CFRA

Industry Surveys

Aerospace & Defense

JUNE 2023

Wilson Ko, CFA
Industry Analyst

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Contacts

Sales Inquires & Client Support
800.220.0502
cservices@cfraresearch.com

Media Inquiries
press@cfraresearch.com

CFRA
977 Seminole Trail, PMB 230
Charlottesville, VA 22901

Contributors

Raymond Jarvis
Senior Editor

Atifi Kuddus, Geraldine Tan
Associate Editors

CHARTS & FIGURES

NEW THEMES

What's Changed: CFRA expect 5%-6% annual growth in U.S. defense spending during 2023-2025, well above the trailing 10-year average annual growth of 1%. Read more starting page 15.

What's Changed: We think large inventories will likely keep Boeing from fully re-ramping production rates to near pre-pandemic levels until late 2024 at the earliest. Check out page 21 for more information.

EXECUTIVE SUMMARY

Our outlook for Aerospace & Defense (A&D) is neutral, as we see growth for defense businesses being offset by below-normal earnings in commercial aerospace due to lingering effects of the pandemic.

Strong Growth in U.S. and Allied Defense Spending Stemming From Russian Invasion of Ukraine

Government contracting generates around 65% of A&D industry revenue, with four of the industry's six largest firms by sales generating 75%-plus of revenue from government contracts, by our estimate.

In March 2022, shortly after Russia's invasion of Ukraine, Congress and the president raised the FY 22 defense budget 5% vs. FY 21. We expect 5%-6% annual growth in U.S. defense spending during 2023-2025, well above the trailing 10-year average annual growth of 1%. European allies are also raising defense spending to support Ukraine and to bolster their own deterrence strategies, which will serve to further boost U.S defense firms.

Inflation Surge Hits Fixed-Price Contracts Hard, Pressuring Defense Firm Margins

Most of the major U.S. defense firms generate at least 50% (sometimes over 80%) of revenue from fixed-price contracts, many of which are for multi-year projects. These contracts don't leave defense firms much, if any, room to raise prices if costs come in higher than expected. Accordingly, the 2022 inflation surge means defense profit margins will likely be under pressure during 2023.

Commercial Aerospace Demand Is Rapidly Recovering From Pandemic Downturn

U.S. air passenger volume as of May 6, 2023 grew over 10% year-over-year and has pretty much recovered to the pre-pandemic level. The U.S. recovery is being followed by similar rebounds in Western Europe, Southeast Asia, and other developed markets as China's border reopening to foreign tourists has boosted demand from first-quarter 2023 onwards. CFRA expects U.S. air passenger volume will surpass 2019 levels during 2023 as international and business travel patterns normalize post-pandemic.

Supply Chain Crunch Limits Output for Commercial Aerospace Firms

During the early phase of the Covid-19 pandemic, the number of aerospace engineers and aerospace manufacturing workers in the U.S. fell 17% and 10%, respectively, from their pre-pandemic peaks, according to the Bureau of Labor Statistics. These job cuts occurred as airlines grounded thousands of planes and canceled orders in the early phase of the Covid-19 pandemic, causing a steep drop-off in work throughout the commercial aerospace supply chain. In response, producers implemented layoffs and early retirement programs to cut cost and save cash, planning for a prolonged downturn.

However, rather than the 2024-2025 time frame that most industry executives targeted for a full global air travel recovery, demand made a near full recovery in 2022. The quick recovery soon after steep job cuts has left firms up and down the flight equipment supply chain struggling to meet maintenance orders and new plane delivery schedules that are now being aggressively pushed by airline customers. Labor and supply chain issues have caused key aircraft original equipment manufacturers (OEMs) Airbus and Boeing to significantly push out their schedules for ramping production back to pre-pandemic levels.

Positive Long-Term Demand Trends for Commercial Aerospace Remain Intact

The federal government and most U.S. firms have lifted Covid-19 travel restrictions, and we expect this will be the case for all countries in 2023. This should allow commercial aerospace to get back to its long-term growth trends, driven by global economic expansion and integration's heavy reliance on air travel. Furthermore, March 2023 backlogs for Boeing and Airbus were roughly 5,300 and 7,200 planes, respectively, leaving the sub-industry with strong long-term earnings potential.

AEROSPACE & DEFENSE

Outlook: Neutral

MARKET CAP BREAKDOWN*

(as of May 31, 2023)

RANK NO.	COMPANY NAME	MARKET CAP ($ billion)
1	Raytheon Technologies	134.4
2	The Boeing Company	123.7
3	Lockheed Martin	112.4
4	Northrop Grumman	66.1
5	General Dynamics	55.9
6	TransDigm	42.5
7	L3Harris	33.3
8	Howmet Aerospace	17.7
9	Axon Enterprise	14.3
10	Textron	12.5
	Others†	42.0

Source: CFRA, S&P Global Market Intelligence.
*Companies included in the S&P 1500 index.
†Refer to the Comparative Company Analysis section of this survey for other companies in the industry.

ETF FOCUS

XLI Industrial Select Sector SPDR	AUM ($M) 12,927	Expense Ratio 0.10
ITA iShares U.S. Aerospace & Defense	AUM ($M) 5,571	Expense Ratio 0.39
VIS Vanguard Industrials	AUM ($M) 3,710	Expense Ratio 0.10
PPA Invesco Aerospace & Defense	AUM ($M) 1,805	Expense Ratio 0.61
XAR SPDR S&P Aerospace & Defense	AUM ($M) 1,423	Expense Ratio 0.35

BY THE NUMBERS

+32% Expected 2023 Y/Y EPS growth for major defense firms (LMT, NOC, GD, LHX)

+6.5% Forecast for U.S. 2023 defense spending growth

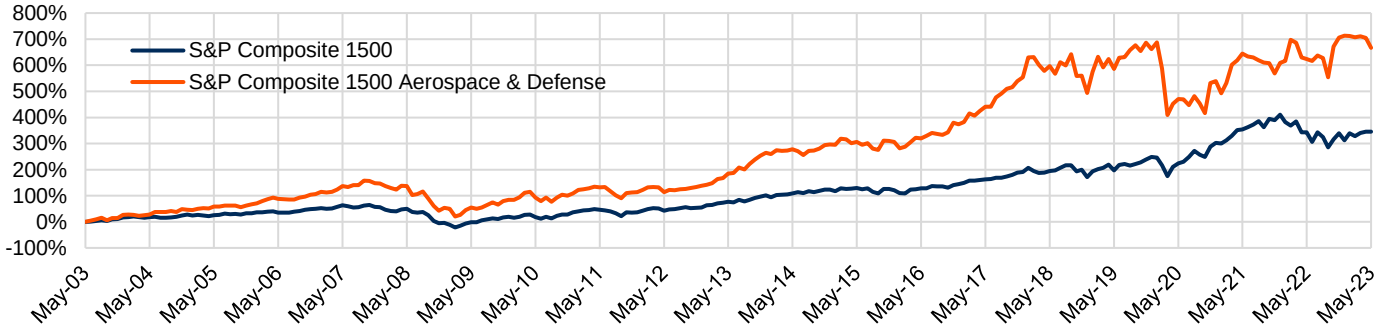
-48% Boeing's commercial airplane revenue in Q1 2023 vs. pre-grounding Q1 2018

78 Boeing 737 orders in the first three months of 2023

+10% Increase in TSA checkpoint travel screenings in April 2023 vs. April 2022

-21% Shortfall in GE narrow-body LEAP engine deliveries in Q1 2023 vs. Q1 2019

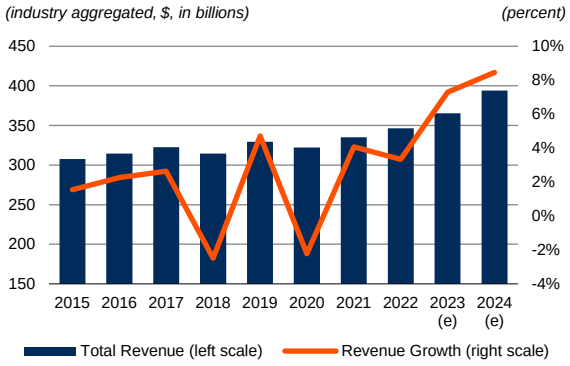
20-YEAR INDEX PERFORMANCE



Data through May 31, 2023.
Source: CFRA, S&P Global Market Intelligence.

FINANCIAL METRICS

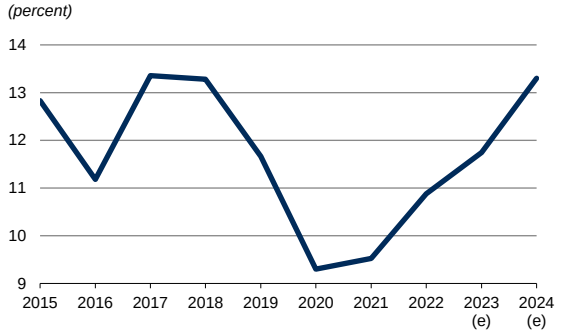
Revenue



Source: S&P Global Market Intelligence, S&P Capital IQ Consensus Estimates.

- Consensus sees the total revenue for companies in the S&P Composite 1500 Aerospace & Defense Index to grow 7.3% in 2023 and 8.5% in 2024, with majority of the growth coming from Boeing, Raytheon, and General Dynamics.
- Pent-up air travel demand and the step-up in U.S. and allied defense spending post-Russian invasion are expected to be the main drivers of revenue growth for 2023-2024, in CFRA's view.

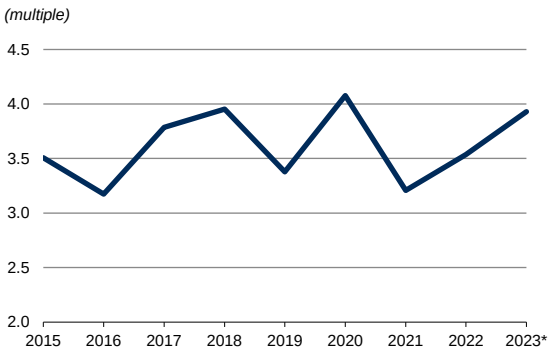
EBIT Margin



Source: S&P Global Market Intelligence, S&P Capital IQ Consensus Estimates.

- The average EBIT margin of the S&P Composite 1500 Aerospace & Defense Index is projected to expand 87 bps in 2023 and 156 bps in 2024 following a 135 bps increase in 2022 as we see tight supply (due to supply crunch) and resilient demand to lift industry margin in 2023 and 2024.

Net Debt-to-EBIT Ratio

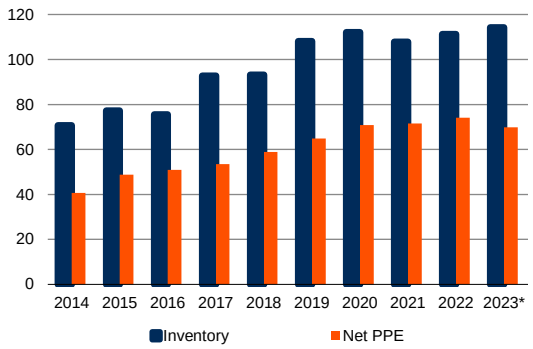


*Last twelve months ended first quarter of 2023.
Source: S&P Global Market Intelligence.

- The median net debt-to-EBIT ratio for the S&P Composite 1500 Aerospace & Defense Index increased to 3.9x in the last 12 months ended first quarter of 2023 from 3.5x in 2022.
- Many Aerospace & Defense firms took out more debt during the pandemic to get through the worst of the crisis. We expect the median debt-to-EBIT ratio to decrease in 2023 as commercial operating profits recover and pandemic debt is gradually paid down. The current fed funds rate at 5% will provide a strong incentive for Aerospace & Defense firms to pay down debt rather than refinance at higher rates, in our view.

Aggregate Inventory and Net Property, Plant, and Equipment (PPE)

(industry aggregated, $, in billions)



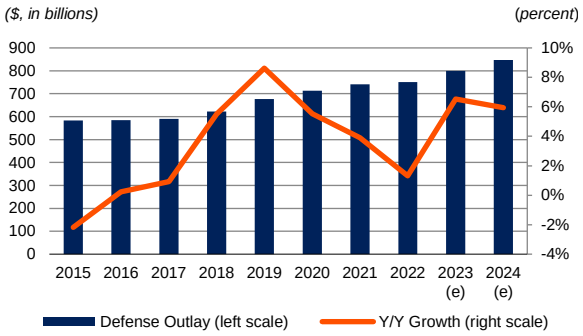
*As of first quarter of 2023.

Source: S&P Global Market Intelligence.

