

## Aerospace and Defense Industry Report

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### Overview

The Aerospace and Defense Industry refers to companies that produce commercial/general aircraft, military aircraft/ships/vehicles/electronics/armaments, and space systems, not including hunting/recreational guns and weapons or commercial services for airports. It is an over \$650 billion market, comprised of several large companies with smaller ones providing parts/services to the large firms or obtaining smaller contracts. Usually, these smaller companies provide services to both commercial aircraft and defense companies. Large companies include Boeing, Raytheon, Northrop Grumman, Lockheed Martin, Airbus, and others. Often, there is overlap between Defense and Commercial Aircraft companies; Boeing is an example of such a company. Its main focus is on commercial aircraft, but it also has a substantial defense sector. While the industry is mainly dominated by U.S. spending, other countries have been increasing their defense budgets and have seen an increase in air passenger traffic. Furthermore, US companies are mainly sought after to supply the aircraft and defense needs of countries worldwide meaning foreign sales are a big part of revenue for these companies. Other main trends within this industry include the resurgence of interest in space travel (with new companies dedicated to this idea) and development of drones. Also, there is generally low efforts into research and development by the larger companies compared to other industries leaving room for newer, innovative firms to develop advanced niche products. This industry is broken into two main sections: Commercial Aircraft and Defense which is how the report will be broken down.

### Commercial Aircraft

#### Overview/Description

The Commercial Aircraft industry has been valued at approximately \$191 billion dollars in 2018 and has been expected to grow at a compound annual growth rate of 2.9%, which estimates the industry to become worth \$2.3 trillion in 2028. This expectation of stable growth in the industry is due to increasing investments in aircraft infrastructure as commercial aircraft become more popular among the middle class, and investments focused on increasing the number of airports in developing countries. With a high demand for inexpensive aircraft travel,

specifically in developing countries, Low Cost Carriers (or LCCS) have become more prominent in the market, offering short flights in both modern and developing countries. LCCS are airlines that minimize operating costs by providing less amenities/services to produce lower cost flights. Single aisle aircrafts alone make up over 56% of the global aircraft market, and as flights become more inexpensive due to an increase in technology such as AI, the market will likely expand and begin to include more middle class/lower middle class consumers. Another section of the aircraft industry that is expanding due to technological innovation is the commercial aerospace industry, most notably, SpaceX. Companies such as SpaceX aim to facilitate space travel to the average consumer through reducing the cost of space transportation.

### Key Players

In the commercial aerospace the two largest key players are The Boeing Company and Airbus. Boeing is an American multinational corporation that designs, manufactures, and sells airplanes, rotorcraft, rockets, satellites, and missiles worldwide, and also provides leasing and product support services. Boeing is the world's largest aerospace company with 101.1 Billion dollars in revenue and about 153,000 employees. Airbus is a European aerospace corporation that designs, manufactures and delivers commercial aircrafts, helicopters, military transports, satellites and launch vehicles. In addition, Airbus provides data services, navigation, secure communications, urban mobility and other solutions for customers on a global scale. Airbus has about 40 billion Euros in revenue and about 130,000 employees.

Honeywell is another large player in the aerospace industry. Honeywell makes a variety of commercial and consumer products, engineering services and aerospace systems for a customer base ranging from private consumers to major corporations and governments. Honeywell has about 131,000 employees.

### Current Trends & Recent Events

With the goal of increasing the profitability per passenger while facing the uncertainty of economics, airlines will make more invest in right-sized aircraft based on market demands for the next 20 years, according to Bombardier's Market Forecast. Such trend is attributed to the issue with overcapacity. Airlines heavily discount fares to fill empty seats and sometimes even heavy discounting can't fill oversized planes. The derived fare pressure continuously reduces per-passenger yields. According to IATA, airlines in 2017 are expected to make \$7.69 per passenger served. This has decreased from \$9.13 in 2016 and \$10.08 in 2015. This

trend is expected to continue, causing airlines will focus on capacity management. As a consequence, we will witness more implementation of the low cost carrier business model.

