523.3						450.5			100.0	
Invesco	U.S.A.	3,632.7		878.3	1,066.7							618.1
ISALT	France	284.9										
Janus Henderson	UK	2,085.9										371.6
JM Financial	India	267.6										
JPMorgan Chase	U.S.A.	30,406.7	82.5	1,138.3	90.5	225.0		8,543.7				3,214.9
Jupiter Fund Management	UK	180.9			180.9							
KeyCorp	U.S.A.	144.1	82.5									
KfW	Germany	253.5		253.5								
Kohlberg Kravis Roberts & Co	U.S.A.	36.3										
Lagan Holding Company	U.S.A.	113.4										
Landesbank Baden-Württemberg (LBBW)	Germany	75.6		75.6								
Landesbank Hessen-Thüringen	Germany	75.6		75.6								
Lazard	Bermuda	47.5									47.5	
Legal & General	UK	1,020.0			387.4							
LKP Group	India	56.8										
Lloyds Banking Group	UK	3,492.7		866.8	307.2			781.5			185.0	830.8

	Honeywell	Huntington Ingalls Industries	Jacobs Engineering	L3 Harris Technologies	Larsen & Toubro	Leidos	Leonardo	Lockheed Martin	Northrop Grumman	Raytheon Technologies Corp	Rostec	Safran	Textron	Thales	Walchandnagar Industries Limited
					190.4										
	351.0		134.5							81.1					
	140.0						751.7			81.1					
		185.1				84.3							800.2		
				1,604.1		110.2						284.9			
					267.6										
	2,584.1	564.6	59.2	367.8		1,687.8	218.0	2,208.5	2,331.6	6,500.9			465.3	124.2	
									16.7	45.0					
															36.3
		113.4													
		193.8		243.9		115.5							79.4		
					56.8										
								521.4							

Investor	Investor Country	Grand Total	Aerojet Rocketdyne	Airbus	BAE Systems	Bechtel	Bharat Dynamics Limited	Boeing	China Aerospace Science and Technology (CASC)	Constructions Industrielles de la Méditerranée	Fluor	General Dynamics
Loews Corporation	U.S.A.	14.5									14.5	
Lone Star Funds	U.S.A.	163.2		163.2								
Loop Capital	U.S.A.	261.1						248.5				
Lord, Abbett & Co	U.S.A.	252.9									40.5	
LSV Asset Management	U.S.A.	669.5			150.6							
M&G	UK	218.6			188.5							
M&T Bank	U.S.A.	36.9	36.9									
Macquarie Group	Australia	1,791.7			115.3							
Madison Asset Management	U.S.A.	83.8										
Magnetar Capital	U.S.A.	143.2	143.2									
Majedie Asset Management	UK	233.7			233.7							
Manulife Financial	Canada	151.1			28.2							
Marathon Asset Management (UK)	UK	93.8			93.8							
MassMutual Financial	U.S.A.	122.7		59.8								
MBS	U.S.A.	57.9						57.9				
Mediobanca Banca di Credito Finanziario	Italy	50.5										
Mega Financial	Taiwan	60.2										60.2
MetLife	U.S.A.	224.7			30.4							
MFR	U.S.A.	63.6						63.6				
Millennium Management	U.S.A.	38.5	38.5									
Mirae Asset Financial Group	South Korea	46.2										

	Honeywell	Huntington Ingalls Industries	Jacobs Engineering	L3 Harris Technologies	Larsen & Toubro	Leidos	Leonardo	Lockheed Martin	Northrop Grumman	Raytheon Technologies Corp	Rostec	Safran	Textron	Thales	Walchandnagar Industries Limited
		36.5		81.2		18.2							12.7		
		278.1											76.4		
							30.1						240.8		
				35.1		55.5		84.0	719.7	732.1		50.0			
		83.8													
		122.9													
												62.9			
							50.5								
			47.5	65.8								81.0			
		46.2													

Investor	Investor Country	Grand Total	Aerojet Rocketdyne	Airbus	BAE Systems	Bechtel	Bharat Dynamics Limited	Boeing	China Aerospace Science and Technology (CASC)	Constructions Industrielles de la Méditerranée	Fluor	General Dynamics
Mischler Financial Group	U.S.A.	679						48.1				
Mitsubishi UFJ Financial	Japan	12,621.7	82.5	404.6	1,171.5	294.0		2,684.8			1,283.8	1,330.8
Mizuho Financial	Japan	13,307.3		1,486.3	90.5			4,469.4			70.0	1,880.3
Modern Woodmen of America	U.S.A.	30.0										
Morgan Stanley	U.S.A.	18,737.0	82.8	1,141.2	307.2			5,097.3			29.6	
National Life Group	U.S.A.	20.0										
National Western Life Group	U.S.A.	30.0									30.0	
Nationwide Mutual Insurance	U.S.A.	71.3										
NatWest	UK	3,016.3		1,746.5	307.2							21.8
Neuberger Berman	U.S.A.	338.3									18.9	
New York Life Insurance	U.S.A.	136.5	21.5	63.1								
Newport Group	U.S.A.	15,132.6						11,753.9				3,378.7
NewSouth Capital Management	U.S.A.	64.3	64.3									
Nierenberg Investment Management	U.S.A.	19.9									19.9	
Ninety One	South Africa	200.3										
Nordea	Finland	81.1										
Norges Bank	Norway	2,255.9										398.8
Northern Trust	U.S.A.	6,577.3	36.6		810.8			1,235.8			41.9	684.6
Northhill Capital	UK	790.1										
Northwestern Mutual	U.S.A.	304.1			32.4							75.0
Novikombank	Russia	37.1										

	Honeywell	Huntington Ingalls Industries	Jacobs Engineering	L3 Harris Technologies	Larsen & Toubro	Leidos	Leonardo	Lockheed Martin	Northrop Grumman	Raytheon Technologies Corp	Rostec	Safran	Textron	Thales	Walchandnagar Industries Limited
								2.9	16.9						
	919.5	135.4	193.7	191.7		2,060.7	185.5	75.0	115.0	225.4		915.9	352.0		
	1,501.6	564.6		125.0		220.9		2,340.8	90.0	468.0					
			10.0									20.0			
	1,822.6	41.9	193.7	3,286.9			20.9	1,443.3	465.5	4,718.3			85.8		
												20.0			
		71.3													
	351.0		59.2				328.9			45.0		156.7			
				319.4											
		9.8		42.0											
		200.3													
										81.1					
				372.4		147.9	71.1			1,089.3				176.3	
	324.0	171.9	59.2	489.2		264.9		977.9	357.0	952.4			171.1		
				790.1											
				119.7								77.0			
											37.1				

Investor	Investor Country	Grand Total	Aerojet Rocketdyne	Airbus	BAE Systems	Bechtel	Bharat Dynamics Limited	Boeing	China Aerospace Science and Technology (CASC)	Constructions Industrielles de la Méditerranée	Fluor	General Dynamics	
Nuance Investments	U.S.A.	29.2	29.2										
Oddo BHF	France	289.8											
OneAmerica Asset Management	U.S.A.	50.0									14.0		
Opus Corporate Finance LLP	UK	37.2	37.2										
Orix Corporation	Japan	1,261.4										479.7	
P. Schoenfeld Asset Management	U.S.A.	56.4	56.4										
Pacific Century Group	Hong Kong	719.4		719.4									
Pacific Investments	UK	60.0											
Passionate Investment Management	India	45.9											
Pendal Group	Australia	311.2											
PenderFund Capital Management	Canada	13.3									13.3		
Penserra Capital Management	U.S.A.	93.4						90.6					
People's United Financial	U.S.A.	73.5										73.5	
Perpetual	Australia	764.3										541.8	
Pictet	Switzerland	60.7											
PNC Financial Services	U.S.A.	1,982.0						230.2				340.5	
Power Financial Corporation	Canada	569.9											
Primecap Management	U.S.A.	2,340.0		1,071.1									

Investor	Investor Country	Grand Total	Aerojet Rocketdyne	Airbus	BAE Systems	Bechtel	Bharat Dynamics Limited	Boeing	China Aerospace Science and Technology (CASC)	Constructions Industrielles de la Méditerranée	Fluor	General Dynamics	
Principal Financial Group	U.S.A.	141.0	24.0										
Prudential Financial (US)	UK	20.1											
	U.S.A.	802.6											
Prudential Plc	UK	37.9											
Punjab & Sind Bank	India	10.0											
Pzena Investment Management	U.S.A.	508.6											
Quaero Capital	Switzerland	0.7								0.7			
R. Seelaus & Co	U.S.A.	75.9						73.0					
Raven's Wing Asset Management	U.S.A.	5,454.4										5,454.4	
Raymond James Financial	U.S.A.	27.5										27.5	
Regions Financial	U.S.A.	872.3	82.5								441.7	241.1	
Reinhart Partners	U.S.A.	38.0	38.0										
Renaissance Technologies	U.S.A.	18.1									18.1		
Riyad Bank	Saudi Arabia	1,578.3						550.4				21.8	
Royal Bank of Canada	Canada	9,095.5	82.5	617.5	761.2			4,188.3			13.5	2,494.8	
Royal London Group	UK	98.6			98.6								
Ruane, Cunniff & Goldfarb	U.S.A.	502.9											
Samlyn Capital	U.S.A.	49.8											
Santander	Spain	6,328.0		1,540.2				2,209.1			145.0		
SAR Holdings	U.S.A.	54.1						54.1					
Schroders	UK	125.3			125.3								

	Honeywell	Huntington Ingalls Industries	Jacobs Engineering	L3 Harris Technologies	Larsen & Toubro	Leidos	Leonardo	Lockheed Martin	Northrop Grumman	Raytheon Technologies Corp	Rostec	Safran	Textron	Thales	Walchandnagar Industries Limited
		79.2	37.8												
						20.1									
			2.8			55.3		68.5				676.0			
		19.5											18.4		
					10.0										
		57.5											451.1		
								2.9							
						107.0									
								466.7		539.4					
	351.0	77.4		105.0		107.0		92.3		205.0					
		502.9													
		49.8													
	866.0						111.2			81.1		788.8		586.7	

Investor	Investor Country	Grand Total	Aerojet Rocketdyne	Airbus	BAE Systems	Bechtel	Bharat Dynamics Limited	Boeing	China Aerospace Science and Technology (CASC)	Constructions Industrielles de la Méditerranée	Fluor	General Dynamics	
Schweizerische Nationalbank	Switzerland	64.4											
Scotiabank	Canada	2,305.8									185.0	592.3	
Securian	U.S.A.	13.5											
Select Equity Partners	U.S.A.	650.7											
Shank Williams Cisneros & Co	U.S.A.	162.5						116.3					
Shenwan Hongyuan Group	China	103.9							103.9				
Silchester International Investors	UK	642.0			642.0								
Skandinaviska Enskilda Banken	Sweden	344.0		253.5	90.5								
SMBC Group	Japan	10,529.3	37.2	1,225.2	90.5	294.0		4,289.9			310.0	460.5	
Sociedad Estatal de Participaciones Industriales	Spain	3,861.5		3,861.5									
Société Générale	France	9,169.1		2,128.8	376.2			3,229.6		21.5			
Southern Farm Bureau Life Insurance	U.S.A.	4.0											
Sovcombank	Russia	371											
Spring Creek Capital	U.S.A.	44.4	44.4										
Standard Chartered	UK	2,333.1		75.6				728.5			285.0		
Standard Life Aberdeen	UK	297.0			297.0								
State Bank of India	India	945.7						318.3				113.7	
State Farm	U.S.A.	284.2			86.5						55.7		
State Street	U.S.A.	45,563.7	157.5		307.5			7,097.0			99.5	2,091.4	
Steel Partners Holdings	U.S.A.	185.5	185.5										
Stern Brothers & Co	U.S.A.	63.6						63.6					