- Inventory grew 3.2% in 2022, while net PPE in 2022 increased 3.6% versus 2021 levels.
- In a growing economy, inventory and net PPE growth typically represents rising capacity to meet higher demand from airlines.
- However, CFRA expects industry inventory to tick down in 2023 as the commercial aircraft supply chain gradually works down excess inventory accumulated due to widespread order cancellations from the airline industry during the pandemic. Further, Boeing is making progress reducing excess 737 and 787 inventories, which rose to unhealthy levels while regulators halted deliveries of those models during large stretches of 2020-2022.

KEY INDUSTRY DRIVERS

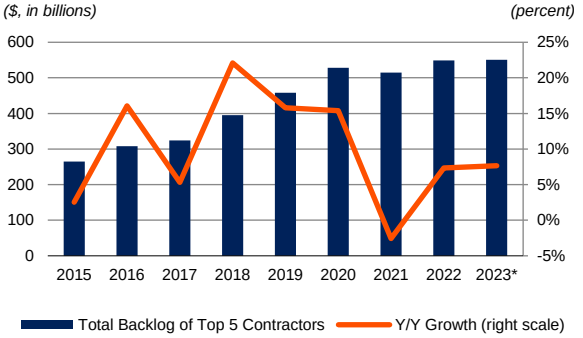
U.S. Defense Spending (Outlays)



e-Estimates.
Source: Congressional Budget Office.

- Defense outlays represent actual money spent by the government, which can differ from budgeted amounts due to timing and discretion.
- U.S. defense spending grew 1.3% to $751.3 billion in 2022 versus $741.6 billion in 2021.
- Congressional Budget Office estimates U.S. defense spending will grow 6.5% in 2023 and will increase by another 5.9% in 2024, driven by defense build-up at home and continued military aid to Ukraine.

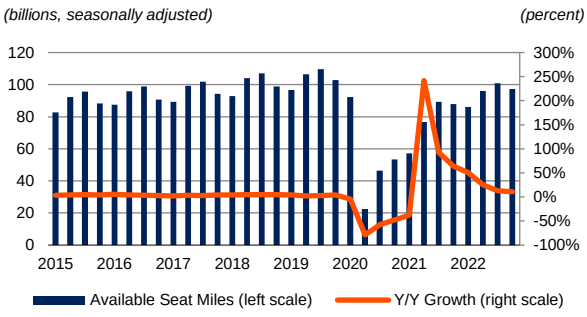
Defense Backlog



*Data through first quarter.
Source: Company reports.

- Defense backlog of the top five defense contractors grew 7.6% in the first quarter of 2023 to $550.3 billion compared to $511.2 billion in the first quarter of 2022.
- We expect backlog growth to remain elevated in 2023 as U.S. politicians are increasingly supporting funding to maintain sea, air, space, and intelligence superiority over non-democratic rival nations, in our view, and with increased funding to support Ukraine's defense against Russia.

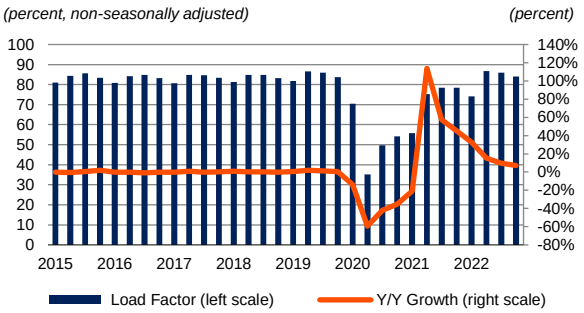
Available Seat Miles



Source: Bureau of Transportation Statistics.

- Available seat miles is a measure of passenger carrying capacity of the airline industry.
- Available seat miles grew 22.3% in 2022 to about 95% of 2019's level. Fast recovery in the available seat miles is consistent with the air travel demand resiliency we have been witnessing in recent quarters.
- CFRA expects available seat miles to grow to 3% above pre-pandemic 2019 levels by year-end 2023.

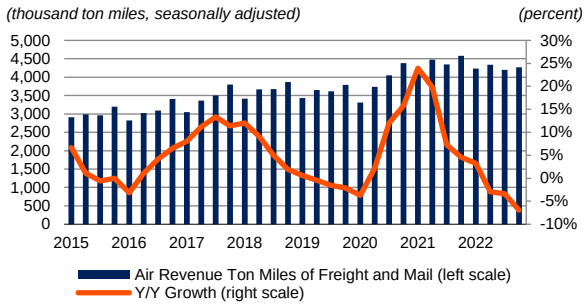
Load Factor



Source: Bureau of Transportation Statistics.

- The passenger load factor measures the capacity utilization of available seat miles.
- The load factor grew 14.9% to 82.7% in 2022, which is close to 2019's average of 84.5%, as demand was strong while capacity addition was limited by supply chain disruption.

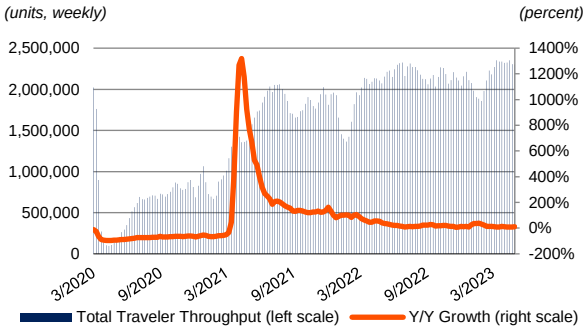
Air Revenue Ton Miles of Freight and Mail



Source: Bureau of Transportation Statistics.

- Air revenue ton miles of freight and mail measures the volume that airlines and air freight carriers generate for non-passenger cargo that they are paid to transport. This includes commercial cargo transported in the bellies of passenger aircraft, as well as the cargo of non-passenger carriers like UPS and FedEx.
- Airfreight and mail ton miles declined 2.7% in 2022 compared to 2021. We think this signals a weakness in consumer goods spendings.

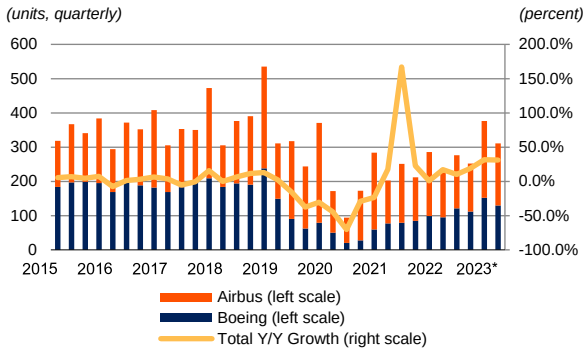
TSA Checkpoint Traffic



*Data through the week of May 6, 2023.
Source: Transportation Security Administration.

- The total number of U.S. air travelers plummeted 95% in the early months of the Covid-19 pandemic, but has since recovered substantially, driven by the ramp-up of Covid-19 vaccinations.
- As of May 6, 2023, U.S. air traveler counts have pretty much recovered to the pre-pandemic level. CFRA expects 2023 U.S. air traveler counts will grow 3% vs. 2019.

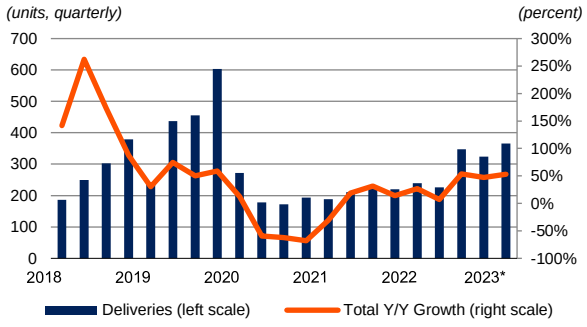
Boeing and Airbus Commercial Aircraft Deliveries



*Data through first quarter.
Source: Company reports.

- The second quarter of 2020 was the low point for deliveries during the pandemic, with a modest recovery starting in the third quarter of 2021.
- The combined total deliveries of Boeing and Airbus increased 31.2% to 311 units in the first quarter of 2023 compared to 237 units a year ago, supported by global travel demand recovery.
- We expect deliveries will continue to grow but will remain below pre-pandemic highs through 2023 due to supply chain shortages for Boeing and Airbus. In addition, China reopening its borders to foreign tourists should provide further support for air travel demand.

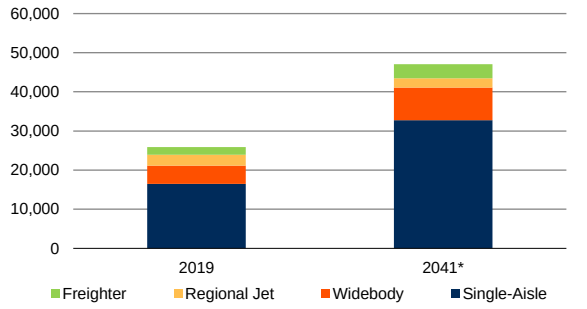
GE LEAP Engines Deliveries



*Data through first quarter.
Source: Company reports.

- The GE LEAP engines are used to power the Airbus A320 and Boeing 737 family of aircraft. The deliveries of the engines are a good leading indicator of Airbus and Boeing's aircraft deliveries.
- In the first quarter of 2023, GE LEAP engines deliveries grew 53.1% to 366 versus 239 units in the first quarter of 2022.
- However, engine volume was still well below pre-pandemic level, signaling that the supply chain cannot yet accommodate Boeing and Airbus ramping production rates back to 2019 levels.

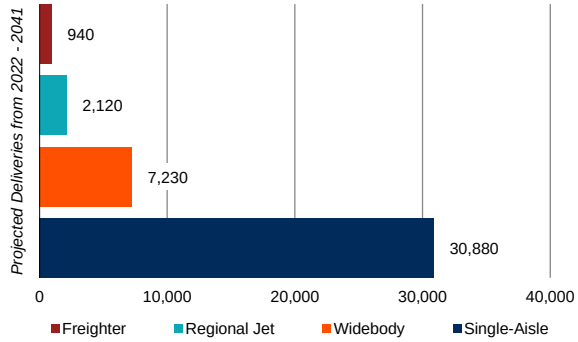
World Aircraft Fleet Forecast



*Forecast.
Source: Boeing's "Commercial Market Outlook 2022-2041".

- The global aircraft fleet is projected to grow at a CAGR of 2.9% over the 21-year period ending 2041, from 25,900 in 2019 to 47,080 by 2041, according to estimates from Boeing.
- The Asia-Pacific region is expected to expand the most at 4.0%, adding 19,060 aircraft by 2041.
- The share of single-aisle airplanes is expected to increase from 64% in 2019 to 70% by 2041, driven primarily by the fast-growing low-cost carriers (which favor single-aisle airplanes) and stronger demand from airlines operating in emerging markets.

Total New Deliveries

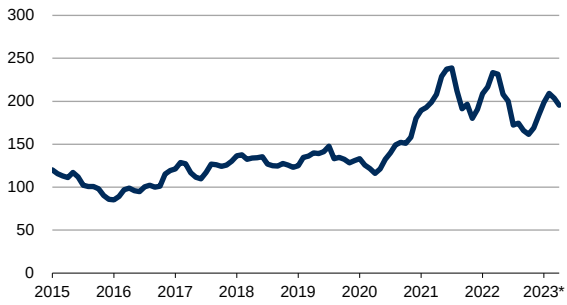


Source: Boeing's "Commercial Market Outlook 2022-2041".

- An estimated 41,170 aircraft are expected to be delivered from 2022 to 2041 globally; 49% of total deliveries will be to support anticipated traffic growth, and 51% to replace retiring aircraft.
- The Asia-Pacific, Europe, and North America regions, which control about 87% of global low-cost carrier (LCC) capacity, are expected to account for about 86% of all single-aisle airplane deliveries from 2022 through 2041, according to Boeing.

Global Metals Price Index

(Index, 2016=100)

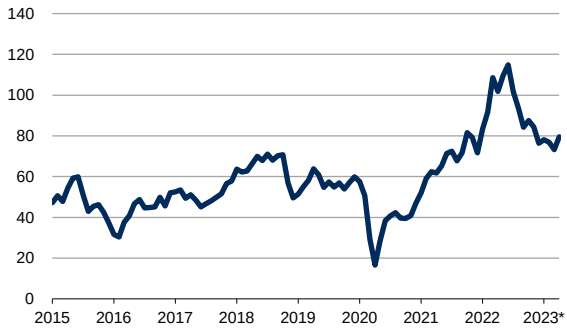


*Data through April.
Source: Federal Reserve Economic Data.

- Prices of metals peaked around the second quarter of 2021 and started to decline as a result of disrupted property markets. S&P Global Market Intelligence expects metal demand to be muted in 2023 as downward trends of the housing market in both the U.S. and China hamper metal demand.
- The global metals price index in April 2023 averaged 195.5, dropping 15.5% year-over-year compared to 231.4 in the prior-year period.