Airlines will also replace aging fleets with modern and fuel efficient aircrafts. 86% of the current fleet in this segment will be ready to retire by 2036. Recently, Bombardier has invested \$16.7 million into two cooperative aerospace research projects involving advanced aircraft systems design and development and more environmentally friendly technologies. It is critical for airlines to develop engines of long-term profitability in order to perform in a more sustainable manner.

Also, we may see a trend toward smaller aircraft, around 100-150 seats. This will allow airlines to retake abandoned routes and offer point-to-point service between lower tier airports, enabling them to charge competitive fares but with higher yields. Intra-regional travel is vital for commercial aircraft as it makes up around 80% of global air traffic. Such routes generate the the highest yield but are completed by inefficient aircraft. Thus, as older planes of 20-60 seats are retired, larger regional aircraft will be desired to create more profit on new and thin routes.

Meanwhile, people are looking forward to space travel. It is reported that Branson is looking ahead to commercial SpaceShipTwo flights. Under new laws, intrepid travelers could fly to space from a UK spaceport as soon as 2020. The development of commercial space travel has sped up people's curiosity towards this unknown area. Recently, SpaceX has successfully launched an unmanned rocket to meet with the International Space Station. If this test succeeds, they will be planning to send astronauts into orbit shortly. This bodes well for its continued development of Starship, a 100 passenger craft.

## **Defense Industry**

### Overview/Description

The Defense industry is incredibly large, as the worldwide market was \$685.6 billion in 2017, and has been expected to grow at a compound annual growth of 5.7% until 2022. The United States is the largest spender in the Defense industry, and despite countries such as Russia and China increasing their Defense spending, the United States is planning on dwarfing the rest of the world in terms of Defense spending. Due to an increase in global political tension, Defense spending worldwide has increased significantly since 2016 and will continue to do so if tensions continue to escalate. An increasing dependence on technology has posed a challenge to Defense companies, as Defense departments have begun to hire more technology

firms as contractors. However, the outlook for the Defense industry is positive overall, as the large firms that dominate the market (Raytheon, Lockheed Martin, Northrop Grumman) continue to report strong numbers. There are different sectors of the defense industry, including aeronautics, land and naval systems, and electronics. However, the largest companies within the defence industry market create products in almost, if not all these sectors.

## Key Players

In the Defense Industry, the three largest key players are Lockheed Martin Corporation, The Raytheon Company, and Northrop Grumman Corporation. Lockheed Martin is an American global aerospace, defense, security and advanced technologies company with worldwide interests and is one of the largest companies in the aerospace, defense, security, and technologies industry. Lockheed Martin was the world's largest defense contractor based on revenue for fiscal year 2014 and in 2013 it topped the list of US federal government contractors and received nearly 10% of the funds paid out by the Pentagon. The vast majority of Lockheed Martin's revenue coming from military sales. Lockheed Martin has a total revenue of over 50 billion dollars. The Raytheon Company is a major U.S. defense contractor and industrial corporation with core manufacturing concentrations in weapons and military and commercial electronics. Raytheon has revenue of over 25 billion dollars. Northrop Grumman is an American global aerospace and defense technology company. The company was the fifth-largest arms trader in the world in 2015. Northrop Grumman reported revenues of over \$30 billion in 2018.

General Dynamics Corporation and Huntington Ingalls Industries are slightly smaller key players in the defense industry. General Dynamics is an American aerospace and defense multinational corporation. It is the world's fifth-largest defense contractor based on 2012 revenues, with 2018 revenues of over 35 billion dollars.. Huntington Ingalls Industries is the largest military shipbuilder in the United States, with 38,000 employees and over 7 billion dollars in revenue.