	Honeywell	Huntington Ingalls Industries	Jacobs Engineering	L3 Harris Technologies	Larsen & Toubro	Leidos	Leonardo	Lockheed Martin	Northrop Grumman	Raytheon Technologies Corp	Rostec	Safran	Textron	Thales	Walchandnagar Industries Limited
		64.4													
	164.0	239.6	193.7	340.2		394.0			33.8	163.3					
			13.5												
		650.7													
				16.5				2.9	16.9				10.0		
	1,201.6			317.7	23.4	182.0	164.5	84.5	106.7	418.5		615.1	520.4	187.5	
	846.0						418.0			81.1		1,480.4		587.4	
			4.0												
											37.1				
	351.0				105.9					96.1		615.1		75.9	
					500.9										12.7
			71.0						71.0						
		1,777.8	12.1	1,767.9		517.2		15,104.0	5,111.7	10,963.2			557.0		

Investor	Investor Country	Grand Total	Aerojet Rocketdyne	Airbus	BAE Systems	Bechtel	Bharat Dynamics Limited	Boeing	China Aerospace Science and Technology (CASC)	Constructions Industrielles de la Méditerranée	Fluor	General Dynamics	
Stifel Financial	U.S.A.	3.9										3.9	
Sumitomo Mitsui Trust	Japan	192.8											
Sun Life Financial	Canada	4,242.5											
T. Rowe Price	U.S.A.	6,710.1		748.2				1,127.3					
Tamilnad Mercantile Bank	India	10.0											
TCW Group	U.S.A.	2.8											
Teacher Retirement System of Texas	U.S.A.	103.3											
Telsey Advisory Group	U.S.A.	90.6						90.6					
The Hartford	U.S.A.	21.5											
Thrivent Financial	U.S.A.	9.4	9.4										
TIAA	U.S.A.	3,028.7		466.9	105.8			702.4			15.2		
Toronto-Dominion Bank	Canada	2,381.2		253.5	185.1							222.5	
Towle & Co	U.S.A.	48.2									48.2		
Travelers	U.S.A.	24.7											
Tredje AP-Fonden (AP-3)	Sweden	13.9									13.9		
Tribal Capital Markets	U.S.A.	56.1						56.1					
Trinity Street Asset Management	UK	89.7			89.7								
Truist Financial	U.S.A.	1,397.8	119.4					554.1				278.7	
Trust Group	India	450.0											
Two Sigma Investments	U.S.A.	109.7	52.0								57.7		
UBS	Switzerland	2,562.2		75.6				764.9					
UniCredit	Italy	5,713.3		1,653.3									
Union Bank of India	India	10.0											

	Honeywell	Huntington Ingalls Industries	Jacobs Engineering	L3 Harris Technologies	Larsen & Toubro	Leidos	Leonardo	Lockheed Martin	Northrop Grumman	Raytheon Technologies Corp	Rostec	Safran	Textron	Thales	Walchandnagar Industries Limited
		102.7				90.2									
		20.5		408.2		122.5		962.6	1,939.2	754.4		35.0			
		755.0		730.4		380.7	57.6		404.1				1,991.9	514.8	
					10.0										
			2.8												
		103.3													
													21.5		
		109.4		78.0			30.0	154.8	394.7	687.9		75.0	208.6		
926.0	135.4	193.7	248.5		107.0			109.5							
		9.7	15.0												
		135.4	59.2	181.0					25.0	45.0					
					450.0										
			2.8		45.9			819.1		854.0					
1,145.3							563.0	342.3	4671	955.0				587.4	
					10.0										

Investor	Investor Country	Grand Total	Aerojet Rocketdyne	Airbus	BAE Systems	Bechtel	Bharat Dynamics Limited	Boeing	China Aerospace Science and Technology (CASC)	Constructions Industrielles de la Méditerranée	Fluor	General Dynamics
Union Bankshares	U.S.A.	6.8										6.8
United Services Automobile Association	U.S.A.	20.0										
Unum Group	U.S.A.	50.0			30.0							
US Bancorp	U.S.A.	5,406.5	82.5					851.4			245.0	340.5
Van Eck Global	U.S.A.	13.0									13.0	
Vanguard	U.S.A.	50,971.2	352.2	1,687.1	747.1			11,193.6			291.6	3,689.2
Victory Capital	U.S.A.	668.7									23.6	
Vijaya Bank	India	10.0										
Voya Financial	U.S.A.	20.0										
VTB Group	Russia	3,000.0										
Water Island Capital	U.S.A.	28.8	28.8									
Wellington Management	U.S.A.	16,867.5		888.4	124.2						53.5	2,808.7
Wells Fargo	U.S.A.	22,603.9	82.5		761.2			6,612.3			410.0	4,770.2
Westchester	U.S.A.	55.4										
Westchester Capital Management	U.S.A.	31.9	31.9									
Westpac	Australia	1,994.6		75.6				1,042.3			100.0	
White Mountains Insurance	Bermuda	260.0		95.0	88.2							
Williams Capital Group	U.S.A.	84.8						52.4				
Woodforest Financial	U.S.A.	66.8										66.8
WoodmenLife	U.S.A.	20.0										
World Bank	U.S.A.	125.0										
Yes Bank	India	136.9					41.2					
Zions Bancorporation	U.S.A.	45.6	45.6									
Grand Total		685,163.6	4,847.6	58,951.3	27,246.9	3,500.0	123.5	143,689.8	1,369.9	148.5	10,848.2	55,616.1

	Honeywell	Huntington Ingalls Industries	Jacobs Engineering	L3 Harris Technologies	Larsen & Toubro	Leidos	Leonardo	Lockheed Martin	Northrop Grumman	Raytheon Technologies Corp	Rostec	Safran	Textron	Thales	Walchandnagar Industries Limited
												20.0			
												20.0			
	726.0	564.6	193.7	428.2		220.9		538.7	115.0	753.3			346.9		
	106.0	2,799.7		3,727.2		1,434.2	81.4	7,937.5	4,129.9	9,827.6		1,377.9	1,328.5	260.6	
						221.4							423.7		
					10.0										
												20.0			
											3,000.0				
						895.1		3,849.0	3,110.6	4,534.1		603.9			
	2,442.1	765.8	743.8	1,383.2		426.0		1,184.2	1,577.3	1,204.6			240.6		
		55.4													
	680.7									96.1					
			27.9	48.9											
	27.0												5.4		
												20.0			
					125.0										
					95.7										
	34,923.1	21,771.9	4,776.0	33,712.1	5,376.0	18,217.3	8,106.8	63,740.5	35,767.0	95,954.8	3,074.2	31,125.2	13,661.4	8,575.2	60.1

Conclusion

Nuclear weapons remain the most destructive bombs ever deployed. They're designed to destroy cities, and even the smallest yield weapons would leave an intergenerational legacy resulting in deformed children, environmental contamination and decades of economic stagnation.

The entry into force of the Treaty on the Prohibition of Nuclear Weapons is an historic shift in the way the world deals with nuclear weapons. They are now comprehensively outlawed, as is any assistance with producing, manufacturing or developing them. Financial institutions that continue investing in companies building nuclear weapons face regulatory risks as more countries join the treaty. They also face an increased reputational risk as clients learn of their support for weapons of mass destruction and terminate their relationships.

With trillions of dollars of wealth moving steadily into the sustainability market, investments cannot only do well, they must also do good. Financial institutions are racing to demonstrate their efforts to reduce their impact on the climate. Wealth generation isn't enough, customers and shareholders are looking for ways to reduce the harm to our shared environment and ecosystem. Stopping the production, development, manufacture and financing of nuclear weapons is a way to protect people and the planet from this existential threat.