WTI Spot Prices

(MMb/d)



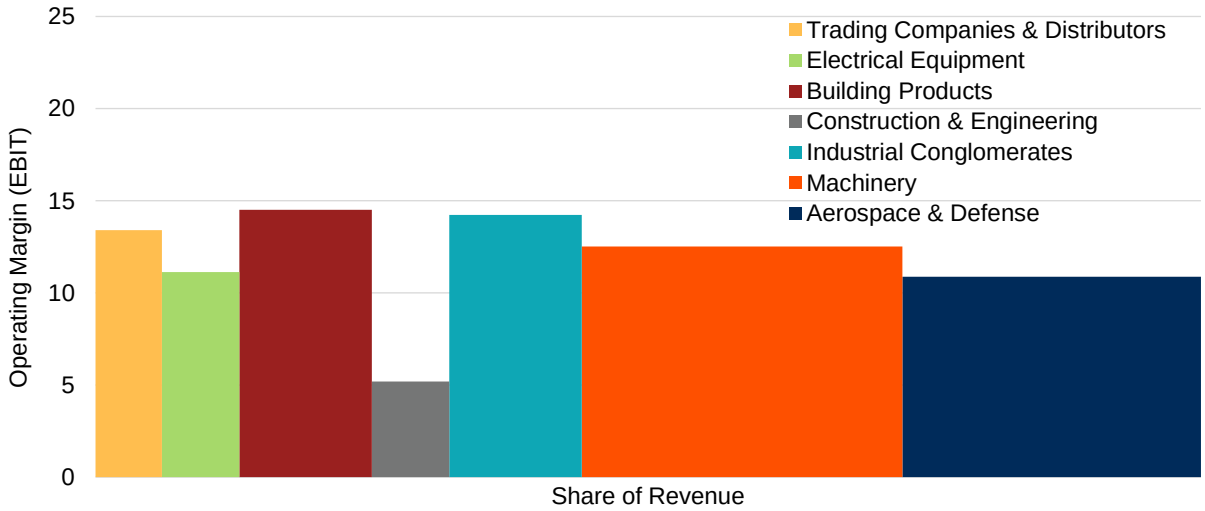
*Data through April.
Source: Federal Reserve Economic Data.

- Lower oil prices reduce airlines' operating expenses and improve profitability via lower fuel costs, their second largest expense after employee compensation.
- The EIA expects WTI to average $73.62 in 2023 and $69.47 in 2024, versus $94.91 in 2022.
- In April 2023, WTI stood at $79.45 per barrel, a 21.9% drop from the prior-year period, as demand weakens as a result of a gloomier global economic outlook.

INDUSTRY TRENDS

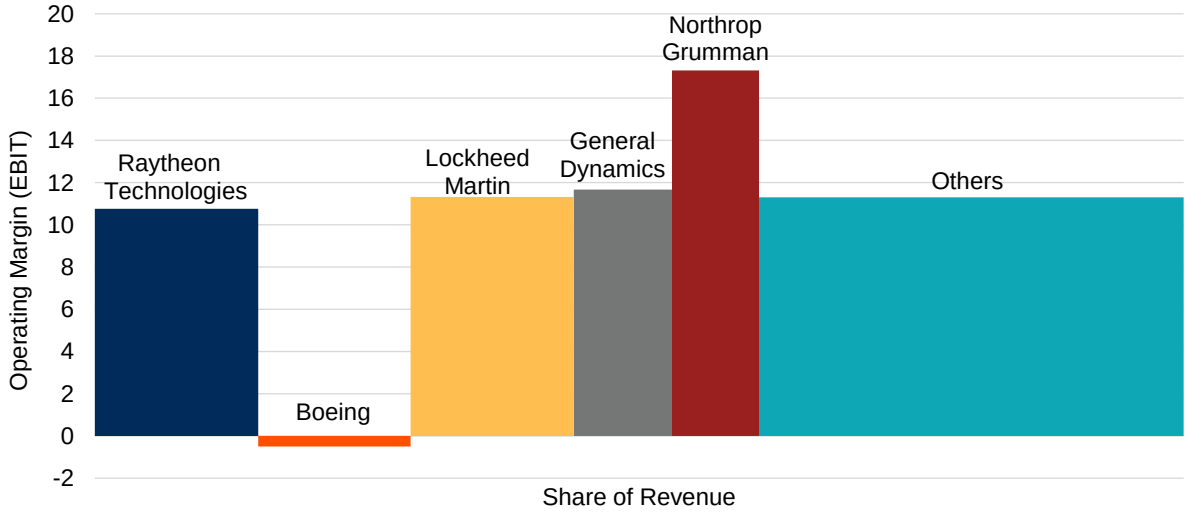
The Aerospace & Defense industry is within the Capital Goods industry group (part of the Industrials sector) and comprises 22 companies. Below are the profit maps showing the current state of the Capital Goods industry group and the Aerospace & Defense industry.

PROFIT-POOL MAP OF CAPITAL GOODS INDUSTRY GROUP
(for the year of 2022)



Source: S&P Global Market Intelligence.

PROFIT-POOL MAP OF AEROSPACE & DEFENSE INDUSTRY
(for the year 2022)



Source: S&P Global Market Intelligence.

As depicted above, Aerospace & Defense is the second largest industry in the Capital Goods industry group in terms of revenue market share; however, the industry ranked sixth in terms of operating margins. Within the Aerospace & Defense industry, three companies (Raytheon Technologies, Lockheed Martin, and Boeing) dominate 56.0% of the industry's market capitalization and 57.6% of the industry's total revenue in 2022.

Competitive Environment

Below, we used the Porter's Five Forces framework as a tool to analyze the competitive environment of the Aerospace & Defense industry.

Porter's Five Forces Analysis	
Degree of Rivalry/ Competition ***(Medium)***	We rank competition in the Aerospace & Defense industry as Medium due to the generally low number of competing firms (usually two to four) compared to more fragmented industries. This helps the industry enjoy relatively less intense price competition, in our view. The **commercial aerospace** original equipment manufacturer (OEM) segment has a multi-tiered duopoly structure, in our view, with Boeing and Airbus dominating the global market for commercial jets. The market for producing private jets is more fragmented, but also much less valuable than the global commercial fleet. For the **defense segment**, there is a greater number of large competitors, but generally, only two to three are capable of competing on specific types of major contracts, such as fighter jets, advanced helicopters, missile systems, satellite projects, or nuclear naval vessels.
Bargaining Power of Customers ***(Medium)***	**Commercial aerospace** customers are globally fragmented compared to the duopoly structure of suppliers, giving the few aircraft OEMs' reasonably strong pricing power. However, OEMs still compete strongly on price, typically offering airlines substantial volume discounts as purchase incentives and to lock in valuable long-term service contracts. OEMs also benefit from airlines' strong incentives to stay with their existing supplier. Changing plane models requires new training for flight and maintenance crews. OEMs also have multi-year backlogs of aircraft orders, meaning it typically takes several years to start seeing delivery of new planes if an airline wishes to switch suppliers. Finally, OEMs require progress payments from airlines as the planes are built, which are typically forfeited if an airline cancels orders. The U.S. Department of Defense is the primary customer for the U.S. **defense industry**, with its large size and sole customer status limiting the industry's bargaining power. The Pentagon usually has the final say in the awards of contracts and how much a defense contractor may earn on invested capital. Declining defense budgets can be a negative catalyst for the industry, but long-term contracts and multi-year backlogs of work for defense firms help mitigate this risk.
Bargaining Power of Suppliers ***(Low)***	Major aircraft manufacturers offer two engine options for some of their new planes, such as Boeing's 787 and Airbus' A320neo, reducing their dependence on one engine supplier. In addition, the avionics (aviation electronic controls equipment) supplier base is less concentrated than the aircraft manufacturing industry, thus giving the larger aircraft manufacturers (Boeing, Airbus, etc.) more bargaining power.
Threat of Substitutes ***(Low)***	We don't see any technology on the horizon that could displace passenger jets in transporting people and cargo over long distances in short time periods. For defense, any disruptive technology is likely to be developed within the industry, as new developments are typically made via government R&D funding flowing through established defense firms.
Threat of New Entrants or New Entry ***(Low)***	The Aerospace & Defense industry has high barriers to entry due to regulation, capital intensity, and long lead times. Designing a new commercial aircraft takes 8 to 10 years with highly regulated certification processes. This means a new entrant would have to absorb years of losses before its first chance to generate revenue. Further, new entrants would likely not be price competitive, with entrenched OEMs substantially undercutting them due to lower costs derived from their already massive production scale.

Operating Environment

The U.S. defense market is dominated by a handful of large players that compete for prime contractor roles (responsible for final delivery of products and controlling total project cost) on major defense programs, such as fighter jets, naval vessels, and missile and satellite systems. The “Big Five” defense contractors in order of estimated defense revenues are Lockheed Martin, Raytheon Technologies, Northrop Grumman, General Dynamics, and Boeing. After the Big Five contractors, there are myriad small- and medium-sized defense firms that compete for smaller contracts, as well as serve as sub-contractors, or suppliers, to the primes. CFRA thinks the defense market is highly competitive, but also highly profitable due to significant barriers to entry.

The commercial aerospace market is heavily dependent on the success of the two dominant global plane makers: Boeing and Airbus. Despite this duopoly, competition is intense to win new orders from airlines. While these two firms dominate the large commercial aircraft market, hundreds of small, medium, and large aerospace firms supply Boeing and Airbus with the over 600,000 individual parts needed to assemble a modern commercial jet. These firms supply Boeing and Airbus planes with everything from highly engineered, multi-million-dollar parts – like jet engines, fuselages, and electronic control systems – to non-complex products – such as tray tables, windows, and carpeting.

The market for business/private jets is more fragmented and competitive than that of commercial jets. Major business jet original equipment manufacturers (OEMs) include Bombardier (Learjet brand), Gulfstream (a division of General Dynamics), Embraer, and Cessna Aircraft Co. (a subsidiary of Textron Inc.).

THE DEFENSE SEGMENT

The top 10 U.S. defense contractors in the S&P Composite 1500 Aerospace & Defense generated defense-related revenues of $324 billion in FY 22, based on CFRA's estimates.

LEADING GLOBAL DEFENSE CONTRACTORS

(ranked by FY2022 defense revenues, in $, millions)

RANK NO.	COMPANY NAME	2022 REVENUES Total	2022 REVENUES Defense	DEFENSE SHARE*
1	Lockheed Martin Corporation	65,984	63,345	96%
2	Raytheon Technologies Corporation	67,074	39,574	59%
3	The Boeing Company	66,608	32,638	49%
4	Northrop Grumman Corporation	36,602	31,478	86%
5	General Dynamics Corporation	39,407	27,585	70%
6	L3Harris Technologies, Inc.	17,062	14,332	84%
7	Huntington Ingalls Industries, Inc.	10,676	10,569	99%
8	Textron Inc.	12,869	3,091	24%
9	TransDigm Group Incorporated	5,429	2,311	43%
10	Aerojet Rocketdyne Holdings, Inc.	2,238	2,148	96%

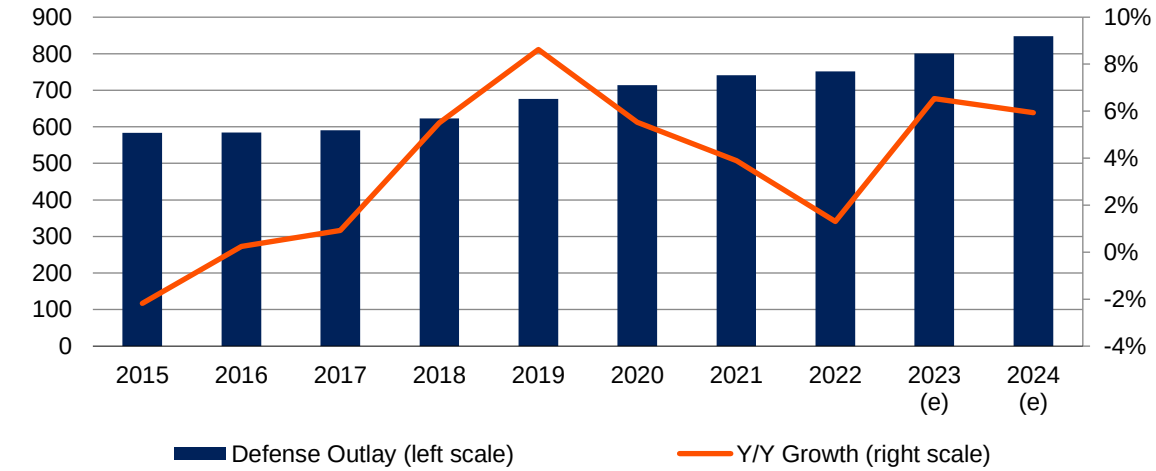
*Estimates by CFRA

Source: CFRA Research, company reports

U.S. defense spending has historically grown regardless of economic downturns, government deficits, or the political party in control of Washington. However, defense budget cuts do periodically occur for other reasons, primarily during periods when major military engagements are drawn down, in our view. This occurred during the Vietnam drawdown of the early 1970s, the post-Gulf War and Cold War drawdown during the mid-1990s, and the 2012-2015 period of reduced defense spending as major U.S. Middle East operations were wound down.