There are several smaller key players that are crucial in both the commercial aerospace and defense industries. These companies mainly consist of those who produce smaller parts and services that are used in bigger machinery, making them applicable to technology in both defense and commercial aerospace. The main players in this overlapping area are TransDigm Group, L3 Technologies and BAE systems. TransDigm Group develops, distributes and manufactures commercial and military aerospace components such as mechanical actuators and ignition systems, and has about 9100 employees and 2018 revenue of about 3.8 billion

dollars. L3 Technologies supplies command and control, communications, intelligence, surveillance and reconnaissance systems and products, avionics, ocean products, training devices and services, instrumentation, aerospace, and navigation products. L3 technologies has about 38,000 employees and revenue of over 9.5 billion dollars. BAE systems is a British multinational defence, security, and aerospace company with over 80,000 employees and over 18 billion pounds in revenue.

## Current Trends & Recent Events

The Intermediate-Range Nuclear Forces (INF) Treaty was set in 1987 to guaranteed that the United States and the Soviet Union would eliminate all nuclear and conventional ground-launched ballistic and cruise missiles within 500-5,500 kilometers. Over one year ago, in December of 2017, the Trump administration strategize to increase research and development in order to counter Russia's alleged treaty violations. In recent news, in February of 2019, Trump declared the United States's formal intent to withdraw from the treaty in six months. Around the same time, President Vladimir Putin also declared the same intent on Russia's behalf. This process has brought rise to the question of starting a new arms race. NATO diplomats have states their hope of preventing a new arms race from happening. Beyond Russia, Europe is moving forward in aerospace development. There are currently 6 prototype satellites slated to launch.

Overall, the Aerospace and Defense industry's revenue will increase by 4.1%, which is double that of last year. Due to heightened demand of global security, countries like Japan, China, and India, will expand the global defense sector's revenue. However, the United States has also approved an increasing defense budget. The John McCain National Defense Authorization Act for Fiscal Year 2019 was recently passed for \$717 billion. Another notable event is the expected continuation of the current acting Pentagon Chief, Patrick Shanahan. Being a former employee of Boeing, it is being questioned as to whether or not he holds a bias toward his former employee. It has been said that he has been heard praising Boeing while criticizing its competitors, such as Lockheed Martin and its production of the F-35 fighter jet (a trillion dollar contract). Thus, this might lead to Boeing being awarded more military contracts in the future.

In terms of new technologies, drones are becoming a larger and larger interest of the U.S. military. With high per flight costs of manned aircraft and a shortage of military pilots, they have been turning to drones for future use. Recently, Boeing announced the "loyal wingman" drone that is designed to be a stealthy fighter jet

that can fly alongside manned aircraft. It is expected to fly by next year. Overall, drones can take many forms including swarming attack drone or suicide drones and are something to look forward to in the U.S. military in the years to come.

## Valuation Metrics

### Return on Assets (ROA)

The return on assets for the global aerospace and defense industry rose by 15.9 percent from 4.5 percent in 2016 to 5.2 percent in 2017, indicating that the industry is improving in how efficiently companies are using their assets to generate income. Parker Hannifin experienced the highest return on assets with 23.7%, while Wesco Aircraft had the lowest return on assets with -13.8%. Approximately 89% of companies in this industry had a positive return on assets.

### Free Cash Flow (FCF)

The global aerospace and defense industry's free cash flow increased by 26% from US\$40.7 billion in 2016 to US \$51.3 billion in 2017. Aggregate free cash flow represents the cash the industry generates from operations excluding cash outflow for capital expenditure. The sudden rise in free cash flow in the industry was largely driven by tax reform in the US. Boeing had the highest FCF in 2017 of \$11.6 billion, contributing 41% to the aggregate FCF. Bombardier reported the lowest FCF of negative \$373 million. Approximately 86% of companies in the industry reported positive free cash flow.

### Book-to-Bill Ratio

The book-to-bill ratio represents the number of orders a company received compared to the number of units shipped and billed. The book-to-bill ratio for the global aerospace and defense industry fell by 20% from 1.19 in 2016 to 0.95 in 2017, which shows the decrease in aircraft orders over the course of the year. Commercial aircraft has reached a record high for backlog in the beginning of 2017, causing new aircraft order to slow down. Airbus was largest contributor to the decline of the book-to-bill ratio, as the remainder of the industry was only decreased by 2.2%.