Endnotes

- ¹ AWE Overview (2014) AWE. Available at: <https://www.awe.co.uk/app/uploads/2014/07/AWE-OVERVIEW-FINAL.pdf> (Accessed: 18 October 2021).
- ² Defence Secretary announces programme to replace the UK's nuclear warhead (2020) GOV.UK. Available at: <https://www.gov.uk/government/news/defence-secretary-announces-programme-to-replace-the-uks-nuclear-warhead> (Accessed: 18 October 2021).
- ³ Our history – AWE (no date). Available at: <https://www.awe.co.uk/about-us/our-history/> (Accessed: 18 October 2021);
- MOD drives efficiencies in improved contract for nuclear sites (2016) GOV.UK. Available at: <https://www.gov.uk/government/news/mod-drives-efficiencies-in-improved-contract-for-nuclear-sites> (Accessed: 18 October 2021);
- Serco (2016) AWE review concluded successfully and updated contract agreed, Serco. Available at: <https://www.serco.com/media-and-news/2016/awe-review-concluded-successfully-and-updated-contract-agreed> (Accessed: 18 October 2021).
- ⁴ Ministry of Defence and Defence Nuclear Organisation (2020) Atomic Weapons Establishment (AWE) Written Ministerial Statement, GOV.UK. Available at: <https://www.gov.uk/government/news/atomic-weapons-establishment-awe-written-ministerial-statement> (Accessed: 18 October 2021).
- ⁵ Niall Brady (2021) 'Ireland's state fund drops nuclear holdings', 27 June. Available at: <https://www.thetimes.co.uk/article/state-fund-drops-nuclear-holdings-ireland-h50whb8mh> (Accessed: 19 October 2021).
- ⁶ Definitive Contract DEAC5207NA27344 (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-deac5207na27344> (Accessed: 18 October 2021).
- ⁷ Management Services Sale (no date) AECOM. Available at: <https://aecom.com/management-services-sale/> (Accessed: 18 October 2021);
- Chris Schneidmiller (2019) 'AECOM to Spin Off Government Contracting Branch', ExchangeMonitor, 21 June. Available at: <https://www.exchangemonitor.com/aecom-spin-off-government-contracting-branch-2/> (Accessed: 18 October 2021).
- ⁸ Arnie Heller (2015) Stockpile Stewardship at 20 Years, Lawrence Livermore National Laboratory. Available at: <https://str.llnl.gov/july-2015/verdon> (Accessed: 18 October 2021).
- ⁹ BWXT (no date) IR Home - BWX Technologies, Inc. Available at: <http://investors.bwxt.com/ir-home/default.aspx> (Accessed: 18 October 2021).
- ¹⁰ BWX Technologies (2021) '2020 Annual Report'. Available at: http://s2.q4cdn.com/477932843/files/doc_financials/2020/BWXT_2020-Annual-Report_smaller.pdf.
- ¹¹ BWXT Announces \$2.2 Billion in Contracts for Naval Nuclear Reactor Components and Fuel (2021) BWXT. Available at: <http://investors.bwxt.com/news-events/News/news-details/2021/BWXT-Announces-2.2-Billion-in-Contracts-for-Naval-Nuclear-Reactor-Components-and-Fuel/default.aspx> (Accessed: 18 October 2021).
- ¹² BWX Technologies (2021) '2020 Annual Report'. Available at: http://s2.q4cdn.com/477932843/files/doc_financials/2020/BWXT_2020-Annual-Report_smaller.pdf.
- ¹³ Ministry of Defence and Defence Nuclear Organisation (2020) Atomic Weapons Establishment (AWE) Written Ministerial Statement, GOV.UK. Available at: <https://www.gov.uk/government/news/atomic-weapons-establishment-awe-written-ministerial-statement> (Accessed: 18 October 2021).
- ¹⁴ Team (no date) Lawrence Livermore National Laboratory. Available at: <https://www.llnslc.com/#team> (Accessed: 18 October 2021).
- ¹⁵ 'Supporting Our Nation's Weapons Defense System with Advanced Conduct of Operations and Best-in-Class Operational Readiness at Los Alamos National Laboratory (LANL)' (2020) Amentum, 1 April. Available at: <https://www.amentum.com/project/supporting-our-nations-weapons-defense-system-with-advanced-conduct-of-operations-at-los-alamos-national-labs/> (Accessed: 18 October 2021).
- ¹⁶ 'Amentum Awarded \$22 Million Contract for Research, Development, Testing and Evaluation Services at NSWC Crane' (2020) Amentum, 8 December. Available at: <https://www.amentum.com/2020/12/08/amentum-awarded-22-million-contract-for-research-development-testing-and-evaluation-services-at-nswc-crane/> (Accessed: 18 October 2021).
- ¹⁷ 'Amentum Launches as Independent Professional and Technical Services Company Serving the U.S. Federal Government, Select Allied Governments, and Commercial Markets' (2020) Amentum, 4 February. Available at: <https://www.amentum.com/2020/02/04/amentum-launches-as-independent-professional-and-technical-services-company-serving-the-u-s-federal-government-select-allied-governments-and-commercial-markets/> (Accessed: 18 October 2021).
- ¹⁸ Contracts for September 9, 2016 (2016) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/939786/> (Accessed: 18 October 2021).
- Definitive Contract FA942216C8041 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-fa942216c8041> (Accessed: 18 October 2021).
- ¹⁹ Definitive Contract 89233119CNA000066 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-89233119cna000066> (Accessed: 18 October 2021).
- ²⁰ 'Technical & Management Services in Support of Defense Nuclear Safety' (no date) Banda Group International. Available at: <https://bandagroupintl.com/project/technical-management-services-in-support-of-defense-nuclear-safety/> (Accessed: 18 October 2021).
- ²¹ Lab Management (no date) Battelle. Available at: <https://www.battelle.org/laboratory-management> (Accessed: 18 October 2021).
- ²² National Nuclear Security Administration (2011) 'Contract No. DE-NA0001942'. Available at: <https://www.energy.gov/sites/prod/files/2018/02/f48/2014-03-25%2520Basic%2520Contract%5B1%5D.pdf> (Accessed: 2 February 2020).
- ²³ Draper (no date) Trident II MARK 6 MOD 1 Guidance System | Draper. Available at: <https://www.draper.com/explore-solutions/trident-ii-mark-6-mod-1-guidance-system> (Accessed: 18 October 2021).
- ²⁴ Contracts for September 30, 2019 (2019) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/1975222/> (Accessed: 18 October 2021).
- ²⁵ Contracts for March 21, 2016 (2016) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/699213/> (Accessed: 18 October 2021);
- Contracts for January 26, 2017 (2017) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/1061625/> (Accessed: 18 October 2021);
- Contracts for February 8, 2017 (2017) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/1076927/> (Accessed: 18 October 2021);
- Contracts for February 24, 2017 (2017) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/1094698/> (Accessed: 18 October 2021);
- Contracts for January 30, 2018 (2018) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/1428131/> (Accessed: 18 October 2021);
- Contracts for February 28, 2018 (2018) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/1454026/> (Accessed: 18 October 2021);
- Contracts for February 15, 2019 (2019) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/1759513/> (Accessed: 18 October 2021);
- Contracts for February 21, 2020 (2020) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/2091020/> (Accessed: 18 October 2021).
- ²⁶ CCPIT (2017) Overall Information, Expo 2017. Available at: http://www.chinadaily.com.cn/m/2017expochinaen/2017-06/05/content_29622565.htm (Accessed: 18 October 2021).
- ²⁷ Brandi Vincent (2019) Nuclear Security Agency Turns to \$600M Supercomputer for Weapons Readiness and Advancements, Nextgov.com. Available at: <https://www.nextgov.com/emerging-tech/2019/08/nuclear-security-agency-turns-600m-supercomputer-weapons-readi->

- ness-and-advancements/159128/ (Accessed: 18 October 2021).
- ²⁸ Definitive Contract FA820413C0010 (no date) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-fa820413c0010> (Accessed: 18 October 2021).
- ²⁹ Vercellone, C. (2020) Northrop expands team for program to replace US Air Force ICBMs, Defense News. Available at: <https://www.defensenews.com/industry/2020/02/25/northrop-grumman-expands-team-for-program-to-replace-air-force-ballistic-missiles/> (Accessed: 18 October 2021);
- Northrop Grumman Successfully Conducted Major Milestone for Ground Based Strategic Deterrent Program (2021) Northrop Grumman Newsroom. Available at: <https://news.northropgrumman.com/news/releases/northrop-grumman-successfully-conducted-major-milestone-for-ground-based-strategic-deterrent-program> (Accessed: 18 October 2021).
- ³⁰ 'Merrick-SMSI JV Team to Perform Project Planning and Engineering Services for Premier National Security Science Laboratory' (2018) Merrick, 10 July. Available at: <https://www.merrick.com/merrick-jv-team-to-perform-project-planning-and-engineering-services/> (Accessed: 18 October 2021).
- ³¹ 'Merrick Opens South Carolina Office In Support of the Savannah River Site' (2019) Merrick, 21 August. Available at: <https://www.merrick.com/merrick-opens-south-carolina-office-in-support-of-the-savannah-river-site/> (Accessed: 18 October 2021).
- ³² GovTribe, "Indefinite Delivery Contract FA821420D0001", 7 June 2021, website GovTribe (<https://govtribe.com/award/federal-idv-award/indefinite-delivery-contract-fa821420d0001>), viewed September 2021.
- ³³ Moog Inc (no date) Thrust Vector Control Systems, Moog.com. Available at: <https://www.moog.com/products/actuation-systems/space/tvc-systems.html> (Accessed: 18 October 2021).
- ³⁴ Moog Inc (no date) Recent Financial Performance. Available at: <https://www.moog.com/investors/recent-financial-performance.html> (Accessed: 18 October 2021).
- ³⁵ N3B (no date) 'Environmental Remediation and Waste Management | N3B - Los Alamos'. Available at: <https://n3b-la.com/> (Accessed: 18 October 2021).
- ³⁶ Aaron Mehta (2019) Northrop teams with Lockheed on ICBM replacement. Here's who else is involved., Defense News. Available at: <https://www.defensenews.com/digital-show-dailies/afa-air-space/2019/09/16/northrop-teams-with-lockheed-on-icbm-replacement-heres-who-else-is-involved/> (Accessed: 18 October 2021).
- ³⁷ Definitive Contract N0003016C0016 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-n0003016c0016> (Accessed: 18 October 2021).
- ³⁸ Safeguards, Security, and Emergency Services at NNSA U.S. Nuclear Sites Pantex and Y-12 (no date). Available at: <https://www.soc-usa.com/portfolio/security-operations-us-nuclear-sites> (Accessed: 18 October 2021).
- ³⁹ Energy, L.A.N.L., Operated by Los Alamos National Security, LLC, for the U.S. Department of (2018) NNSA awards Los Alamos National Laboratory management & operating contract, Los Alamos National Laboratory. Available at: <https://www.lanl.gov/discover/science-briefs/2018/June/0608-new-contractor.php> (Accessed: 18 October 2021).
- ⁴⁰ 'Performance Assurance and Organizational Improvement' (no date) Strategic Management Solutions LLC. Available at: <https://smsi.us/projects/performance-assurance-and-organizational-improvement> (Accessed: 18 October 2021).
- ⁴¹ Definitive Contract N0003017C0004 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-n0003017c0004> (Accessed: 18 October 2021).
- ⁴² Systems Planning & Analysis Inc - Company Profile and News (no date) Bloomberg.com. Available at: <https://www.bloomberg.com/profile/company/3706027Z:US> (Accessed: 18 October 2021).
- ⁴³ Definitive Contract FA821419C0008 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-fa821419c0008> (Accessed: 18 October 2021).
- ⁴⁴ About us | i2S2 (no date). Available at: <https://www.i2s2llc.com/about> (Accessed: 18 October 2021).
- ⁴⁵ LLNS BOARD OF GOVERNORS (no date). Available at: <https://www.llnslc.com/llns-board-governors> (Accessed: 18 October 2021).
- ⁴⁶ The US Nuclear Weapons Complex (2012) Union of Concerned Scientists. Available at: <https://www.ucsusa.org/resources/us-nuclear-weapons-complex> (Accessed: 18 October 2021);
- Weapon Physics and Design (no date) Weapons and Complex Integration. Available at: <https://wci.llnl.gov/about-us/weapon-physics-and-design> (Accessed: 18 October 2021);
- Energy, L.A.N.L., Operated by Los Alamos National Security, LLC, for the U.S. Department of (no date) Nuclear Deterrence and Stockpile Stewardship, Los Alamos National Laboratory;
- Available at: <https://www.lanl.gov/mission/nuclear-deterrence.php> (Accessed: 18 October 2021);
- Whitney J. Spivey (2016) 'National Security Science', National Security Science, December, p. 35. Available at: <https://www.lanl.gov/discover/publications/national-security-science/2016-december/index.php> (Accessed: 18 October 2021);
- Y-12 produces canned subassembly first production unit for B61-12 | Y-12 National Security Complex (2019) Y-12. Available at: <https://www.y12.doe.gov/news/press-releases/y-12-produces-first-production-unit-b61-12> (Accessed: 18 October 2021).
- ⁴⁷ NNSA Completes First Production Unit of W80-1 Alt 369 (2017) Energy.gov. Available at: <https://www.energy.gov/nnsa/articles/nnsa-completes-first-production-unit-w80-1-alt-369> (Accessed: 18 October 2021).
- ⁴⁸ 'W88 Alteration 370' (no date). National Nuclear Security Administration. Available at: <https://www.energy.gov/sites/default/files/2020/06/f76/W88-Alt%20370-20200622.pdf>.
- ⁴⁹ 'W76-1 Life Extension Program' (2019). National Nuclear Security Administration. Available at: <https://www.energy.gov/sites/prod/files/2019/02/f59/02-13-2019-Factsheet-W76-1%20LEP.pdf>.
- ⁵⁰ 'W80-4 Life Extension Program' (2019). National Nuclear Security Administration. Available at: <https://www.energy.gov/sites/prod/files/2019/04/f61/2019-04-16-FACTSHEET-W80-4.pdf> (Accessed: 15 September 2021).
- ⁵¹ 'B61-12 Life Extension Program' (no date). National Nuclear Security Administration. Available at: <https://www.energy.gov/sites/prod/files/2018/12/f58/B61-12%20LEP%20factsheet.pdf> (Accessed: 15 March 2020).
- ⁵² 'Fiscal Year 2018 Stockpile Stewardship and Management Plan Report to Congress' (2017). U.S. Department of Energy. Available at: https://www.energy.gov/sites/prod/files/2017/11/f46/fy18ssmp_final_november_2017%5B1%5D_0.pdf (Accessed: 15 March 2020).
- ⁵³ Future Maritime Support Programme (2021) Babcock International. Available at: <https://www.babcockinternational.com/news/new-contract-for-naval-base-support-announced/> (Accessed: 18 October 2021).
- ⁵⁴ Q3 Trading Statement 2017 (2017) Babcock International. Available at: <https://www.babcockinternational.com/news/q3-trading-statement-2017/> (Accessed: 18 October 2021).
- ⁵⁵ Babcock awarded multimillion pound missile tube contract extension by Electric Boat (2020) Babcock International. Available at: <https://www.babcockinternational.com/news/babcock-awarded-multimillion-pound-missile-tube-contract-extension-by-electric-boat/> (Accessed: 18 October 2021).
- ⁵⁶ Naval defence (no date) Naval Group. Available at: <https://www.naval-group.com/en/naval-defence-5> (Accessed: 18 October 2021).
- ⁵⁷ Modernisation de la force océanique stratégique : le SNLE Le Triomphant adapté au M51 (2015) Ministère de la Défense. Available at: <https://www.defense.gouv.fr/marine/actu-marine/modernisation-de-la-force-oceanique-strategique-le-snle-le-triomphant-adapte-au-m51> (Accessed: 18 October 2021);
- Jacques Gautier, Xavier Pintat, and Daniel Reiner (2014) 'Projet de loi de finances pour 2015 : Défense : équipement des forces'. Available at: <http://www.senat.fr/rap/a14-110-8/a14-110-81.pdf>;
- Naval defence (no date) Naval Group. Available at: <https://www.naval-group.com/en/naval-defence-5> (Accessed: 18 October 2021).
- ⁵⁸ DCNS changes its name to Naval Group (2017) Naval Group. Available at: <https://www.naval-group.com/en/>