U.S. ANNUAL DEFENSE OUTLAYS

($, in billions)



e-Estimates by CFRA.

Source: Congressional Budget Office.

In December 2022, President Biden signed into law a 2% increase in the FY 23 defense budget vs. FY 22. The base defense budget for FY 23 includes request for procurement and research & development (R&D) totaling $276 billion, which is the largest budget request in the history of the Department – $56.5 billion was requested to advance Air Power (includes F-35 and F-15EX, the B-21 bomber, mobility aircraft, and KC46A), $40.8 billion for Sea Power (includes new construction of nine battle force fleet ships, Ford class carriers, and two Columbia class ballistic missile submarines), and $12.6 billion for Land Power.

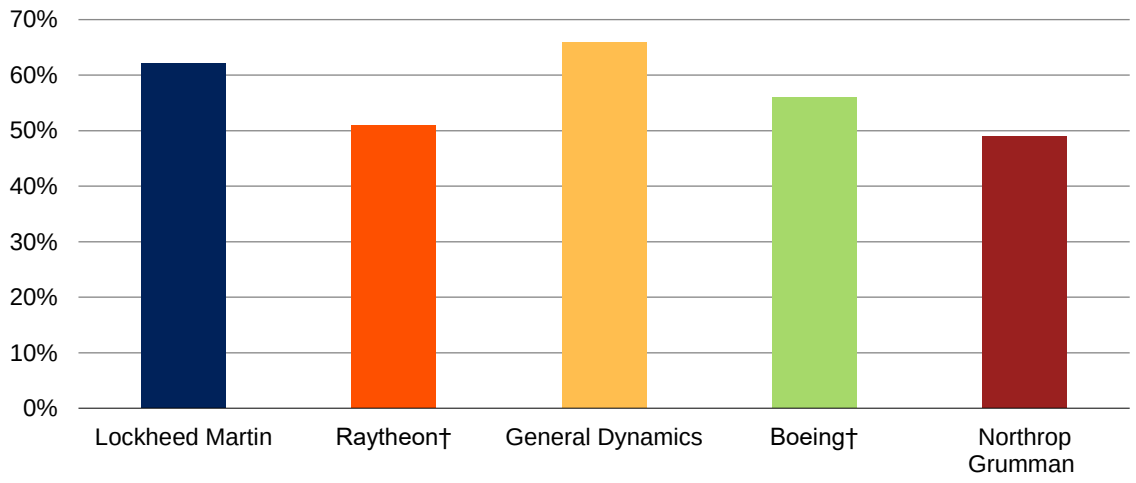
We expect elevated U.S. and allied defense spending growth to be sustained for several years following the Russian atrocities in Ukraine, in turn driving healthy sales growth for defense businesses that make up roughly 65% of sub-industry revenue. Additionally, China's recent military threats against Taiwan are further persuading defense doves in Congress to support a build-up and deterrence strategy, in our view. There is a risk that Republicans winning back control of the U.S. House will result in budgeting stalemates with the Democratic Senate and president, leading to little or no growth in defense spending. But we ultimately think strong bipartisan support for global deterrence will win out. CFRA forecasts 5%-6% annual growth in U.S. defense spending during 2023-2025, well above the trailing 10-year average annual growth of 1%.

Inflation Surge Hits Fixed-Price Contracts Hard, Pressuring Defense Firm Margins

High inflation has been dragging defense companies' margins down. Most of the major U.S. defense firms generate 50%-75% of revenue from fixed-price contracts, many of which are for multi-year projects. These contracts don't leave defense firms much, if any, room to raise prices if costs come in higher than expected. Given the 2022 inflation surge, defense profit margins have been under pressure.

While we forecast healthy top-line growth for defense firms in 2023, margins are likely to be hurt by persistent high inflation. Much of defense firms' 2023 revenue was contracted before the 2022 inflation surge. Fixed-price contracts do not typically allow higher-than-expected costs to be passed on to buyers, putting defense firms at high risk of weak margins in 2023, in our view.

REVENUE PERCENTAGE FROM FIXED-PRICE CONTRACTS FOR THE TOP 5 DEFENSE FIRMS IN FY 22
(percent)



†Revenue from defense segments.
Source: Company reports.

Large U.S. Defense Firms Focusing on Advanced Technology

While defense spending is currently seeing healthy growth, reductions do periodically occur. However, this does not necessarily pose a major risk to defense firms' earnings, in our view. Roughly 61% of the U.S. defense budget is spent on personnel and operations, by our estimate, while the areas where defense contractors focus, R&D and procurement, represent only about 33% of spending. This relatively small share for R&D and procurement means total defense spending can come down even as R&D and procurement spending continue increasing, in our view.

We think the major defense firms' focus on R&D and procurement helps limit the impact they feel when total budgets are reduced. This is because politicians and military leaders will typically look to cut spending in areas other than the high-priority programs the contractors are working on, in our view. In fact, U.S. defense spending decreased 4% annually during 2012-2015, but major defense contractor earnings per share grew around 8% annually over the same period. This was most likely due to the contractors' focus on high-priority R&D and procurement programs that saw healthy funding growth even as the overall defense budget shrank, in our opinion. Below, we outline a few examples of high-priority defense programs that are likely to see steady growth in funding even if total defense budgets are unexpectedly reduced in the years ahead.

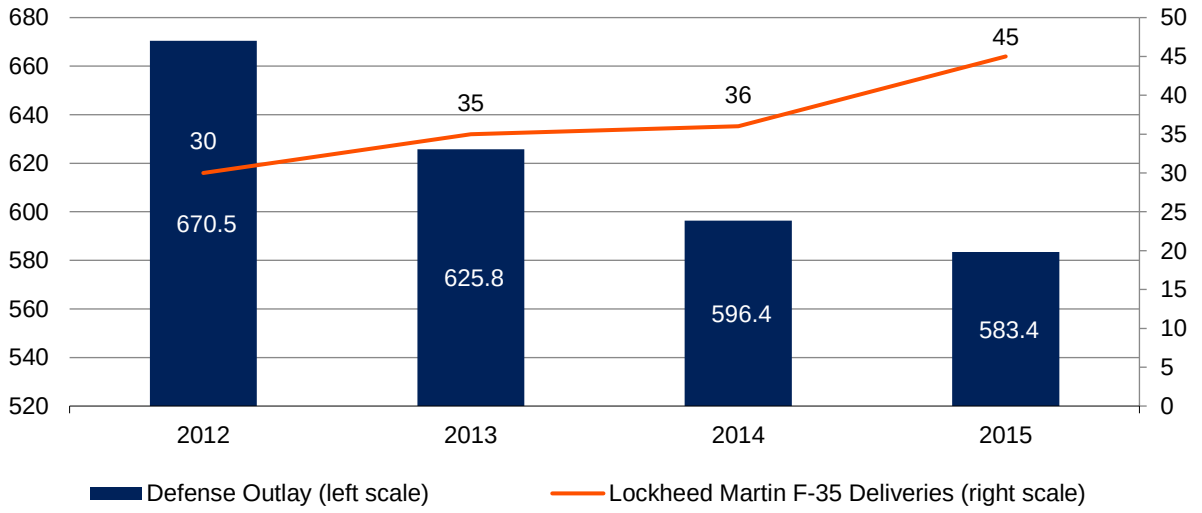
F-35 Joint Strike Fighter

The F-35 initiative is the Department of Defense's (DOD) most expensive weapons program ever, and is the largest revenue source for the nation's largest defense contractor, Lockheed Martin. The DOD plans to acquire a total of 2,456 F-35 fighter jets through 2044. Allies are expected to purchase hundreds of additional F-35s, and eight nations are cost-sharing partners in the program with the U.S. The Biden administration's proposed FY 23 defense budget requested about $11 billion for the program. Prime contractor Lockheed Martin performs overall systems integration and final assembly and checkout; Northrop Grumman and BAE Systems supply components for mission systems and airframe, while Raytheon Technologies' Pratt & Whitney division supplies F-35 jet engines.

Below is an illustration of how the DOD's strong demand for state-of-the-art fighter jets allowed Lockheed Martin to rapidly grow its F-35 deliveries (and earnings) even as total U.S. defense spending was in decline from 2012 to 2015.

F-35 DELIVERIES AND U.S. DEFENSE OUTLAYS

($, in billions) *(units)*



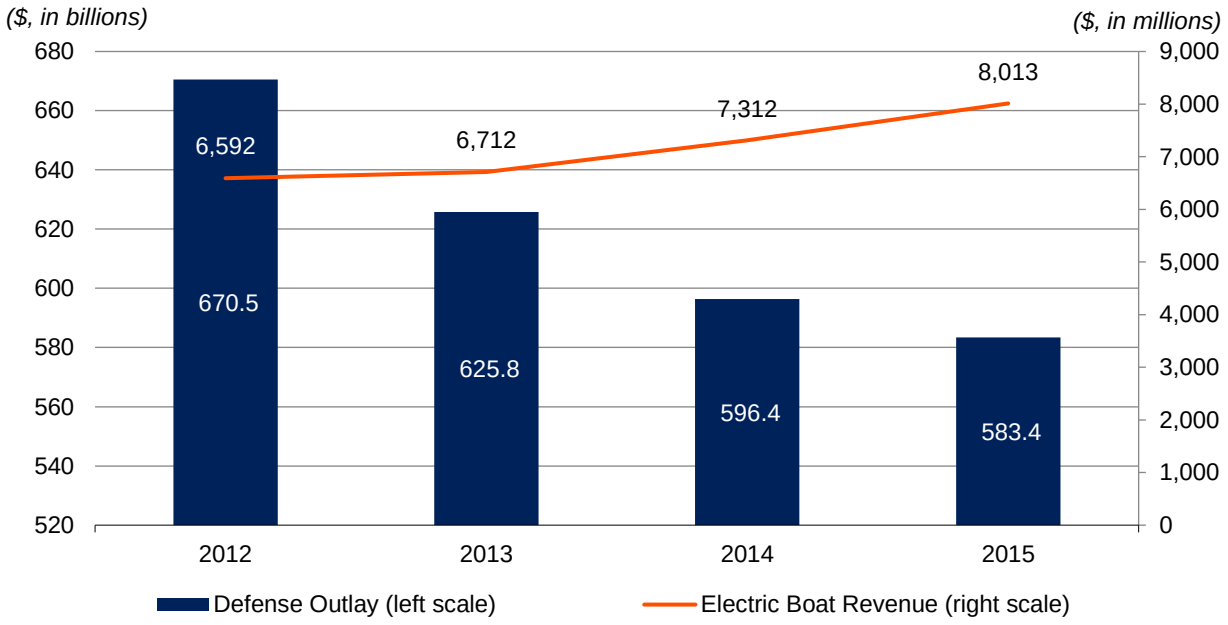
Source: Congressional Budget Office, company reports.

Missile Defense: Terminal High Altitude Area Defense (THAAD) and/or Patriot Advanced Capability
The Missile Defense Agency's budget for FY 24 is $10.9 billion, and $484.7 million for THAAD. Lockheed Martin is the primary contractor, with Raytheon as the systems integrator.

Virginia-Class Nuclear Submarines
The Navy has been procuring Virginia-class nuclear-powered attack submarines since FY 98. The Navy's FY 24 budget submission estimates the procurement cost of the Virginia-class submarine program at $10.8 billion. The main defense firms for the program are Electric Boat, a subsidiary of General Dynamics (prime contractor), and Huntington Ingalls (sub-contractor).

Below is an illustration of how the DOD's high priority on nuclear navy superiority allowed Electric Boat to rapidly grow revenue even as total U.S. defense spending was in decline during 2012-2015.

ELECTRIC BOAT AND U.S. DEFENSE OUTLAYS



Source: Congressional Budget Office, company reports.

Ford Class Aircraft Carriers (CVN-78)
USS Gerald R. Ford (CVN-78) is the first completely new design for an aircraft carrier since USS Nimitz (CVN-68). The shipbuilders found value in every square inch of the ship, saving the Navy a projected $4 billion in ownership costs over the ship's 50-year lifespan. The Navy's proposed FY 24 budget requests $2.7 billion in procurement funding for Ford Class Aircraft Carriers. The carriers are assembled at Newport News Shipbuilding, a division of Huntington Ingalls, which is the only shipyard in the U.S. that can build nuclear aircraft carriers.