### Price-to-Earnings (PE) Ratio

The price-to-earnings ratio is calculated by dividing the market value of equity by the earnings per share, indicating how much the market is willing to pay per dollar of earnings. As of January 2018, the cumulative price-to-earnings ratio for the aerospace and defense industry in the US was 45.24. The trailing PE ratio was 29.34

and the forward PE ratio was 47.24, suggesting that the stock price rose dramatically in 2017 and is predicted to be approaching its fair value.

#### Return on Equity (ROE)

Return on equity is calculated by dividing net income by average shareholders' equity. This financial metric represents the company's ability to convert assets into profits. The ROE for the aerospace and defense industry in the US increased 29.03% in January 2018 to 32.01% in January 2019, indicating that the industry was able to use its assets more efficiently.

#### Enterprise Multiple (EV/EBITDA)

Enterprise multiple is used to determine whether a company is undervalued or overvalued by comparing it across an industry. The ratio is calculated by dividing the enterprise value of a company by its earnings before interest, tax, depreciation, and amortization. The enterprise multiple for the aerospace and defense industry in the US was 13.47 as of January 2019.

### **Conclusion**

In conclusion, the Aerospace and Defense Industry has been showing strong results and continues to expand both domestically and globally. Between the increase in passenger airline travel and rising geopolitical tensions, both commercial aircraft and defense are primed to grow.

## References

[http://people.stern.nyu.edu/adamodar/New\\_Home\\_Page/dataarchived.html#industry](http://people.stern.nyu.edu/adamodar/New_Home_Page/dataarchived.html#industry)

<https://www.aia-aerospace.org/report/2017-facts-figures/>

[https://www.iclub.com/investing/stock\\_watch\\_list\\_industry.asp](https://www.iclub.com/investing/stock_watch_list_industry.asp)

<https://www2.deloitte.com/content/dam/Deloitte/global/Images/infographics/gx-eri-global-a-d-industry-financial-performance-study-2018.pdf>

[https://ec.europa.eu/growth/sectors/defence\\_en](https://ec.europa.eu/growth/sectors/defence_en)

<https://www.spacex.com/>

<https://www.strategyand.pwc.com/trend/2018-defense>

<http://aviationweek.com/commercial-aviation/five-key-trends-affecting-commercial-aviation-next-20-years>

<https://www.ainonline.com/aviation-news/business-aviation/2019-02-22/bombardier-funds-design-green-technologies-research>

<https://www.ainonline.com/aviation-news/business-aviation/2019-02-19/honeywell-debut-hybrid-electric-engine-heli-expo>

<https://www.ainonline.com/aviation-news/general-aviation/2019-02-22/autonomous-flight-ready-build-flying-prototype-y6s>

<https://nypost.com/2017/02/20/commercial-space-travel-could-ready-as-early-as-2020/>

<https://spacenews.com/branson-looks-ahead-to-beginning-commercial-spaceship-two-flights>

<https://dod.defense.gov/News/Article/Article/1601016/president-signs-fiscal-2019-defense-authorization-act-at-fort-drum-ceremony/>

<https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Manufacturing/gx-eri-2019-global-a-and-d-sector-outlook.pdf>

<https://markets.on.nytimes.com/research/markets/usmarkets/industry.asp?industry=5211>



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<https://www.strategyand.pwc.com/trend/2018-defense>

[http://valueline.com/Stocks/Industries/Industry\\_Overview\\_Aerospace\\_and\\_Defense.aspx#.XHR70y3Mwml](http://valueline.com/Stocks/Industries/Industry_Overview_Aerospace_and_Defense.aspx#.XHR70y3Mwml)

<https://www.politico.com/story/2019/01/09/defense-patrick-shanahan-boeing-pentagon-1064203>

<https://finance.yahoo.com/news/boeing-unveils-breed-wingman-drones-002904280.html>

<https://mybroadband.co.za/news/science/298042-how-spacex-lowered-the-cost-of-space-travel.html>