- dcns-changes-its-name-naval-group-553 (Accessed: 18 October 2021).
- ⁵⁹ French Navy's final nuclear submarine starts 18-month overhaul (2016) Naval Today. Available at: <https://www.navaltoday.com/2016/12/12/french-navys-final-nuclear-submarine-starts-18-month-overhaul/> (Accessed: 18 October 2021);
- Adaptation au M51 des SNLE (2017). Available at: <https://www.defense.gouv.fr/dga/equipement/dissuasion/adaptation-au-m51-des-snle> (Accessed: 18 October 2021).
- ⁶⁰ 'PLF 2019: Extrait du Bleu Budgétaire de la Mission: Défense – Programme 146: Équipement Des Forces' (2018). Ministère de Finances et des Comptes Publics. Available at: https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2019/pap/pdf/DBGPGMPGM146.pdf (Accessed: 15 June 2021);
- Ministere des Armees (2020) Tir d'acceptation réussi pour le SNLE Le Téméraire, SIRPA Marine. Available at: <https://www.defense.gouv.fr/marine/actu-marine/tir-d-acceptation-reussi-pour-le-snle-le-temeraire> (Accessed: 18 October 2021).
- ⁶¹ The United Kingdom's future nuclear deterrent: the 2019 update to Parliament (2019) GOV.UK. Available at: <https://www.gov.uk/government/publications/the-united-kingdoms-future-nuclear-deterrent-the-2019-update-to-parliament/the-united-kingdoms-future-nuclear-deterrent-the-2019-update-to-parliament> (Accessed: 18 October 2021).
- ⁶² 'Notebook 2020 : International Defence Companies' (2019). Direction générale de l'armement, DGA. Available at: https://www.defense.gouv.fr/content/download/573555/9831497/Calepin_DGA_EDITION_2020_VA%20_17122019.pdf (Accessed: 15 March 2020).
- ⁶³ 'Notebook of International defence companies- Edition 2021' (2020). Ministère des Armees. Available at: https://www.defense.gouv.fr/english/content/download/602417/10143804/Calepin_DGA_EDITION_2021_VF_21122020.pdf (Accessed: 5 May 2021).
- ⁶⁴ Walchandnagar Industries Limited, "Defence, Aerospace, Missiles", brochure, available: <https://www.walchand.com/download.php?flp=http://www.walchand.com/wp-content/uploads/2015/07/WIL-Brochure-Defence-Aerospace-Missile-Reduced.pdf>, viewed March 2021
- ⁶⁵ About Us | Aerojet Rocketdyne Holdings, Inc. (no date). Available at: <https://www.aerocketrocketdyne.com/about-us> (Accessed: 18 October 2021).
- ⁶⁶ Aerojet Rocketdyne Holdings, Inc. Annual Report on Form 10-K For the Year Ended December 31, 2020 (2020) Aerojet Rocketdyne Holdings, Inc. Available at: <https://ir.aerocketrocketdyne.com/node/25406/html> (Accessed: 18 October 2021).
- ⁶⁷ Aerojet Rocketdyne Holdings Inc, "AEROJET ROCKETDYNE HOLDINGS, INC. REPORTS 2021 SECOND QUARTER RESULTS", 26 July 2021, website Aerojet Rocketdyne (<https://ir.aerocketrocketdyne.com/news-releases/news-release-details/aerocketrocketdyne-holdings-inc-reports-2021-second-quarter>), viewed August 2021.
- ⁶⁸ Aerojet Rocketdyne Holdings, Inc. Annual Report on Form 10-K For the Year Ended December 31, 2020 (2020) Aerojet Rocketdyne Holdings, Inc. Available at: <https://ir.aerocketrocketdyne.com/node/25406/html> (Accessed: 18 October 2021).
- ⁶⁹ Aerojet Rocketdyne, 'Ground Based Strategic Deterrent (GBSD) | Aerojet Rocketdyne'. <https://www.rocket.com/defense/ground-based-strategic-deterrent-gbsd> (accessed May 15, 2021).
- ⁷⁰ Aerojet Rocketdyne, "AEROJET ROCKETDYNE SELECTED TO POWER NATION'S NEXT GENERATION STRATEGIC DETERRENT", website Aerojet Rocketdyne. 8 September 2020 (<https://ir.aerocketrocketdyne.com/news-releases/news-release-details/aerocketrocketdyne-selected-power-nations-next-generation>), last viewed February 2021;
- Aerojet Rocketdyne, "Aerojet Rocketdyne Holdings, Inc. Annual Report on Form 10-K For the Year Ended December 31, 2020", website Aerojet Rocketdyne (<https://ir.aerocketrocketdyne.com/node/25406/html>), viewed February 2021.
- ⁷¹ U.S. Department of Defense, "Daily contract list – Contract FA9300-18-D-0002", Website U.S. Department of Defense, 16 January 2018 (<https://dod.defense.gov/News/Contracts/Contract-View/Article/1416414/>), accessed February 2020.
- ⁷² Aerojet Rocketdyne, "2019 Annual Report", available: <https://ir.aerocketrocketdyne.com/static-files/eeac3738-afdd-4c4c-a417-aac182859420>, viewed September 2020.
- ⁷³ Aerojet Rocketdyne, "Strategic Systems", Website Aerojet Rocketdyne (<https://www.rocket.com/defense/strategic-systems>), viewed October 2021.
- ⁷⁴ We are Airbus (no date) Airbus. Available at: <https://www.airbus.com/company/we-are-airbus.html> (Accessed: 18 October 2021).
- ⁷⁵ Airbus (2015) '2014 Corporate Responsibility and Sustainability Report'. Airbus Group. Available at: <https://www.airbus.com/content/dam/corporate-topics/financial-and-company-information/airbus-group-crs-2014.pdf> (Accessed: 15 February 2020).
- ⁷⁶ Le missile ASMPA (2016) Direction Générale de Armement. Available at: <https://www.defense.gouv.fr/dga/equipement/dissuasion/le-missile-asmpa> (Accessed: 18 October 2021);
- About Us | MBDA Systems (no date) MBDA. Available at: <https://www.mbda-systems.com/about-us/> (Accessed: 18 October 2021).
- ⁷⁷ Airbus (2021) 'Airbus reports Full-Year (FY) 2020 results'. Airbus Group. Available at: <https://www.airbus.com/content/dam/corporate-topics/financial-and-company-information/EN-Press-Release-Airbus-FY2020-Results.pdf>), (Accessed: 15 September 2021).
- ⁷⁸ Justification au premier euro (2021) Ministère de Finances et des Comptes Publics. Available at: https://www.budget.gouv.fr/files/uploads/extract/2021/PLF/BG/PGM/146/FR_2021_PLF_BG_PGM_146_JPE.html (Accessed: 18 October 2021).
- ⁷⁹ 'PLF 2018: Extrait du Bleu Budgétaire de la Mission: Défense – Programme 146: Équipement Des Forces' (2017). Ministère de Finances et des Comptes Publics. Available at: https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2018/pap/pdf/DBGPGMPGM146.pdf (Accessed: 15 September 2021).
- ⁸⁰ Pierre Tran (2018) France makes progress on refitting submarine for M51 missiles, Defense News. Available at: <https://www.defensenews.com/naval/2018/07/23/france-makes-progress-on-refitting-submarine-for-m51-missiles/> (Accessed: 18 October 2021);
- 'PLF 2019: Extrait du Bleu Budgétaire de la Mission: Défense – Programme 146: Équipement Des Forces' (2018). Ministère de Finances et des Comptes Publics. Available at: https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2019/pap/pdf/DBGPGMPGM146.pdf (Accessed: 15 June 2021).
- ⁸¹ M51 (no date) ArianeGroup. Available at: <https://www.ariane.group/en/defense/m51/> (Accessed: 18 October 2021).
- ⁸² Airbus Defence and Space: 2014 – a year full of successes (2015) Airbus. Available at: <https://www.airbus.com/newsroom/press-releases/en/2015/01/airbus-defence-and-space-2014-a-year-full-of-successes.html> (Accessed: 18 October 2021);
- Ariane Group - Summer Defence Conference (2017). Available at: https://www.universite-defense.org/en/publications/the_2017_position_papers/ariane-group.htm (Accessed: 18 February 2021).
- ⁸³ About us (no date) BAE Systems | International. Available at: <https://www.baesystems.com/en/our-company/about-us> (Accessed: 18 October 2021).
- ⁸⁴ Le missile ASMPA (2016) Direction Générale de Armement. Available at: <https://www.defense.gouv.fr/dga/equipement/dissuasion/le-missile-asmpa> (Accessed: 18 October 2021);
- About Us | MBDA Systems (no date) MBDA. Available at: <https://www.mbda-systems.com/about-us/> (Accessed: 18 October 2021).
- ⁸⁵ '2020 Annual Report' (2020). BAE Systems. Available at: https://investors.baesystems.com/~/_media/Files/B/Bae-Systems-Investor-Relations-V3/PDFs/results-and-reports/results/2021/bae-ar-complete-2020.pdf (Accessed: 15 April 2021).
- ⁸⁶ Justification au premier euro (2021) Ministère de Finances et des Comptes Publics. Available at: https://www.budget.gouv.fr/files/uploads/extract/2021/PLF/BG/PGM/146/FR_2021_PLF_BG_PGM_146_JPE.html (Accessed: 18 October 2021).
- ⁸⁷ 'PLF 2018: Extrait du Bleu Budgétaire de la Mission: Défense – Programme 146: Équipement Des Forces' (2017). Ministère de