COMMERCIAL AEROSPACE SEGMENT

The customer base for commercial aerospace consists of hundreds of airlines and aircraft leasing companies around the world, but they are supplied by a small number of aircraft developers and manufacturers. Boeing and European firm Airbus have historically held a duopoly for global supply of narrow-body (generally 100-200 seats) and wide-body (200+ seats) commercial jets. From 2012 to 2018, Boeing was the leader in annual global aircraft deliveries. But in 2019, Airbus passed Boeing as the top airplane producer globally, with Boeing faltering as its design and safety failures led regulators to ground its flagship 737 MAX narrow-body following two fatal crashes. Boeing's commercial aircraft deliveries peaked at 806 in 2018, and were just 340 in 2021, with large swathes of 737 orders canceled during 2019-2021.

However, after a nearly two-year grounding and a comprehensive design and safety system overhaul, the 737 MAX was cleared by federal regulators to resume flying in the U.S. in late 2020. European and Canadian regulators followed suit in early 2021. This renewed faith in the airplane from regulators led to the resumption of growth in Boeing's 737 order book. Year-to-date through March 2023, Boeing received 94 new 737 orders, signaling the plane's operating efficiencies, particularly on fuel, are still highly desirable to airline customers.

COMMERCIAL AIRCRAFT NET ORDERS, DELIVERIES AND BACKLOG BY MANUFACTURER

(in units of commercial aircraft)

	NET ORDERS		DELIVERIES		BACKLOG	
YEAR	BOEING	AIRBUS	BOEING	AIRBUS	BOEING	AIRBUS
2023*	56	142	130	127	5,356	7,254
2022	774	820	480	661	4,578	7,239
2021	479	507	340	611	5,136	7,082
2020	-471	268	157	566	4,997	7,184
2019	243	1,131	380	863	5,625	7,482
2018	918	796	806	800	5,873	7,577
2017	932	1,207	763	718	5,786	7,265
2016	767	853	748	688	5,715	6,874
2015	837	1,160	762	635	5,795	6,831
2014	1,384	1,712	723	629	5,789	6,386

*Data through March 2023

Source: Company reports/website

The Commercial Aerospace Market Is Still Battling the After-Effects of Covid-19 Downturn

The primary end market of commercial aerospace is airlines, which have historically been highly cyclical and financially unstable during recessions. When the economy is healthy, air traffic tends to grow to support global economic growth and integration, driving high existing fleet utilization. This results in strong demand for maintenance, repair, and overhaul (MRO) for the Aerospace & Defense industry. Growing air travel demand also leads to influxes of new aircraft orders to expand airline fleets, which increases the backlogs of major OEMs like Boeing, Airbus, and their major suppliers, allowing them to raise prices and ramp up their production lines.

On the flip side, air traffic tends to decline during recessions, leading to lower fleet utilization and aftermarket MRO revenue, as well as airline distress that leads to new aircraft orders being delayed or canceled. In a typical recession, most of the global airline fleet continues to fly, although with cheaper tickets and fewer full flights. This differs significantly from the current Covid-19 downturn.

Unlike a typical aviation downturn where passenger volumes remain above 90% of peak levels, TSA checkpoint traffic (number of U.S. air travelers) fell to just 5% of 2019 levels during the initial Spring 2020 months of the pandemic in the U.S. This multi-year severe downturn has marked by far the worst period in the history of commercial aviation. Even with the significant recovery over the past year, airline passenger volumes are still in a downturn, with significant ground still to recover to pre-pandemic highs.

Not surprisingly, demand for new commercial aircraft fell alongside air travel volumes during the pandemic. Accordingly, Airbus and Boeing sharply reduced production rates of new aircraft, with Boeing's cuts also driven by regulatory and quality control problems on the 737 and 787 models. At Airbus, the cuts were driven purely by the pandemic. For 2022, we estimate Airbus' narrow-body production was down roughly 20%-30% vs. 2019 (pre-pandemic), and that wide-body production was down an even greater 40%-50%. The larger cuts for wide-bodies are due to their more common use on long-haul international flights, which saw more pandemic travel restrictions than domestic flights that more often rely on narrow-bodies.

Lower Airbus and Boeing production hurts not only the earnings of these major OEMs, but their hundreds of suppliers too. Supplier firms range from large (engine and fuselage suppliers) to small (seats and small mechanical parts), but regardless of size, most are still being hurt as MRO revenue and new orders from the OEMs remain well below pre-pandemic levels. Operating costs have been hard to cut, too, as costs for key inputs like labor, metals, and semiconductors have risen sharply during the pandemic. Much of the supply chain's cost base is also tied up in fixed assets like plants and machinery that are difficult to reduce.

Some aerospace suppliers did enough business in the more stable defense segment to maintain positive earnings and healthy balance sheets through the pandemic. But many that are highly focused on commercial aerospace had to significantly increase debt to pay their bills while their operations burned cash. For many suppliers, the balance sheet deterioration that occurred in 2020-2021 will keep earnings below the 2019 peak long after the pandemic ends and demand has recovered, in our view, as much of their future operating profit will now be used for debt service that was not there before the pandemic.

We think most global airlines are experiencing record utilization of single-aisle jets amid strong leisure travel demand post-pandemic. We also expect wide-body utilization will fully recover in 2023 as tourists and businesses take advantage of the recent end of international travel restrictions. These trends are leading to strong orders and backlogs for the major planemakers, but regulatory foul-ups at Boeing and global supply chain problems are preventing production from fully recovering to meet healthy demand. We see the commercial aircraft supply chain exiting 2023 at annualized production run rates still roughly 20% below the pre-pandemic peak, but marking steady improvement versus 2022, down roughly 30%.

CFRA expects U.S. air passenger volumes and global plane demand to grow above 2019 levels during 2023, but supply chain issues will likely prevent the commercial aerospace market from making a full recovery until 2024 or later. Large swaths of commercial aerospace employees were laid off or encouraged to retire early during 2020-2021, as most firms were burning through cash and the downturn seemed likely to last several more years. These firms and their airline customers have been pleasantly surprised by the faster-than-expected recovery in global air travel, but the speed of the recovery and broad labor shortages since the pandemic have now left aerospace suppliers unable to staff back up to meet recovering demand.

Flight equipment OEMs such as Boeing, Airbus, GE, and Pratt & Whitney have all expressed issues with strained output due to labor shortages, supply chain issues, or both. As a result of these shortages, Boeing reduced its aircraft delivery guidance twice in 2022 to 375 from the planned delivery of about 500 at the start of the year. Similarly, Airbus also reduced its aircraft delivery guidance to 700 from 720 and had to delay its ramp-up plans for the A320neo family by over half a year from the summer of 2023 to

early 2024 due to supply chain issues. CFRA expects these aerospace labor and supply chain problems will gradually improve during 2023-2024, but they are likely to keep Boeing and Airbus deliveries well below all-time highs even as air travel demand reaches new records, in our view.

The 737 MAX Is Flying Again, and 787 Deliveries Have Resumed

Boeing, many of its top customers, and its suppliers were all severely impacted by two tragic crashes of the 737 MAX in late 2018 and early 2019. Both crashes were ultimately found to be caused by the same sensor failure, which was compounded by poor safety software in the plane's design. This led to a global regulatory grounding of the 737 MAX aircraft starting in March 2019, which ultimately lasted until January 2021 when the MAX began flying again globally.

With the MAX now flying again, Boeing has begun working down its large inventory of MAX planes. As of December 2022, Boeing had inventory of 250 completed 737s due to the company's recent safety and/or regulatory failures. These large inventories will keep Boeing from fully re-ramping production rates to near pre-pandemic levels until late 2024 at the earliest, especially with the latest announced production with its supplier Spirit AeroSystems, which is expected to affect its ability to deliver a "significant" number of 737 Max jets, in our view. In turn, sales volume for Boeing and key suppliers will materially lag the recovery in air travel demand, in our view.

Boeing also has an unhealthy inventory of 787 wide-bodies, which stood at 100 planes in December 2022. This was caused by quality control issues on Boeing's 787 production lines, which led regulators to halt new 787 deliveries for much of 2021-2022. However, Boeing received permission to resume 787 deliveries during Summer 2022, and we expect 787 inventory to normalize by year-end 2024.

The resumption of 737 MAX and 787 deliveries is a much-needed development for Boeing, especially after a combination of crises caused the firm to burn through $23.2 billion of cash during 2020-2021. The development is less welcome for Airbus, as the competitor gained considerable market share in the narrow-body market during the MAX grounding in 2019 and 2020. In CFRA's view, Boeing is likely to offer planes at a discount to historical prices to sell its excess inventory, and also in an effort to get the planes back into fleets to start rebuilding faith in the brand.

Complex Nature of Aerospace Technology, Manufacturing, and Supply Chains

Commercial aircraft deliveries are occasionally disrupted by supplier issues arising from the complex nature of the product. In 2018, both Boeing and Airbus were negatively impacted by delays and volume shortfalls caused by suppliers. Boeing failed to meet its 737's delivery target of 52 aircraft per month for much of 2018 due to delivery delays from two major suppliers – engine manufacturer CFM International and fuselage supplier Spirit AeroSystems Holdings.

Airbus was also impacted by engine shortages for both of its A320neo engine options – Pratt & Whitney's (P&W) PW1100G and CFM's LEAP-1A. In January 2018, a new knife-edge seal issue on the P&W engines was discovered after four Airbus A320neos experienced engine shutdowns on take-off or during flight. P&W resumed shipments of the fixed PW1100G engines to Airbus in April 2018, while Airbus restarted deliveries of the P&W's engine-powered A320neo in late April 2018.

KEY INFOMATION FOR MAJOR COMMERCIAL AIRCRAFT PROGRAMS AS OF APRIL 2023			
Manufacturer	**Model**	**Backlog**	**Key Stats**
Boeing	737	4,196	▪ The 737 MAX variant has secured more than 5,000 orders since launch. ▪ Total number of suppliers: 417
	777	436	▪ The 777X variant has 353 unfilled orders as of April 2023, with first delivery targeted for 2025. ▪ Total number of suppliers: 389
	787	592	▪ The first 787-10 variant, claimed to be one of the most profitable Boeing models, was delivered to Singapore Airlines in March 2018. ▪ Total number of suppliers: 457
Airbus	A220	523	▪ Previously known as the Bombardier C Series – rebranded under the Airbus A220 series since July 2018, following the completion of strategic partnership between Airbus, Bombardier, and Investissement Quebec. ▪ Claimed to have 13% cost advantage per seat over its nearest competitor. ▪ Total number of suppliers: 148
	A320 family (including A318, A319, A320, and A321)	6,034	▪ Two engine options available: Pratt & Whitney's PW1100G and CFM LEAP-1A. ▪ The A320neo (new engine option) version is equipped with sharklet wing tip devices, able to deliver 20% fuel burn reduction per seat. ▪ Total number of suppliers: 468
	A330	208	▪ The most popular wide-body family – more than 1,400 A330s in operations with over 130 organizations. ▪ The A330neo family offers a 25% improvement in fuel burn per seat. ▪ Total number of suppliers: 389
	A350	437	▪ The A350 XWB offers 25% lower fuel burn, carbon dioxide emissions, and operating costs than its previous generation competitor aircraft. ▪ The A350-900 Ultra-Long-Range variant can fly up to 9,700 nautical miles (nm), further than any other commercial aircraft in service today. ▪ Total number of suppliers: 397
Source: CFRA, Boeing, Airbus, Airframer.			

The Jet Engine Oligarchy

Commercial aircraft OEMs source their engines from third-party suppliers. The jet engine supply market has a limited number of established competitors, including GE's jet engine-making division, GE Aviation (with revenues of $26.8 billion in 2022), Rolls-Royce's jet engine division (£9.3 billion in 2022, including civil and defense aerospace revenues), Raytheon Technologies' Pratt & Whitney division ($16.2 billion in 2022), and Safran's Aircraft Propulsion and Aircraft Interiors divisions (€2.0 billion in 2022).

Engine manufacturers commonly operate through joint ventures to defray the high costs and risks of engine development and manufacturing. GE has a 50/50 joint venture, called CFM International, with France's Safran Aircraft Engines. CFM International makes the engines used for the Boeing 737 MAX (LEAP-1B), Airbus A320neo family (LEAP-1A), and COMAC C919 (LEAP-1C). Another joint venture, International Aero Engines (IAE), includes Pratt & Whitney, Japanese Aero Engine Corp., and Germany's MTU Aero Engines. IAE makes the V2500 engine, which powers the original Airbus A320 family (prior to the A320neo family).

Maintenance, Repair, and Overhaul

The global maintenance, repair, and overhaul (MRO) business consists largely of repair service and replacement parts sold to aircraft operators around the world. MROs differ from aircraft OEMs primarily through their recurring revenue streams. Contracts for OEM suppliers or maintenance businesses allow them to benefit from years of service and replacement part orders over an aircraft's approximately 20-year flying life. Further, in economic downturns, MROs typically see revenues hold up relatively well as the primary driver of their business is aircraft utilization and not new aircraft orders.