- Finances et des Comptes Publics. Available at: <https://www.performance-publique.budget.gouv.fr/sites/performance-publique/files/farandole/ressources/2018/pap/pdf/DBGPGMPGM146.pdf> (Accessed: 15 September 2021).
- ⁸⁸ BAE Systems Wins \$534 Million Contract to Sustain U.S. Intercontinental Ballistic Missiles (no date) BAE Systems | International. Available at: <https://www.baesystems.com/en/article/bae-systems-wins-534-million-contract-to-sustain-us-intercontinental-ballistic-missiles> (Accessed: 18 October 2021);
- Definitive Contract FA821413C0001 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-fa821413c0001> (Accessed: 18 October 2021).
- ⁸⁹ Contracts for November 20, 2019 (2019) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/2022193/> (Accessed: 18 October 2021);
- Contracts for September 25, 2019 (2019) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/1971381/> (Accessed: 18 October 2021);
- Contracts for September 16, 2020 (2020) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/2350212/> (Accessed: 18 October 2021);
- Contracts for September 18, 2020 (2020) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/2353697/> (Accessed: 18 October 2021)..
- ⁹⁰ Definitive Contract N0003017C0001 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-n0003017c0001> (Accessed: 18 October 2021);
- Definitive Contract N0003019C0007 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-n0003019c0007> (Accessed: 18 October 2021).
- ⁹¹ Engineering the Extraordinary (no date) Bechtel Corporate. Available at: <https://www.bechtel.com/about-us/> (Accessed: 18 October 2021).
- ⁹² U.S. National Laboratories, New Mexico and California, USA (no date) Bechtel Corporate. Available at: <https://www.bechtel.com/projects/us-national-laboratories/> (Accessed: 18 October 2021).
- ⁹³ Bechtel Report (no date) Bechtel Corporate. Available at: <https://www.bechtel.com/Bechtel/media/html/Bechtel-Report/> (Accessed: 18 October 2021).
- ⁹⁴ Bechtel Joins Northrop Grumman's Ground Based Strategic Deterrent Team (2020) Bechtel Corporate. Available at: <https://www.bechtel.com/newsroom/releases/2020/02/bechtel-joins-northrop-grumman-gbsd-team/> (Accessed: 18 October 2021).
- ⁹⁵ Definitive Contract DEAC5207NA27344 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-deac5207na27344> (Accessed: 18 October 2021).
- ⁹⁶ NNSA Production Office contract (2014) Energy.gov. Available at: <https://www.energy.gov/nnsa/nnsa-production-office-contract> (Accessed: 18 October 2021).
- ⁹⁷ National Nuclear Security Administration (2011) 'Contract No. DE-NA0001942'. Department of Energy. Available at: <https://www.energy.gov/sites/prod/files/2018/02/f48/2014-03-25%2520Basic%2520Contract%5B1%5D.pdf> (Accessed: 15 September 2021).
- ⁹⁸ Definitive Contract DENA0001942 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-dena0001942> (Accessed: 18 October 2021).
- ⁹⁹ Contract No. DE-NA0001942 (2014) Energy.gov. Available at: <https://www.energy.gov/nnsa/downloads/contract-no-de-na0001942> (Accessed: 18 October 2021).
- ¹⁰⁰ Company Profile | BHARAT DYNAMICS LIMITED INDIA (2021). Available at: <https://bdl-india.in/company-profile> (Accessed: 18 October 2021).
- ¹⁰¹ NSE - National Stock Exchange of India Ltd. (no date). Available at: https://www1.nseindia.com/live_market/dynaContent/live_watch/get_quote/GetQuote.jsp?symbol=BDL&illiquid=0&smeFlag=0&itpFlag=0 (Accessed: 18 October 2021).
- ¹⁰² 'BDL-2020-21 Q4 financial results' (2021). Bharat Dynamics Limited. Available at: https://bdl-india.in/sites/default/files/2021-06/2020-21_Q4.pdf (Accessed: 15 September 2021).
- ¹⁰³ Company Profile | BHARAT DYNAMICS LIMITED INDIA (2021). Available at: <https://bdl-india.in/company-profile> (Accessed: 18 October 2021);
- PTI (2019) Prithvi-2 Missile : Nuclear capable Prithvi-2 missile successfully testfired at night, The Economic Times. Available at: <https://economictimes.indiatimes.com/news/defence/nuclear-capable-prithvi-2-missile-successfully-testfired-at-night/articleshow/72147446.cms> (Accessed: 18 October 2021).
- ¹⁰⁴ PARLIAMENTARY STANDING COMMITTEE ON DEFENCE VISITS BDL | BHARAT DYNAMICS LIMITED INDIA (2021) Bharat Dynamics Limited. Available at: <https://bdl-india.in/node/3776> (Accessed: 18 October 2021).
- ¹⁰⁵ Boeing: The Boeing Company: General Information (no date). Available at: <https://www.boeing.com/company/general-info/index.page> (Accessed: 18 October 2021).
- ¹⁰⁶ 'The Boeing Company 2020 Annual Report' (2021). Boeing. Available at: https://s2.q4cdn.com/661678649/files/doc_financials/2020/ar/2020_The_Boeing_Company_Annual_Report.pdf (Accessed: 15 September 2021).
- ¹⁰⁷ GovTribe, "Indefinite Delivery Contract FA811914D0003", website GovTribe (<https://govtribe.com/award/federal-idv-award/indefinite-delivery-contract-fa811914d0003/>), viewed September 2021;
- IDV to BOEING COMPANY, THE | USAspending (no date). Available at: https://usaspending.gov/award/CONT_IDV_FA811914D0003_9700 (Accessed: 18 October 2021).
- ¹⁰⁸ Contracts for April 26, 2019 (2019) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/1825952/> (Accessed: 18 October 2021);
- Definitive Contract FA210318C0061 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-fa210318c0061> (Accessed: 18 October 2021).
- ¹⁰⁹ Contracts for March 13, 2019 (2019) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/1784315/> (Accessed: 18 October 2021);
- GovTribe, "Indefinite Delivery Contract FA210319D3000", 22 February 2021, website GovTribe (<https://govtribe.com/award/federal-idv-award/indefinite-delivery-contract-fa210319d3000>) viewed September 2021;
- CONTRACT to BOEING COMPANY (no date) USAspending. Available at: https://usaspending.gov/award/CONT_AWD_FA812818C0003_9700_-NONE_-NONE- (Accessed: 18 October 2021).
- ¹¹⁰ Boeing: Historical Snapshot: LGM- Minuteman Missile (no date). Available at: <https://www.boeing.com/history/products/lgm-30-minute-man.page> (Accessed: 18 October 2021).
- ¹¹¹ Definitive Contract FA821415C0001 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-fa821415c0001> (Accessed: 18 October 2021);
- CONTRACT to BOEING COMPANY (no date) USAspending. Available at: https://usaspending.gov/award/CONT_AWD_FA821415C0001_9700_-NONE_-NONE- (Accessed: 18 October 2021).
- ¹¹² Definitive Contract N0003021C6002 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-n0003021c6002> (Accessed: 18 October 2021);
- Definitive Contract N0003019C0002 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-n0003019c0002> (Accessed: 18 October 2021);
- Contracts for February 26, 2021 (2021) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/2518088/> (Accessed: 18 October 2021).
- ¹¹³ Company Profile (no date) China Aerospace Science and Technology Corporation. Available at: <http://english.spacechina.com/n16421/n17138/n17229/index.html> (Accessed: 18 October 2021).
- ¹¹⁴ China Aerospace Science & Technology Company Profile, News, Rankings | Fortune | Fortune (2021) Fortune. Available at: <https://fortune.com/company/china-aerospace-science-technology/global500/> (Accessed: 18 October 2021).
- ¹¹⁵ Lu Hui (2019) China's National Defense in the New Era, Xinhua Net. Available at: <http://www.xinhuanet.com/>

- english/2019-07/24/c_138253389.htm (Accessed: 18 October 2021).
- ¹¹⁶ Strategic Nuclear Missiles (no date) China Aerospace Science and Technology Corporation. Available at: <http://english.spacechina.com/n16421/n17215/n17272/c2388530/content.html> (Accessed: 18 October 2021).
- ¹¹⁷ About us | CNIM (no date) CNIM. Available at: <https://cnim.com/en/group/about-us> (Accessed: 18 October 2021).
- ¹¹⁸ Deterrent Systems (no date) CNIM. Available at: <https://cnim.com/en/businesses/defense-security-and-digital-intelligence#deterrent-systems> (Accessed: 18 October 2021).
- ¹¹⁹ 'CNIM Groupe Universal Registration Document 2020' (2021). CNIM. Available at: <https://cnim.com/sites/default/files/media/Finance/CNIM-DEU2020-EN.pdf> (Accessed: 15 September 2021).
- ¹²⁰ 'PLF 2018: Extrait du Bleu Budgétaire de la Mission: Défense – Programme 146: Équipement Des Forces' (2017). Ministère de Finances et des Comptes Publics. Available at: https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2018/pap/pdf/DBGPGMPGM146.pdf (Accessed: 15 September 2021).
- ¹²¹ Deterrent Systems (no date) CNIM. Available at: <https://cnim.com/en/businesses/defense-security-and-digital-intelligence#deterrent-systems> (Accessed: 18 October 2021).
- ¹²² The Laser Megajoule: power and precision for French Deterrence (no date) CNIM. Available at: <https://cnim.com/en/laser-megajoule-power-and-precision-french-deterrence> (Accessed: 18 October 2021).
- ¹²³ CEA - Laser Mégajoule - Experiences (no date). Available at: <http://www-lmj.cea.fr/lmj-applications-defense.html> (Accessed: 18 October 2021).
- ¹²⁴ The Laser Megajoule: power and precision for French Deterrence (no date) CNIM. Available at: <https://cnim.com/en/laser-megajoule-power-and-precision-french-deterrence> (Accessed: 18 October 2021).
- ¹²⁵ Hans M. Kristensen and Matt Korda (2019) 'French nuclear forces, 2019', *Bulletin of the Atomic Scientists*, 75(1), pp. 51–55. doi:10.1080/00963402.2019.1556003.
- ¹²⁶ Fluor Client Markets: Industries Served by Business Groups (no date) Fluor. Available at: <https://www.fluor.com/client-markets> (Accessed: 18 October 2021).
- ¹²⁷ 'Building a better future: Annual Report 2020' (2021). Fluor. Available at: <https://investor.fluor.com/static-files/cdafdde5-9c9d-4f79-848c-a1872b7f298b>.
- ¹²⁸ SRNS - Our Parent Companies (no date). Available at: <https://www.savannahrivernuclearsolutions.com/about/parent.htm> (Accessed: 18 October 2021).
- ¹²⁹ Amy F Woolf and James D Werner (2021) 'The U.S. Nuclear Weapons Complex: Overview of Department of Energy Sites', Congressional Research Service, p. 39. Available at: <https://crsreports.congress.gov/product/pdf/R/R45306> (Accessed: 15 September 2021).
- ¹³⁰ Savannah River Nuclear Solutions, LLC Contract (no date) Energy.gov. Available at: <https://www.energy.gov/srs/articles/savannah-river-nuclear-solutions-llc-contract> (Accessed: 18 October 2021).
- ¹³¹ Definitive Contract DEAC0908SR22470 (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-deac0908sr22470> (Accessed: 18 October 2021).
- ¹³² Innovation Spanning Every Sector (no date). Available at: <https://www.gd.com/> (Accessed: 18 October 2021).
- ¹³³ 'Annual Report 2020' (2021). General Dynamics. Available at: https://s22.q4cdn.com/891946778/files/doc_financials/2020/ar/GD-2020-Annual-Report-Final.pdf (Accessed: 15 September 2021).
- ¹³⁴ Contracts for August 22, 2019 (2019) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/1941859/> (Accessed: 18 October 2021).
- ¹³⁵ Definitive Contract N0002417C2117 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-n0002417c2117> (Accessed: 18 October 2021).
- ¹³⁶ Contracts for December 16, 2019 (2019) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/2041268/> (Accessed: 18 October 2021);
- Contract To General Dynamics Mission Systems, Inc (no date) USAspending. Available at: https://usaspending.gov/award/CONT_AWD_N0003020C0005_9700_-NONE_-NONE- (Accessed: 18 October 2021).
- ¹³⁷ Aaron Mehta (2019) Northrop teams with Lockheed on ICBM replacement. Here's who else is involved., *Defense News*. Available at: <https://www.defensenews.com/digital-show-dailies/afa-air-space/2019/09/16/northrop-teams-with-lockheed-on-icbm-replacement-heres-who-else-is-involved/> (Accessed: 18 October 2021).
- ¹³⁸ Home (no date). Available at: <https://www.honeywell.com/us/en> (Accessed: 18 October 2021).
- ¹³⁹ Financial Information - Fundamentals - Honeywell (no date). Available at: <https://investor.honeywell.com/financial-information/fundamentals/default.aspx> (Accessed: 18 October 2021).
- ¹⁴⁰ Aaron Mehta (2019) Northrop teams with Lockheed on ICBM replacement. Here's who else is involved., *Defense News*. Available at: <https://www.defensenews.com/digital-show-dailies/afa-air-space/2019/09/16/northrop-teams-with-lockheed-on-icbm-replacement-heres-who-else-is-involved/> (Accessed: 18 October 2021).
- ¹⁴¹ Definitive Contract FA821418C0001 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-fa821418c0001> (Accessed: 18 October 2021).
- ¹⁴² Kansas City National Security Campus contract (2017) Energy.gov. Available at: <https://www.energy.gov/nnsa/kansas-city-national-security-campus-contract> (Accessed: 18 October 2021).
- ¹⁴³ 'W88 Alteration 370' (no date). National Nuclear Security Administration. Available at: <https://www.energy.gov/sites/default/files/2020/06/f76/W88-Alt%20370-20200622.pdf>.
- ¹⁴⁴ Aaron Mehta (2019) How a \$5 part used to modernize nuclear warheads could cost \$850 million to fix, *Defense News*. Available at: <https://www.defensenews.com/smr/nuclear-arsenal/2019/09/25/nuclear-warhead-programs-need-850m-fix-heres-how-the-government-plans-to-cover-it/> (Accessed: 18 October 2021).
- ¹⁴⁵ Definitive Contract DENA0002839 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-dena0002839> (Accessed: 18 October 2021).
- ¹⁴⁶ 'W88 Alteration 370' (no date). National Nuclear Security Administration. Available at: <https://www.energy.gov/sites/default/files/2020/06/f76/W88-Alt%20370-20200622.pdf>.
- ¹⁴⁷ 'W76-1 Life Extension Program' (2019). National Nuclear Security Administration. Available at: <https://www.energy.gov/sites/prod/files/2019/02/f59/02-13-2019-Factsheet-W76-1%20LEP.pdf>.
- ¹⁴⁸ 'W80-4 Life Extension Program' (2019). National Nuclear Security Administration. Available at: <https://www.energy.gov/sites/prod/files/2019/04/f61/2019-04-16-FACTSHEET-W80-4.pdf> (Accessed: 15 September 2021).
- ¹⁴⁹ 'B61-12 Life Extension Program' (no date). National Nuclear Security Administration. Available at: <https://www.energy.gov/sites/prod/files/2018/12/f58/B61-12%20LEP%20factsheet.pdf> (Accessed: 15 March 2020).
- ¹⁵⁰ Definitive Contract DENA0003525 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-dena0003525> (Accessed: 18 October 2021).
- ¹⁵¹ Universities Research Association, Inc., (URA), is a consortium of over 90 leading research-oriented universities, primarily in the United States, and in Canada, Italy, Japan, and the United Kingdom. More information found here: <https://www.ura-hq.org/>
- ¹⁵² NNSA Awards Sandia National Laboratories Management & Operating Contract to National Technology and Engineering Solutions of Sandia (NTESS) (2016) Energy.gov. Available at: <https://www.energy.gov/nnsa/articles/nnsa-awards-sandia-national-laboratories-management-operating> (Accessed: 18 October 2021).
- ¹⁵³ SRNS - Our Parent Companies (no date). Available at: <https://www.savannahrivernuclearsolutions.com/about/parent.htm> (Accessed: 18 October 2021).
- ¹⁵⁴ Amy F Woolf and James D Werner (2021) 'The U.S. Nuclear Weapons Complex: Overview of Department of Energy Sites', Congressional Research Service, p. 39. Available at: <https://crsreports.congress.gov/product/pdf/R/R45306> (Accessed: 15 September 2021).

- ¹⁵⁵ Definitive Contract DEAC0908SR22470 (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-deac0908sr22470> (Accessed: 18 October 2021).
- ¹⁵⁶ Who We Are (no date) Huntington Ingalls Industries. Available at: <https://huntingtoningalls.com/who-we-are/> (Accessed: 18 October 2021).
- ¹⁵⁷ 'Huntington Ingalls Industries Reports Fourth Quarter and Full Year 2020 Results' (2021). Huntington Ingalls Industries. Available at: <https://ir.huntingtoningalls.com/static-files/68e7b41b-96f9-4143-a4e7-8386073e61f7> (Accessed: 15 September 2021).
- ¹⁵⁸ National Nuclear Security Administration (2020) 'Fiscal Year 2021 Stockpile Stewardship and Management Plan'. Energy.gov. Available at: https://www.energy.gov/sites/default/files/2020/12/f82/FY2021_SSPM.pdf (Accessed: 15 September 2021).
- ¹⁵⁹ triadnationalecurity (no date) TRIAD National Security, TRIAD National Security, LLC. Available at: <https://triadns.org/> (Accessed: 18 October 2021);
- Huntington Ingalls Industries (2018) Huntington Ingalls Industries to Support New Management Contract at Los Alamos National Laboratory, Huntington Ingalls Newsroom. Available at: <https://newsroom.huntingtoningalls.com/releases/huntington-ingalls-industries-to-support-new-management-contract-at-los-alamos-national-laboratory> (Accessed: 18 October 2021).
- ¹⁶⁰ Amy F Woolf and James D Werner (2021) 'The U.S. Nuclear Weapons Complex: Overview of Department of Energy Sites', Congressional Research Service, p. 39. Available at: <https://crsreports.congress.gov/product/pdf/R/R45306> (Accessed: 15 September 2021).
- ¹⁶¹ NNSA Awards Nevada National Security Site Management & Operating Contract to Mission Support and Test Services, LLC (2017) Energy.gov. Available at: <https://www.energy.gov/nnsa/articles/nnsa-awards-nevada-national-security-site-management-operating-0> (Accessed: 18 October 2021).
- ¹⁶² Definitive Contract DENA0003624 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-dena0003624> (Accessed: 18 October 2021).
- ¹⁶³ Amy F Woolf and James D Werner (2021) 'The U.S. Nuclear Weapons Complex: Overview of Department of Energy Sites', Congressional Research Service, p. 39. Available at: <https://crsreports.congress.gov/product/pdf/R/R45306> (Accessed: 15 September 2021).
- ¹⁶⁴ Savannah River Nuclear Solutions, LLC Contract (2019) Energy.gov. Available at: <https://www.energy.gov/srs/articles/savannah-river-nuclear-solutions-llc-contract> (Accessed: 18 October 2021).
- ¹⁶⁵ Definitive Contract DEAC0908SR22470 (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-deac0908sr22470> (Accessed: 18 October 2021).
- ¹⁶⁶ Critical Solutions for a More Connected, Sustainable World (no date) Jacobs. Available at: <http://www.jacobs.com/solutions> (Accessed: 18 October 2021).
- ¹⁶⁷ Jacobs Completes CH2M Acquisition, Creating \$15 Billion Professional Services Leader Focused on Delivering Innovative Solutions for a More Connected, Sustainable World (2017) Jacobs. Available at: <https://invest.jacobs.com/investors/Press-Release-Details/2017/Jacobs-Completes-CH2M-Acquisition-Creating-15-Billion-Professional-Services-Leader-Focused-on-Delivering-Innovative-Solutions-for-a-More-Connected-Sustainable-World/default.aspx> (Accessed: 18 October 2021).
- ¹⁶⁸ 2020 Integrated Annual Report (2020). Annual Report. Jacobs. Available at: https://s24.q4cdn.com/280511176/files/doc_financials/2019/ar/2020_Integrated_Annual_Report.pdf (Accessed: 15 September 2021).
- ¹⁶⁹ Amy F Woolf and James D Werner (2021) 'The U.S. Nuclear Weapons Complex: Overview of Department of Energy Sites', Congressional Research Service, p. 39. Available at: <https://crsreports.congress.gov/product/pdf/R/R45306> (Accessed: 15 September 2021).
- ¹⁷⁰ NNSA Awards Nevada National Security Site Management & Operating Contract to Mission Support and Test Services, LLC (2017) Energy.gov. Available at: <https://www.energy.gov/nnsa/articles/nnsa-awards-nevada-national-security-site-management-operating-0> (Accessed: 18 October 2021).
- ¹⁷¹ Definitive Contract DENA0003624 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-dena0003624> (Accessed: 18 October 2021).
- ¹⁷² Our History (no date) L3HarrisTM Fast. Forward. Available at: <https://www.l3harris.com/company/our-history> (Accessed: 18 October 2021).
- ¹⁷³ L3Harris Reports Fourth Quarter and 2020 Results; Initiates 2021 Guidance (2021) L3HarrisTM Fast. Forward. Available at: <https://www.l3harris.com/newsroom/press-release/2021/01/l3harris-reports-fourth-quarter-and-2020-results-initiates-2021> (Accessed: 18 October 2021).
- ¹⁷⁴ Northrop Grumman (2020) 'Our Ground Based Strategic Deterrent (GBSD) nationwide team will involve over 10,000 people across the United States directly working on this vital national security program.', p. 1. Available at: <https://www.northropgrumman.com/wp-content/uploads/Approved-NG20-1485-200812-GBSD-Nationwide-Team-Map.pdf>.
- ¹⁷⁵ Definitive Contract N0003018C0001 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-n0003018c0001> (Accessed: 18 October 2021).
- ¹⁷⁶ Our Businesses | L&T Corporate (no date). Available at: <https://www.larsentoubro.com/corporate/our-businesses/> (Accessed: 18 October 2021).
- ¹⁷⁷ Company | IT & Technology Consulting | Mindtree (no date). Available at: <https://www.mindtree.com/about> (Accessed: 18 October 2021).
- ¹⁷⁸ Larsen & Toubro (2021) Technology for Sustainable Growth, 76th Annual Report. Annual Report. Larsen & Toubro. Available at: <https://investors.larsentoubro.com/upload/AnnualRep/FY2021AnnualRepLnT%20Annual%20Report%202020-21.pdf> (Accessed: 15 September 2021).
- ¹⁷⁹ Talegaon, Maharashtra | L&T Corporate | L&T India (no date). Available at: <https://www.larsentoubro.com/corporate/about-it-group/facilities/india/talegaon-maharashtra/> (Accessed: 18 October 2021).
- ¹⁸⁰ Larsen & Toubro (2020) Technology for sustainable growth, Integrated report 2019-2020. Annual Report. Larsen & Toubro. Available at: <https://corpwebstorage.blob.core.windows.net/media/43158/lt-ir-2020.pdf>.
- ¹⁸¹ New Construction - Defence Shipbuilding | Shipbuilding | L&T India (no date). Available at: <https://www.lntshipbuilding.com/products-services/new-construction-defence-shipbuilding/> (Accessed: 18 October 2021).
- ¹⁸² L&T Expertise | Capabilities | L&T MBDA Missile Systems (no date). Available at: <https://www.lntmbda.com/capabilities/lt-expertise/> (Accessed: 18 October 2021).
- ¹⁸³ Company (no date) Leidos. Available at: <https://www.leidos.com/company> (Accessed: 18 October 2021).
- ¹⁸⁴ Defense (no date) Leidos. Available at: <https://www.leidos.com/company/our-business/defense> (Accessed: 18 October 2021).
- ¹⁸⁵ 'Leidos 4Q 2020 Earnings Conference Call' (2021). Earnings Conference Call, 23 February. Available at: https://s22.q4cdn.com/107245822/files/doc_financials/2020/q4/Leidos-4Q20-Earnings-Presentation-FINAL.pdf.
- ¹⁸⁶ About | Consolidated Nuclear Security, LLC (no date). Available at: <https://cns-llc.us/about> (Accessed: 18 October 2021);
- Amy F Woolf and James D Werner (2021) 'The U.S. Nuclear Weapons Complex: Overview of Department of Energy Sites', Congressional Research Service, p. 39. Available at: <https://crsreports.congress.gov/product/pdf/R/R45306> (Accessed: 15 September 2021);
- Definitive Contract DENA0001942 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-dena0001942> (Accessed: 18 October 2021).
- ¹⁸⁷ Contract No. DE-NA0001942 (2018) Energy.gov. Available at: <https://www.energy.gov/nnsa/downloads/contract-no-de-na0001942> (Accessed: 18 October 2021).
- ¹⁸⁸ Profile (no date) Leonardo. Available at: <https://www.leonardocompany.com/en/about-us/profile> (Accessed: 18 October 2021).
- ¹⁸⁹ Finmeccanica: Shareholders' Meeting approves the change of the Company's name and the 2015 Financial Statements (2016). Available at: <https://www.leonardocompany.com/en/press-release-detail/-/detail/>