M&A Environment

CFRA does not expect any major M&A announcements in the Aerospace & Defense industry during 2023. Recent attempts to consolidate on the defense side have been blocked by the Biden Administration's regulators and their view that further consolidation of the current Big Five prime contractors will reduce competition.

Similarly, the commercial side is already highly consolidated, with just two major plane OEMs and three dominant engine OEMs. One potential area where some smaller scale M&A may occur is lower-tier suppliers to big primes and dominant commercial OEMs. A fair number of smaller suppliers are likely still in distress due to debt taken on to survive the pandemic, and inability to adequately staff up during the recovery due to labor shortages. This will likely lead to some smaller suppliers consolidating during 2023-2024, in our view.

HOW THE INDUSTRY OPERATES

Although the Aerospace & Defense industry generally operates in mature, volatile markets, as well as in highly competitive and regulated environments, the major segments of the industry – commercial aircraft, military weapons, and space – also possess their own distinct demand drivers and operating characteristics. Therefore, we discuss each segment separately.

Commercial Aircraft Manufacturing

Volatile factors, such as airline profitability and growth in air traffic, drive demand for new commercial jets. Influencing these factors, in turn, is the overall health of the global economy, fuel prices, interest rates, and consumer confidence, which are also highly variable.

Demand Drivers for Commercial Jets
Airlines' willingness to buy new jets is influenced by the need to replace aging aircraft, match passenger demand with fleet capacity, meet environmental regulations regarding emissions and noise reduction, and reduce operating costs by improving fleet commonality and reducing fuel costs.

Airlines' profitability and long-term fleet planning are the primary demand drivers for large commercial aircraft. Fleet planning, in turn, is based on overall air traffic forecasts, combined with each airline's route structure and the age of existing aircraft.

◆ **Air traffic growth.** Using research provided by industry trade organizations such as the International Air Transport Association (IATA), UN agency International Civil Aviation Organization (ICAO), independent research firms, and aircraft makers Boeing and Airbus, airlines attempt to predict air traffic growth. The long-term growth rate of passenger air traffic provides a rough proxy for commercial aircraft demand or at least its directional trend.

◆ **Airline profitability and cash flow.** Another demand driver for new commercial aircraft is airline profitability and the ability to generate strong cash flow. Because aircraft tend to be very expensive assets that are typically heavily debt financed, an airline that is unprofitable and not generating solid, stable cash flow over a reasonable period will ultimately have difficulty financing new aircraft purchases at reasonable terms, no matter how optimistic management is about future traffic growth.

◆ **Fleet age and retirement cycle.** Commercial aircraft demand is also subject to fleet retirement cycles, which vary by airline or fleet operator. The average economic life of a commercial airplane is about 20 years.

Purchase Contracts Favor Buyers
Airlines usually buy new jets under long-term contracts. Typically, the aircraft buyer pays one-third or less of the contract price upfront, makes several progress payments, and then makes a relatively large balloon payment upon aircraft delivery. Although these contracts specify a fixed purchase price, they generally also include price escalation clauses tied to labor and materials costs (using the employment cost index and the producer price index for industrial commodities). Contracts also specify delivery dates. If the aircraft manufacturer does not meet the prescribed delivery date, it usually pays a stiff penalty.

Original equipment manufacturers (OEMs) have a strong incentive not to accept orders from customers they think will not take timely delivery. Given that manufacturers produce each aircraft model at a set rate, they tend to think of an aircraft in terms of one of a fixed number of delivery slots in a given year. When demand is strong and all the delivery slots over a period of time are full, manufacturers will consider increasing the production rate to satisfy incremental demand. Given enough upfront warning of a

cancellation or deferral request, manufacturers are often able to find another customer to fill that delivery slot for that particular model of aircraft.

If demand is not strong enough to fill all the delivery slots for a particular model over a given time frame, the manufacturer must decide whether or not to build the aircraft for its inventory (called a “white-tail” in industry vernacular, referring to the lack of airline customer logo on the aircraft’s tail), or to cut the production rate. Manufacturers are usually loath to build white-tails, as they tie up significant working capital (aircraft are expensive assets) and pose a significant financial risk.

Development and Production Profile
The production of commercial aircraft is capital intensive. Aircraft makers spend heavily on research & development (R&D) and must reconfigure or retool production lines when management decides to build a new or derivative aircraft model. For example, observers estimate that development costs of $25 billion for the Airbus A380 were about 50% more than originally projected. Development costs for new engines are estimated to be in the $1 billion to $2 billion range.

Aircraft manufacturing involves long lead times. Building a commercial jet aircraft takes about a year on average, according to Boeing. Designing new aircraft or engines can take about eight to 10 years for a completely new model, and about five years for a derivative of an existing model. Tooling costs typically comprise one-third to one-half of total development costs. Once the production line is up and running, the company must continue to spend heavily to maintain it. Production equipment, especially tooling equipment, wears out relatively quickly and must be replaced.

The Defense Segment

The military weapons-making business operates in a highly regulated environment. Everything from weapons demand to cost allocation issues is dictated by the U.S. government. Except in times of war, demand for weaponry is driven mainly by the U.S. military’s anticipated long-term needs: The Pentagon accounts for more than 40% of global military weapons sales. Other factors include the geopolitical climate and U.S. government budget allocations.

Strategic Planning: The QDR
The U.S. Department of Defense (DOD) attempts to anticipate defense needs several decades into the future. Under a congressionally mandated process called the Quadrennial Defense Review (QDR), the DOD conducts an extensive study every four years to examine all military risks scenarios and, based on this, it makes recommendations regarding military strategy, troop size and deployment, and weapons procurement. Congress then reviews the recommendations.

Geopolitical Climate
The global geopolitical environment influences the type and quantity of weapons systems the U.S. military demands. It also influences foreign governments’ demand for American-made weapons, and U.S. approval of such export sales. During the Cold War, the Pentagon bought large amounts of traditional, big-ticket weapons systems in a bid to outgun the former Soviet Union’s once-formidable army and navy, and its nuclear missile arsenal. The wars in Afghanistan and Iraq, however, emphasized counterinsurgency equipment designed to find the enemy and protect U.S. troops from covert attacks (*e.g.,* anti-improvised explosive device technologies).

Defense Budget Process: Arduous and Unpredictable
Formulating the U.S. defense budget is a complicated, circuitous, and continuous process. Every year, the DOD, the president, and Congress review a five-year defense budget. Budgetary considerations dramatically affect the type and volume of weapons procurements.

In making long-range purchase decisions for specific weapons, the government considers force requirements and budget constraints. Nevertheless, even after all involved, from the DOD to Congress, have approved final budgets, spending on specific defense programs can deviate from previous plans. Even a decision to expand or terminate a program can be reversed the following year.

Political Considerations

A fact of life for defense businesses is that contracts are not awarded based on price and performance alone, but also on political considerations. Military contractors often purposefully spread out jobs on high-profile programs over as many states and congressional districts as possible to help ensure local congressional representatives and senators will actively support their programs. They have also been known to spend heavily on political donations.

International Markets: Offsets Needed to Win Contracts

While the U.S. represents by far the largest defense market, international defense contracts represent an important and growing opportunity for U.S. defense contractors. In the intensely competitive overseas military weapons markets, defense contractors typically must offer "offsets" to international customers, usually governments, to boost their chances of winning big contracts. To win a contract from a foreign country, the defense contractor typically must build a portion of the weapons system in the buyer's country. Offsets also may involve transferring jobs or skills to build the weapons systems or facilitating agreements to help the country export its goods.

Procurement Processes and Contract Administration Are Highly Regulated

Strict laws and regulations govern military weapons procurement processes and contracts. The primary one is the Defense Federal Acquisition Regulations Supplement (DFARS), which regulates everything from profit controls to cost allocation and reimbursement issues. Government inspectors, auditors, and technical specialists typically oversee contract administration and cost accounting practices. Consequently, the U.S. government has enormous sway over how much a defense contractor may earn on invested capital.

Military Contracts Vary

Historically, the military contractor system has used two basic kinds of contracts: cost-reimbursement contracts and fixed-price contracts.

◆ **Cost-reimbursement (cost-plus) contracts.** These contracts typically constitute reimbursement of allowable costs plus an additional fee. The defense contractor is reimbursed periodically for allowable costs based on its progress in fulfilling the contract. Cost-plus contracts fall into three categories:

- *Cost-plus fixed fee contracts* include a fixed fee regardless of the program's final costs;
- *Cost-plus incentive fee contracts* include increases or decreases in the fixed fee within a certain range, based on whether the defense contractor completes the program under or over budget;
- *Cost-plus-award-fee contracts* provide the defense contractor with an award fee based on its performance against predetermined benchmarks, at the discretion of the customer.

◆ **Fixed-price contracts.** These typically fall into one of two categories: firm and incentive contracts.

- *Firm fixed-price contracts* allow the defense contractor to benefit from cost savings it may achieve by completing the contract under budget. At the same time, the contractor accepts the sole responsibility for losing money if it experiences cost overruns.
- *Fixed-price incentive contracts* allow the defense contractor to share any savings based on target costs or to share the cost of overruns that exceed targeted costs, up to a negotiated ceiling price. The defense contractor is responsible for all costs above that ceiling.

◆ **Time-and-materials contracts.** A third type of contract, the time-and-materials contract, is used when it is not possible to estimate accurately the extent or duration of the work or to anticipate costs with any degree of confidence. Time-and-materials contracts pay contractors for labor at negotiated hourly billing rates and for certain material expenses. Such contracts include a ceiling price that the contractors exceed at their own risk.

Regulatory Environment

The Federal Aviation Administration (FAA) is the regulatory body for aircraft development, production, and operation in the United States. The FAA's primary responsibilities include overseeing airport operations, air traffic control, certification of private and commercial aircraft, and oversight on launch and re-entry of commercial space vehicles.

Gaining FAA certification for a new aircraft model is a rigorous, iterative process that can take up to a decade, and still up to five years on derivative models of existing aircraft. This major hurdle is one of the key components of high barriers to entry in the commercial aerospace market, in our view, and long-term successful relationships with regulators are of large value to entrenched competitors in the industry.

The FAA has counterparts in most other developed economies, including the European Aviation Safety Agency, Transport Canada's Civil Aviation, and the Civil Aviation Administration of China.

Commercial aircraft operations are also subject to myriad international, federal, state, and local laws, as well as regulations governing protection of the environment, including regulation of greenhouse gas and other air emissions and noise reduction. Increasingly strict emission standards have been a long-term driving force in aircraft modernization, with successful new models needing to demonstrate significant improvements in fuel efficiency and noise reduction.

Government agencies control all aspects of defense contracts both internationally and abroad. In the U.S., the DOD, or Pentagon, is the primary overseer of defense industry operations. Defense contractors also have manufacturing operations that are subject to typical regulations as the private, including workplace safety, labor, and environmental standards.

HOW TO ANALYZE A COMPANY IN THIS INDUSTRY

At CFRA, we recommend a top-down approach to valuation. An examination of the industry drivers outlined on pages 8 to 11 is a good starting point.

Industry Drivers

◆ **Commercial aircraft orders and backlog.** Trends in aircraft orders and backlog foreshadow production and revenue patterns. The Aerospace Industries Association (AIA), a trade group, compiles data on net orders and backlog of major commercial aircraft companies by product group. Similar data for other kinds of aircraft and military equipment are also available from the AIA.

◆ **Airline industry profits.** The financial success of the airline industry drives new orders (or cancellations) for commercial aircraft. Airlines for America (or A4A, formerly the Air Transport Association), a trade group, compiles reports on aggregate airline industry profits and reports earnings results from major air freight carriers.

◆ **Production capacity utilization.** This measure is an important indicator in assessing aerospace manufacturers' cost structure and pricing power. These, in turn, are important determinants of profit margin and return on equity (ROE), two key profitability measures. In general, rising capacity utilization rates lead to higher profit margin and ROE; conversely, declining capacity utilization rates lead to lower profit margin and ROE. The Federal Reserve provides various production capacity statistics.

◆ **Air traffic forecasts.** Because the world's airlines are the civil aircraft segment's primary customer base, their air traffic forecasts constitute another important indicator for civil aircraft manufacturers. The airlines use short- and long-term air traffic forecasts to help determine whether to expand or contract fleet size. Several industry trade organizations, such as the IATA and Airlines for America (A4A), provide air traffic statistics.

◆ **General aviation shipments.** The General Aviation Manufacturers Association (GAMA) compiles and publishes quarterly data on units shipped and the dollar value of shipments by general aviation manufacturers of small jets and turboprop planes. This information can be used to calculate historical growth statistics and projections.

◆ **U.S. defense budget.** Every fall, the U.S. Congress and the president finalize the annual budget for the U.S. Department of Defense (DOD). The budget specifies planned purchase levels for each military program.