- cs-28042016 (Accessed: 18 October 2021).
- ¹⁹⁰ Le missile ASMPA (2016) Direction Générale de Armement. Available at: <https://www.defense.gouv.fr/dga/equipement/dissuasion/le-missile-asmpa> (Accessed: 18 October 2021);
- About Us | MBDA Systems (no date) MBDA. Available at: <https://www.mbda-systems.com/about-us/> (Accessed: 18 October 2021).
- ¹⁹¹ Leonardo (2021) Integrated Annual Report 2020. Annual Report. Rome: Leonardo. Available at: https://www.leonardocompany.com/documents/20142/120078/LDO_bilanciointegrato2020_ENG_pagg_doppie.pdf/ad687c33-fb8c-d05b-272c-f814176c4930?t=1621239404724 (Accessed: 15 September 2021).
- ¹⁹² ASMPA | Air Dominance (no date) MBDA. Available at: <https://www.mbda-systems.com/product/asmpa/> (Accessed: 18 October 2021).
- ¹⁹³ Steve Trimble (2019) Scramjet Will Power France's Next Nuclear Missile | Aviation Week Network, Aviation Week. Available at: <https://aviationweek.com/defense-space/scramjet-will-power-frances-next-nuclear-missile> (Accessed: 18 October 2021).
- ¹⁹⁴ About Us (2021) Lockheed Martin. Available at: <https://www.lockheedmartin.com/en-us/who-we-are.html> (Accessed: 18 October 2021).
- ¹⁹⁵ Lockheed Martin (2020) 'Lockheed Martin Corporation 2020 Annual Report', Annual Report, p. 132. Available at: <https://www.lockheedmartin.com/content/dam/lockheed-martin/eo/documents/annual-reports/lockheed-martin-annual-report-2020.pdf> (Accessed: 15 September 2021).
- ¹⁹⁶ Aaron Mehta (2019) Northrop teams with Lockheed on ICBM replacement. Here's who else is involved., Defense News. Available at: <https://www.defensenews.com/digital-show-dailies/afa-air-space/2019/09/16/northrop-teams-with-lockheed-on-icbm-replacement-heres-who-else-is-involved/> (Accessed: 18 October 2021).
- ¹⁹⁷ Lockheed Martin (2020) 'Lockheed Martin Corporation 2020 Annual Report', Annual Report, p. 132. Available at: <https://www.lockheedmartin.com/content/dam/lockheed-martin/eo/documents/annual-reports/lockheed-martin-annual-report-2020.pdf> (Accessed: 15 September 2021).
- ¹⁹⁸ GovTribe, "Indefinite Delivery Contract FA821419D0001", 29 April 2021, website GovTribe (<https://govtribe.com/award/federal-idv-award/indefinite-delivery-contract-fa821419d0001>), viewed September 2021.
- ¹⁹⁹ Contracts for October 3, 2017 (2017) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/1333296/> (Accessed: 18 October 2021);
- Definitive Contract FA820418C0009 - GovTribe (no date). Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-fa820418c0009> (Accessed: 18 October 2021).
- ²⁰⁰ Gareth Jennings (2021) US Navy accelerates TACAMO nuclear communications recap plan, Janes.com. Available at: <https://www.janes.com/defence-news/news-detail/us-navy-accelerates-tacamo-nuclear-communications-recap-plan> (Accessed: 18 October 2021).
- ²⁰¹ Trident II D5 Fleet Ballistic Missile (2021) Lockheed Martin. Available at: <https://www.lockheedmartin.com/en-us/products/trident-ii-d5-fleet-ballistic-missile.html> (Accessed: 18 October 2021).
- ²⁰² Definitive Contract N0003016C0100 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-n0003016c0100> (Accessed: 18 October 2021);
- Definitive Contract N0003017C0001 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-n0003017c0001> (Accessed: 18 October 2021);
- Contracts for December 20, 2018 (2018) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/1719367/> (Accessed: 18 October 2021);
- Definitive Contract N0003019C0045 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-n0003019c0045> (Accessed: 18 October 2021);
- Contracts for January 31, 2020 (2020) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/2071889/> (Accessed: 18 October 2021);
- Definitive Contract N0003020C0101 (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-n0003020c0101> (Accessed: 19 October 2021);
- Definitive Contract N0003019C0100 (2020) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-n0003019c0100> (Accessed: 19 October 2021);
- CONTRACT to LOCKHEED MARTIN CORPORATION (no date) USAspending. Available at: https://usaspending.gov/award/CONT_AWD_N0003020C0100_9700_-NONE_-NONE- (Accessed: 19 October 2021).
- ²⁰³ Contracts for April 1, 2019 (2019) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/1802502/> (Accessed: 19 October 2021).
- ²⁰⁴ Definitive Contract N0003018C0023 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-n0003018c0023> (Accessed: 19 October 2021).
- ²⁰⁵ Who We Are (no date) Northrop Grumman. Available at: <https://www.northropgrumman.com/who-we-are> (Accessed: 19 October 2021).
- ²⁰⁶ Northrop Grumman (2021) 2020 Annual Report. Annual Report. Northrop Grumman. Available at: <https://www.northropgrumman.com/wp-content/uploads/2020-Annual-Report-Northrop-Grumman.pdf>.
- ²⁰⁷ Northrop Grumman Completes Orbital ATK Acquisition, Blake Larson Elected to Lead New Innovation Systems Sector (2018) Northrop Grumman Newsroom. Available at: <https://news.northropgrumman.com/news/releases/northrop-grumman-completes-orbital-atk-acquisition-blake-larson-elected-to-lead-new-innovation-systems-sector> (Accessed: 19 October 2021).
- ²⁰⁸ About | Consolidated Nuclear Security, LLC (no date). Available at: <https://cns-llc.us/about> (Accessed: 18 October 2021);
- Amy F Woolf and James D Werner (2021) 'The U.S. Nuclear Weapons Complex: Overview of Department of Energy Sites', Congressional Research Service, p. 39. Available at: <https://crsreports.congress.gov/product/pdf/R/R45306> (Accessed: 15 September 2021);
- Definitive Contract DENA0001942 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-dena0001942> (Accessed: 18 October 2021).
- ²⁰⁹ Contract No. DE-NA0001942 (2018) Energy.gov. Available at: <https://www.energy.gov/nnsa/downloads/contract-no-de-na0001942> (Accessed: 18 October 2021).
- ²¹⁰ Delivery Order FA861614D6060-FA861618F0041 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/delivery-order-fa861614d6060-fa861618f0041> (Accessed: 19 October 2021).
- ²¹¹ Definitive Contract FA821920C0006 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-fa821920c0006> (Accessed: 19 October 2021).
- ²¹² Contracts for November 8, 2019 (2019) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/2012852/> (Accessed: 19 October 2021).
- ²¹³ Valerie Insinna (2019) The US nuclear forces' Dr. Strangelove-era messaging system finally got rid of its floppy disks, C4ISRNet. Available at: <https://www.c4isrnet.com/air/2019/10/17/the-us-nuclear-forces-dr-strangelove-era-messaging-system-finally-got-rid-of-its-floppy-disks/> (Accessed: 19 October 2021).
- ²¹⁴ Definitive Contract F4261098C0001 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-f4261098c0001> (Accessed: 19 October 2021).
- ²¹⁵ Propulsion Systems (no date) Northrop Grumman. Available at: <https://www.northropgrumman.com/space/propulsion-systems> (Accessed: 19 October 2021).
- ²¹⁶ Contracts for September 6, 2018 (2018) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/1622674/> (Accessed: 19 October 2021);
- Indefinite Delivery Contract FA881818D0001 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-idv-award/indefinite-delivery-contract-fa881818d0001> (Accessed: 19 October 2021).
- ²¹⁷ NNSA Production Office contract (2020) Energy.gov. Available at: <https://www.energy.gov/nnsa/nnsa-production-office-contract> (Accessed: 19 October 2021).
- ²¹⁸ National Nuclear Security Administration (2011) 'Contract No. DE-NA0001942'. Department of Energy. Available at: <https://www.energy.gov>