Financial Analysis

To analyze the financial health and investment prospects of a company in the Aerospace & Defense industry, it is important to assess the company's business fundamentals, the competitive landscape, and health and major trends of the industry in which the company competes. It is also critical to determine the company's profitability and solvency ratios, as indicated by its financial statements, in order to evaluate its financial performance relative to its own history and that of its peers.

An aerospace company's financial statements – the income statement, balance sheet, and the statement of cash flows – provide an important basis for assessing its overall performance.

Quality of Revenues and Earnings

Assessing the quality of revenues and earnings is important when analyzing the companies in the Aerospace & Defense industry. High-quality revenue growth likely comes from internally generated volume expansion and price increases. Lower quality (and less predictable) revenue expansion mostly comes from acquisition-related sales volume growth, which is not internally generated. High-quality earnings consist primarily of income generated by the company's ongoing business operations. Lower-quality earnings typically include nonrecurring gains from asset sales, pension plans, litigation, insurance, or tax-related settlements. High-quality earnings should also track free cash flow generation, as there is a high degree of program accounting used by companies in the industry, so earnings can be heavily influenced by subtle changes in management estimates.

Watch Out! *Program accounting is not officially addressed in the formal accounting literature, but it is used mainly in the commercial aircraft industry and more commonly with commercial sales. Program accounting requires estimates of future costs such as labor and raw materials costs, warranty, and guarantee costs. These estimates enable management to manipulate earnings by underestimating expected costs and overestimating profits under a program during initial estimates, subsequently revising cost estimates upward in later periods to reflect more accurate information. In addition, revenue projections required are based on expected units to be produced. As revenues are recognized on delivery, gross margins may be manipulated if the company overestimates units to be produced. Fixed costs are then spread over more units, resulting in lower unit costs and therefore higher margins.*

◆ **Assessing revenue growth.** It is important to identify the factors driving revenue expansion. Are revenues rising on sales volume growth from operations, or from one-time boosts related to acquisitions? If revenue growth is being driven by acquisitions, will the acquisitions enable cost reductions, and if so, will they justify the purchase price of the acquired company? Is growth in sales volume benefiting from favorable market fundamentals and management acumen, or from large price discounts?

◆ **Analysis of free cash flow.** Free cash flow represents actual cash generated by operations minus capital expenditures, or costs needed to maintain the company's business operations. While reported earnings are accounted for through an accrual method that seeks to match expenses with the revenues they generate, cash flow is reported as it occurs and thus tends to be more variable than reported earnings.

Free cash flow can be used to grow the business, make acquisitions, pay down debt, repurchase shares, and/or pay dividends – activities that shareholders generally like to see.

Rapidly growing businesses sometimes have low or even negative cash flow, as heavy investments are made in inventory, plant and equipment, and other cash outlays necessary to grow the business. At some point, however, these businesses must begin generating significant positive cash flow, if they are to provide decent returns for investors.

CFRA also uses free cash flow generation as a check on the quality of earnings. Given the high degree of program accounting used in the industry, earnings are highly susceptible to changes in management estimates. Industry investors tend to pay close attention to the old street adage: "Earnings are an opinion. Cash is fact." As such, we monitor the degree to which net income is converted into free cash flow over several quarters.

Watch Out! *Supplier financing arrangements (also known as reverse factoring) can delay a company's payments to its suppliers. These arrangements can result in overstated cash flows and understated leverage ratios. There are several variations of these programs, but basically, a company arranges for a financial institution to pay its suppliers and the company repays the financial institution later. This effectively lengthens the supplier payment terms and thus improves working capital. However, operating cash flows can be overstated if the cash payment to the financial institution is presented as financing outflows rather than operating cash flows, which would be the case if the company pays the supplier directly. Furthermore, companies may not reclassify accounts payable under reverse factoring programs into financial liabilities, which may understate leverage ratios.*

◆ **Restructuring charges and asset write-downs.** Because the timing and size of restructurings and write-downs are often discretionary, CFRA thinks that restructuring charges and asset write-downs materially reduce earnings quality. Questions arise as to whether assets were obsolete or overvalued in earlier periods, which signals that the company may have been under-depreciating the asset – and, thus, overstating reported net earnings. Questions also arise as to whether large asset write-downs overstate future earnings, especially when companies continue to operate assets that previously had been written down. Amounts charged typically can be found either in the "Management Discussion and Analysis" or in the footnotes section of a company's annual report.

Watch Out! *Significant and/or recurring use of special charges is a red flag that a company may be using special charges to flatter non-GAAP results. Specifically, we caution that companies may boost non-GAAP earnings in the current period by bundling normal, recurring costs into the special charges. Alternatively, the company may position itself to boost reported earnings in future periods by either (a) recording excess reserves on the liability side of the balance sheet or (b) by reducing the carrying value of assets that will be used in a subsequent period.*

Measures of Financial Condition

Among the useful measures of financial condition are the current ratio and the debt-to-equity ratio.

◆ **Current ratio.** This commonly used ratio helps in assessing a company's ability to service its short-term financial obligations; it is one indicator of solvency, or the ability to pay debts and meet other financial responsibilities as they come due. The current ratio is derived by dividing current assets by current liabilities. Current assets are those that can be readily converted into cash or used up in the course of a firm's operating cycle (typically one year). Current liabilities generally encompass short-term debt, accounts payable, and other short-term obligations.

A ratio above 1.0 is viewed as a positive; the higher the current ratio, the better the company is able to service its short-term obligations. A good practice is to compare a company's present current ratio with its historical ratio, to make sure that the present ratio is not abnormally low.

◆ **Debt-to-equity ratio.** This ratio, used to assess a company's financial strength and flexibility, is based on the level of debt relative to total equity. The ratio is calculated by dividing total debt (including lease obligations) by total equity. A high debt-to-equity ratio would indicate that a company is highly leveraged and thus is generally more vulnerable to economic downturns when interest and debt payments might take up a significant portion of income.

Watch Out! *The revaluation of an acquired company's balance sheet to fair market value required under U.S. GAAP provides an opportunity to value that balance sheet in a way that will benefit future earnings. This is generally done by understating the value of assets and overstating the value of liabilities acquired. This provides a benefit to earnings following the acquisition because the difference between the fair market value of the target's net assets and the purchase price is allocated to goodwill, which is not expensed unless it is deemed impaired in a future period, and therefore does not impact earnings on a recurring basis.*

Measures of Profitability

Among the useful profitability measures are operating and net profit margins.

◆ **Operating margins.** These ratios measure a company's profits as a percentage of revenues; the higher the ratio, the greater the company's profitability. Operating profit margins are derived by dividing operating income (which excludes interest, taxes, special gains and charges, and non-operating income) by total revenues. Net profit margins are calculated by dividing net income by total revenues.

Watch Out! *Aerospace & Defense companies generally incur substantial costs related to R&D. Under U.S. GAAP, R&D costs must be expensed as incurred. A sharp decline in R&D costs relative to sales raises concern that a company may be delaying or cutting back on R&D costs in the current period to boost earnings. This practice may benefit current period earnings at the expense of future earnings as the company suffers due to inadequate investment in new products resulting from lower R&D. While research costs must be expensed in the period of occurrence, IFRS standards allow the capitalization of certain costs incurred in the development of new products. The concerns, indicators, and discussion above are therefore equally applicable when analyzing companies reporting under IFRS.*

◆ **ROE and ROA.** These measures reveal how profitably a company manages its capital investments. Return on equity (ROE), which measures the rate of return on common shareholders' equity, is calculated by dividing net income (less preferred stock dividends) by average common shareholders' equity. Return on assets (ROA), a measure that compares net income to assets, independent of the company's debt leverage, is calculated by dividing net income by total assets.

Equity Valuation

Aerospace & Defense stocks generally have quite different profitability and growth profiles and, therefore, trade at significantly different earnings multiples. Investors typically use price-to-earnings (P/E) multiples in valuing stocks, and CFRA also uses this metric as our primary valuation tool. The industrials sector P/E multiples tend to be tied to investors' outlook for Aerospace & Defense industry spending.

GLOSSARY

Fighter jet—A military jet designed primarily to engage in air-to-air combat.

Fuselage—The central structure of an aircraft, which houses crew, passengers, and/or cargo.

Jet engine—An engine in which air is taken from the outside, compressed, heated (via fuel combustion), expanded in a jet or a turbine, and expelled from the jet at a much higher velocity than the intake velocity, which creates propulsive thrust.

Narrow-body—A passenger jet with single-aisle in its cabin.

Maintenance, repair, and overhaul (MRO)—The MRO business consists largely of repair service and replacement parts sales to the global commercial airlines segment.

Range—The distance an aircraft can travel before needing to refuel.

Transport—A commercial or military aircraft designed principally for the movement of people and/or cargo.

Turboprop—A gas turbine engine that employs a portion of its drive to rotate a propeller; also, an aircraft with such an engine.

White-tails—Commercial jets with tails that have not yet been painted with the airline's logo. They are new planes that have not been delivered to the customer, usually due to the latter's financial problems.

Wide-body—A passenger jet with two aisles in its cabin.

INDUSTRY REFERENCES

ONLINE RESOURCES

Airbus: Global Market Forecast
aircraft.airbus.com
Provides Airbus' long-range air traffic and commercial aircraft market forecasts.

Airframer
airframer.com
Provides a unique and valuable overview of this rapidly evolving marketplace, with a substantial database and up-to-the-minute analysis.

BOEING: Current Market Outlook
boeing.com/commercial/market
Provides Boeing's long-range air traffic and commercial aircraft market forecasts.

Defense News
defensenews.com
Covers developments in the defense industry.

The New York Times
nytimes.com
An American daily newspaper based in New York City with a worldwide readership.

TRADE ASSOCIATIONS

Aerospace Industries Association
aia-aerospace.org
Represents the nation's major manufacturers of aircraft, aircraft engines, missiles, spacecraft, and related components and equipment. Releases numerous statistical series, including industry financial results, employment, imports/exports, and backlogs. The "Statistics/Additional Resources" page has a comprehensive list of links to other aerospace research and websites.

Airlines for America
airlines.org
A trade organization for the principal U.S. airlines (formerly called the Air Transport Association); publishes statistics on airline traffic, revenues, costs, and capacity.

General Aviation Manufacturers Association
gama.aero
Represents more than 50 manufacturers of fixed-wing aircraft, engines, avionics, and components; compiles and publishes quarterly statistics on U.S. general aviation manufacturers' shipments.

International Air Transport Association
iata.org
A trade association of the world's largest airlines; publishes statistics on the global airline industry.

International Civil Aviation Organization
icao.int/Pages/default.aspx
A United Nations specialized agency that works with industry groups to reach consensus on international civil aviation Standards and Recommended Practices and policies.

REGULATORY AND GOVERNMENT AGENCIES

Bureau of Transportation Statistics
bts.gov
A principal agency of the U.S. Federal Statistical System.

Congressional Budget Office
cbo.gov
A federal agency within the legislative branch of the U.S. government that provides budget and economic information to Congress.

Federal Aviation Administration
faa.gov
A federal agency that is part of the Department of Transportation; monitors the commercial and general aviation industries and designs regulations governing aviation safety.

Federal Reserve Economic Data
fred.stlouisfed.org
A database maintained by the Research division of the Federal Reserve Bank of St. Louis that has more than 500,000 economic time series from 87 sources.

National Aeronautics and Space Administration – NASA
nasa.gov
A government agency that administers U.S. government space programs.

Transportation Security Administration
tsa.gov
An agency of the U.S. Department of Homeland Security that has authority over the security of the traveling public in the U.S.

U.S. Department of Defense
defense.gov
A division of the U.S. executive branch in charge of planning defense forces and overseeing military operations; compiles annual DOD budget information and discussion of military programs and structure of U.S. military forces.

U.S. Department of Transportation
transportation.gov
Regulates transportation in the U.S.; publishes monthly air carrier traffic statistics and quarterly information on air carrier financial results and space launches.