- gov/sites/prod/files/2018/02/f48/2014-03-25%2520Basic%2520Contract%5B1%5D.pdf (Accessed: 15 September 2021).
- 219 Definitive Contract DENA0001942 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-dena0001942> (Accessed: 18 October 2021).
- 220 Contract No. DE-NA0001942 (2018) Energy.gov. Available at: <https://www.energy.gov/nnsa/downloads/contract-no-de-na0001942> (Accessed: 18 October 2021).
- 221 'W88 Alteration 370' (no date). National Nuclear Security Administration. Available at: <https://www.energy.gov/sites/default/files/2020/06/f76/W88-Alt%20370-20200622.pdf>.
- 222 'W76-1 Life Extension Program' (2019). National Nuclear Security Administration. Available at: <https://www.energy.gov/sites/prod/files/2019/02/f59/02-13-2019-Factsheet-W76-1%20LEP.pdf>.
- 223 'W80-4 Life Extension Program' (2019). National Nuclear Security Administration. Available at: <https://www.energy.gov/sites/prod/files/2019/04/f61/2019-04-16-FACTSHEET-W80-4.pdf> (Accessed: 15 September 2021).
- 224 'B61-12 Life Extension Program' (no date). National Nuclear Security Administration. Available at: <https://www.energy.gov/sites/prod/files/2018/12/f58/B61-12%20LEP%20factsheet.pdf> (Accessed: 15 March 2020).
- 225 Definitive Contract DENA0003525 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-dena0003525> (Accessed: 18 October 2021).
- 226 Universities Research Association, Inc., (URA), is a consortium of over 90 leading research-oriented universities, primarily in the United States, and in Canada, Italy, Japan, and the United Kingdom. More information found here: <https://www.ura-hq.org/>
- 227 NNSA Awards Sandia National Laboratories Management & Operating Contract to National Technology and Engineering Solutions of Sandia (NTESS) (2016) Energy.gov. Available at: <https://www.energy.gov/nnsa/articles/nnsa-awards-sandia-national-laboratories-management-operating> (Accessed: 18 October 2021).
- 228 Propulsion Systems (no date) Northrop Grumman. Available at: <https://www.northropgrumman.com/space/propulsion-systems> (Accessed: 19 October 2021).
- 229 Definitive Contract N0003016C0010 (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-n0003016c0010> (Accessed: 19 October 2021).
- 230 Definitive Contract N0003019C0015 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-n0003019c0015> (Accessed: 19 October 2021).
- 231 Collins Aerospace (no date) Raytheon Technologies. Available at: <https://www.rtx.com/our-company/our-businesses/ca> (Accessed: 19 October 2021).
- 232 Raytheon Technologies (2021) Bold moves. Boundless Future. Annual Report. Raytheon Technologies. Available at: <https://investors.rtx.com/static-files/225310fa-b108-4298-aa1c-177fd526041e>.
- 233 United Technologies and Raytheon Complete Merger of Equals Transaction (2020) Raytheon Technologies. Available at: <https://www.rtx.com/news/2020/04/03/united-technologies-and-raytheon-complete-merger-of-equals-transaction> (Accessed: 19 October 2021).
- 234 Contracts for July 1, 2021 (2021) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/2680485/> (Accessed: 19 October 2021).
- 235 Jessica Napoli (2020) Collins Aerospace to deliver launch platform for ICBM modernization program, Collins Aerospace. Available at: <https://www.collinsaerospace.com/newsroom/News/2020/11/Collins-deliver-launch-platform-ICBM-modernization-program> (Accessed: 19 October 2021).
- 236 Definitive Contract FA820413C0009 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-fa820413c0009> (Accessed: 19 October 2021).
- 237 Rostec :: About (no date). Available at: <https://rostec.ru/en/about/> (Accessed: 19 October 2021).
- 238 S V Chemezov and N V Borisova (2019) Science. Overcoming Technologic Barriers. Rostec, p. 16. Available at: <https://rostec.ru/upload/iblock/baf/baf448d95ffa8611fad46e0df57032df.pdf> (Accessed: 1 October 2021).
- 239 S V Chemezov and N V Borisova (2019) Science. Overcoming Technologic Barriers. Rostec, p. 152, 186. Available at: <https://rostec.ru/upload/iblock/baf/baf448d95ffa8611fad46e0df57032df.pdf> (Accessed: 1 October 2021).
- 240 Safran at a glance | Safran (no date). Available at: <https://www.safran-group.com/group/profile> (Accessed: 19 October 2021).
- 241 Safran at a glance | Safran (no date). Available at: <https://www.safran-group.com/group/profile> (Accessed: 19 October 2021).
- 242 Company profile (no date) ArianeGroup. Available at: <https://www.ariane.group/en/about-us/company-profil/> (Accessed: 19 October 2021).
- 243 'PLF 2019: Extrait du Bleu Budgétaire de la Mission: Défense – Programme 146: Équipement Des Forces' (2018). Ministère de Finances et des Comptes Publics. Available at: https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2019/pap/pdf/DBGPGMPGM146.pdf (Accessed: 15 June 2021).
- 244 M51 (no date) ArianeGroup. Available at: <https://www.ariane.group/en/defense/m51/> (Accessed: 18 October 2021).
- 245 'PLF 2019: Extrait du Bleu Budgétaire de la Mission: Défense – Programme 146: Équipement Des Forces' (2018). Ministère de Finances et des Comptes Publics. Available at: https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2019/pap/pdf/DBGPGMPGM146.pdf (Accessed: 15 June 2021);
- Ministère de Finances et des Comptes Publics (2020) JUSTIFICATION AU PREMIER EURO; ÉLÉMENTS TRANSVERSAUX AU PROGRAMME, Ministère de Finances et des Comptes Publics. Available at: https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2020/pap/html/DBGPGMJPEPM146.htm (Accessed: 19 October 2021).
- 246 'Roxel is the European leader in tactical propulsion systems and a major player in world markets' (no date) Roxel. Available at: <https://www.roxelgroup.com/en/corporate/> (Accessed: 19 October 2021).
- 247 'Roxel market segments: military propulsion systems, civil sector...' (no date) Roxel. Available at: <https://www.roxelgroup.com/en/market-segments/> (Accessed: 19 October 2021).
- 248 Textron (no date). Available at: <https://www.textron.com/> (Accessed: 19 October 2021).
- 249 Selected Year-Over-Year Financial Data (2019) Textron. Available at: <https://www.textron.com/assets/AR/2019/selected-year-over-year-financial-data.html> (Accessed: 19 October 2021).
- 250 Definitive Contract FA820414C0011 - GovTribe (2021) GovTribe. Available at: <https://govtribe.com/award/federal-contract-award/definitive-contract-fa820414c0011> (Accessed: 19 October 2021).
- 251 Contracts for February 15, 2019 (2019) U.S. Department of Defense. Available at: <https://www.defense.gov/News/Contracts/Contract/Article/1759513/> (Accessed: 18 October 2021);
- Indefinite Delivery Contract FA820414D0001 - GovTribe (2020) GovTribe. Available at: <https://govtribe.com/award/federal-idv-award/indefinite-delivery-contract-fa820414d0001> (Accessed: 19 October 2021).
- 252 Aaron Mehta (2019) Northrop teams with Lockheed on ICBM replacement. Here's who else is involved., Defense News. Available at: <https://www.defensenews.com/digital-show-dailies/afa-air-space/2019/09/16/northrop-teams-with-lockheed-on-icbm-replacement-heres-who-else-is-involved/> (Accessed: 18 October 2021).
- 253 About Thales (no date) Thales Group. Available at: <https://www.thales-group.com/en/global/group> (Accessed: 19 October 2021).
- 254 Governance (no date) Naval Group. Available at: <https://www.naval-group.com/en/governance-26> (Accessed: 19 October 2021).
- 255 'PLF 2019: Extrait du Bleu Budgétaire de la Mission: Défense – Programme 146: Équipement Des Forces' (2018). Ministère de Finances et des Comptes Publics. Available at: https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2019/pap/pdf/DBGPGMPGM146.pdf (Accessed: 15 June 2021);
- Ministère de Finances et des Comptes Publics (2020) JUSTIFICATION

AU PREMIER EURO; ÉLÉMENTS TRANSVERSAUX AU PROGRAMME, Ministère de Finances et des Comptes Publics. Available at: https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2020/pap/html/DBGPGMJPEPGM146.htm (Accessed: 19 October 2021).

²⁵⁶ Ministère de Finances et des Comptes Publics (2020) JUSTIFICATION AU PREMIER EURO; ÉLÉMENTS TRANSVERSAUX AU PROGRAMME, Ministère de Finances et des Comptes Publics. Available at: https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2020/pap/html/DBGPGMJPEPGM146.htm (Accessed: 19 October 2021).

²⁵⁷ Walchandnagar Industries Overview (no date) Walchandnagar Industries. Available at: <https://walchand.com/about-us/company-profile/overview/> (Accessed: 19 October 2021).

²⁵⁸ Walchandnagar Industries (2021) Annual Report 2020-2021. Annual Report. Mumbai: Walchandnagar Industries. Available at: <https://walchand.com/wp-content/uploads/2021/07/112AnnualReportWIL.pdf> (Accessed: 1 October 2021).

²⁵⁹ Walchandnagar Industries Overview (no date) Walchandnagar Industries. Available at: <https://walchand.com/about-us/company-profile/overview/> (Accessed: 19 October 2021).

²⁶⁰ Walchandnagar Industries- Defence (no date) Walchandnagar Industries. Available at: <https://walchand.com/business-area/defence-missile/> (Accessed: 19 October 2021).

²⁶¹ Arihant Class Submarine - Naval Technology (no date). Available at: <https://www.naval-technology.com/projects/arihant-class/> (Accessed: 19 October 2021).

²⁶² Franz-Stefan Gady (2018) India Test Fires Short-Range Ballistic Missiles From Submerged Sub, The Diplomat. Available at: <https://thediplomat.com/2018/08/india-test-fires-short-range-ballistic-missiles-from-submerged-sub/> (Accessed: 19 October 2021).

²⁶³ Snehesh Alex Philip (2020) 'Ballistic missile submarine Arighat in final stages of trials, to be commissioned early 2021', ThePrint, 16 December. Available at: <https://theprint.in/defence/ballistic-missile-submarine-arighat-in-final-stages-of-trials-to-be-commissioned-early-2021/567869/> (Accessed: 19 October 2021).

²⁶⁴ 'Defence, Aerospace, Missiles' (no date). Walchandnagar Industries. Available at: <https://www.walchand.com/download.php?flp=http://www.walchand.com/wp-content/uploads/2015/07/WIL-Brochure-Defence-Aerospace-Missile-Reduced.pdf> (Accessed: 15 March 2021).



2021

**DON'T BANK
ON THE BOMB**