COMPARATIVE COMPANY ANALYSIS

Operating Revenues

Ticker		Company		Yr. End	Million $ 2022	2021	2020	2019	2018	2017	2016	CAGR (%) 10-Yr.	5-Yr.	1-Yr.	Index Basis (2012=100) 2022	2021	2020	2019	2018	2017
AEROSPACE AND DEFENSE																				
AIR	§	AAR CORP.	#	MAY	NA	1,820.0	1,652.3	2,072.0	2,051.8	1,748.3	1,590.8	-1.3	2.7	10.1	NA	114	104	130	129	110
AJRD	§	AEROJET ROCKETDYNE HOLDINGS, INC.		DEC	2,237.6	2,188.0	2,072.7	1,981.5	1,895.9	1,877.2	1,761.3	8.4	3.6	2.3	127	124	118	113	108	107
AVAV	§	AEROVIRONMENT, INC.	#	APR	NA	445.7	394.9	367.3	314.3	268.4	233.1	3.2	13.8	12.9	NA	191	169	158	135	115
AXON	[]	AXON ENTERPRISE, INC.		DEC	1,189.9	863.4	681.0	530.9	420.1	343.8	268.2	26.4	28.2	37.8	444	322	254	198	157	128
CW	†	CURTISS-WRIGHT CORPORATION		DEC	2,557.0	2,505.9	2,391.3	2,488.0	2,411.8	2,271.0	2,108.9	3.4	2.4	2.0	121	119	113	118	114	108
GD	[]	GENERAL DYNAMICS CORPORATION		DEC	39,407.0	38,469.0	37,925.0	39,350.0	36,193.0	30,973.0	30,561.0	2.4	4.9	2.4	129	126	124	129	118	101
HXL	†	HEXCEL CORPORATION		DEC	1,577.7	1,324.7	1,502.4	2,355.7	2,189.1	1,973.3	2,004.3	0.0	-4.4	19.1	79	66	75	118	109	98
HWM	[]	HOWMET AEROSPACE INC.		DEC	5,663.0	4,972.0	5,259.0	7,098.0	6,778.0	12,960.0	12,394.0	NA	-15.3	13.9	46	40	42	57	55	105
HII	[]	HUNTINGTON INGALLS INDUSTRIES, INC.		DEC	10,676.0	9,524.0	9,361.0	8,899.0	8,176.0	7,441.0	7,068.0	4.8	7.5	12.1	151	135	132	126	116	105
KAMN	§	KAMAN CORPORATION		DEC	688.0	709.0	784.5	761.6	736.0	724.9	1,808.4	-7.9	-1.0	-3.0	38	39	43	42	41	40
LHX	[]	L3HARRIS TECHNOLOGIES, INC.		DEC	17,062.0	17,814.0	17,814.0	18,194.0	6,168.0	5,897.0	5,992.0	12.1	23.7	-4.2	285	297	297	304	103	98
LMT	[]	LOCKHEED MARTIN CORPORATION		DEC	65,984.0	67,044.0	65,398.0	59,812.0	53,762.0	49,960.0	47,290.0	3.4	5.7	-1.6	140	142	138	126	114	106
MRCY	†	MERCURY SYSTEMS, INC.		JUL	988.2	924.0	796.6	654.7	493.2	408.6	270.2	15.3	19.3	6.9	366	342	295	242	183	151
MOG.A	§	MOOG INC.		OCT	3,035.8	2,852.0	2,884.6	2,904.7	2,709.5	2,497.5	2,411.9	2.1	4.0	6.4	126	118	120	120	112	104
NPK	§	NATIONAL PRESTO INDUSTRIES, INC.		DEC	321.6	355.8	352.6	308.5	323.3	333.6	341.9	-3.8	-0.7	-9.6	94	104	103	90	95	98
NOC	[]	NORTHROP GRUMMAN CORPORATION		DEC	36,602.0	35,667.0	36,799.0	33,841.0	30,095.0	26,004.0	24,706.0	3.8	7.1	2.6	148	144	149	137	122	105
RTX	[]	RAYTHEON TECHNOLOGIES CORPORATION		DEC	67,074.0	64,388.0	56,587.0	45,349.0	34,701.0	59,837.0	57,244.0	1.5	2.3	4.2	117	112	99	79	61	105
TXT	[]	TEXTRON INC.		DEC	12,869.0	12,869.0	12,382.0	11,651.0	13,972.0	14,198.0	13,788.0	0.5	-1.9	3.9	93	93	90	85	101	103
BA	[]	THE BOEING COMPANY		DEC	66,608.0	62,286.0	58,158.0	76,559.0	101,127.0	94,005.0	93,496.0	-2.0	-6.7	6.9	71	67	62	82	108	101
TDG	[]	TRANSDIGM GROUP INCORPORATED		SEP	5,429.0	4,798.0	5,103.0	5,223.0	3,811.0	3,504.3	3,171.4	12.3	9.2	13.2	171	151	161	165	120	110
TGI	§	TRIUMPH GROUP, INC.	#	MAR	NA	1,459.9	1,869.7	2,900.1	3,364.9	3,199.0	3,532.8	-8.1	-16.2	-21.9	NA	41	53	82	95	91
WWD	†	WOODWARD, INC.		SEP	2,382.8	2,245.8	2,495.7	2,900.2	2,325.9	2,098.7	2,023.1	2.5	2.6	6.1	118	111	123	143	115	104

Note: Data as originally reported. CAGR-Compound annual growth rate.

[]Company included in the S&P 500. †Company included in the S&P MidCap 400. §Company included in the S&P SmallCap 600. #Of the following calendar year.

Souce: S&P Capital IQ.

Net Income

Ticker		Company		Yr. End	Million $ 2022	2021	2020	2019	2018	2017	2016	CAGR (%) 10-Yr.	5-Yr.	1-Yr.	Index Basis (2012=100) 2022	2021	2020	2019	2018	2017
AEROSPACE AND DEFENSE																				
AIR	§	AAR CORP.	#	MAY	NA	78.7	35.8	4.4	7.5	15.6	56.5	1.5	6.9	119.8	NA	139	63	8	13	28
AJRD	§	AEROJET ROCKETDYNE HOLDINGS, INC.		DEC	74.0	146.6	137.5	141.0	137.3	-9.2	18.0	NA	NM	-49.5	411	814	764	783	763	-51
AVAV	§	AEROVIRONMENT, INC.	#	APR	NA	-4.2	23.3	41.1	47.4	17.9	13.1	NA	NM	NM	NA	-32	178	314	362	136
AXON	[]	AXON ENTERPRISE, INC.		DEC	147.1	-60.0	-1.7	0.9	29.2	5.2	17.3	25.9	95.1	NM	851	-347	-10	5	169	30
CW	†	CURTISS-WRIGHT CORPORATION		DEC	294.3	267.2	201.4	307.6	275.7	214.9	187.3	10.0	6.5	10.2	157	143	108	164	147	115
GD	[]	GENERAL DYNAMICS CORPORATION		DEC	3,390.0	3,257.0	3,167.0	3,484.0	3,345.0	2,912.0	2,572.0	NA	3.1	4.1	132	127	123	135	130	113
HXL	†	HEXCEL CORPORATION		DEC	126.3	16.1	31.7	306.6	276.6	284.0	249.8	-2.6	-15.0	684.5	51	6	13	123	111	114
HWM	[]	HOWMET AEROSPACE INC.		DEC	469.0	258.0	261.0	470.0	642.0	-74.0	-941.0	NA	NM	81.8	-50	-27	-28	-50	-68	8
HII	[]	HUNTINGTON INGALLS INDUSTRIES, INC.		DEC	579.0	544.0	696.0	549.0	836.0	479.0	573.0	14.8	3.9	6.4	101	95	121	96	146	84
KAMN	§	KAMAN CORPORATION		DEC	-46.2	43.7	-69.7	209.8	54.2	49.8	58.9	NA	NM	NM	-79	74	-119	357	92	85
LHX	[]	L3HARRIS TECHNOLOGIES, INC.		DEC	1,062.0	1,846.0	1,846.0	1,119.0	699.0	543.0	324.0	42.6	14.4	-42.5	328	570	570	345	216	168
LMT	[]	LOCKHEED MARTIN CORPORATION		DEC	5,732.0	6,315.0	6,833.0	6,230.0	5,046.0	1,963.0	5,173.0	7.6	23.9	-9.2	111	122	132	120	98	38
MRCY	†	MERCURY SYSTEMS, INC.		JUL	11.3	62.0	85.7	46.8	40.9	24.9	19.7	-6.7	-14.6	-81.8	57	314	434	237	207	126
MOG.A	§	MOOG INC.		OCT	155.2	157.2	9.2	174.5	95.2	141.3	126.7	0.2	1.9	-1.3	122	124	7	138	75	111
NPK	§	NATIONAL PRESTO INDUSTRIES, INC.		DEC	20.7	25.7	47.0	42.2	39.9	53.0	44.6	-6.1	-17.1	-19.3	46	58	105	95	90	119
NOC	[]	NORTHROP GRUMMAN CORPORATION		DEC	4,896.0	7,005.0	3,189.0	2,248.0	3,229.0	2,869.0	2,043.0	9.5	11.3	-30.1	240	343	156	110	158	140
RTX	[]	RAYTHEON TECHNOLOGIES CORPORATION		DEC	5,197.0	3,864.0	-3,519.0	5,537.0	5,269.0	4,552.0	5,055.0	0.1	2.7	34.5	103	76	-70	110	104	90
TXT	[]	TEXTRON INC.		DEC	861.0	861.0	746.0	309.0	1,222.0	307.0	962.0	3.9	22.9	15.4	90	90	78	32	127	32
BA	[]	THE BOEING COMPANY		DEC	-4,935.0	-4,202.0	-11,873.0	-636.0	10,460.0	8,458.0	5,034.0	NA	NM	17.4	-98	-83	-236	-13	208	168
TDG	[]	TRANSDIGM GROUP INCORPORATED		SEP	866.0	680.0	699.0	890.0	957.0	596.9	586.4	10.3	7.7	27.4	148	116	119	152	163	102
TGI	§	TRIUMPH GROUP, INC.	#	MAR	NA	-42.8	-450.9	-29.4	-327.1	-425.4	-43.0	NA	-0.1	-90.5	NA	100	1050	69	762	990
WWD	†	WOODWARD, INC.		SEP	171.7	208.6	240.4	259.6	180.4	200.5	180.8	1.9	-3.1	-17.7	95	115	133	144	100	111

Note: Data as originally reported. CAGR-Compound annual growth rate.
[]Company included in the S&P 500. †Company included in the S&P MidCap 400. §Company included in the S&P SmallCap 600. #Of the following calendar year.
Souce: S&P Capital IQ.

Ticker	Company		Yr. End	Return on Revenues (%) 2022	2021	2020	2019	2018	2017	Return on Assets (%) 2022	2021	2020	2019	2018	2017	Return on Equity (%) 2022	2021	2020	2019	2018	2017
AEROSPACE AND DEFENSE																					
AIR	§ AAR CORP.	#	MAY	NA	4.3	2.2	0.2	0.4	0.9	NA	5.0	2.3	0.2	0.5	1.0	NA	7.8	4.9	2.7	9.1	8.0
AJRD	§ AEROJET ROCKETDYNE HOLDINGS, INC.		DEC	3.3	6.7	6.6	7.1	7.2	NM	3.1	6.0	4.7	5.2	5.5	NM	3.1	38.7	33.9	28.3	52.4	NM
AVAV	§ AEROVIRONMENT, INC.	#	APR	NA	NM	5.9	11.2	15.1	6.7	NA	NM	2.5	7.0	9.3	3.8	NA	NM	4.2	8.5	9.6	5.4
AXON	[] AXON ENTERPRISE, INC.		DEC	12.4	NM	NM	0.2	7.0	1.5	5.2	NM	NM	0.1	4.1	1.5	5.2	NM	NM	0.2	9.2	3.3
CW	† CURTISS-WRIGHT CORPORATION		DEC	11.5	10.7	8.4	12.4	11.4	9.5	6.6	6.5	5.0	8.2	8.5	6.6	6.6	14.8	11.3	18.6	18.0	15.2
GD	[] GENERAL DYNAMICS CORPORATION		DEC	8.6	8.5	8.4	8.9	9.2	9.4	6.6	6.5	6.2	7.1	7.4	8.3	6.6	19.6	21.4	27.1	29.0	26.8
HXL	† HEXCEL CORPORATION		DEC	8.0	1.2	2.1	13.0	12.6	14.4	4.5	0.6	1.1	9.8	9.8	10.2	4.5	1.1	2.1	22.2	19.6	20.7
HWM	[] HOWMET AEROSPACE INC.		DEC	8.3	5.2	5.0	6.6	9.5	NM	4.6	2.5	2.3	2.7	3.4	NM	4.6	7.3	5.2	2.5	5.9	NM
HII	[] HUNTINGTON INGALLS INDUSTRIES, INC.		DEC	5.4	5.7	7.4	6.2	10.2	6.4	5.3	5.1	8.5	7.8	13.1	7.5	5.3	23.1	39.9	35.4	51.1	28.1
KAMN	§ KAMAN CORPORATION		DEC	NM	6.2	NM	27.6	7.4	6.9	NM	3.6	NM	14.8	3.7	3.4	NM	5.7	NM	7.8	2.5	3.3
LHX	[] L3HARRIS TECHNOLOGIES, INC.		DEC	6.2	10.4	6.2	8.9	11.3	9.2	3.2	5.3	3.0	4.3	7.1	5.4	3.2	9.2	5.0	0.0	22.6	21.0
LMT	[] LOCKHEED MARTIN CORPORATION		DEC	8.7	9.4	10.4	10.4	9.4	3.9	10.8	12.4	13.5	13.1	11.2	4.2	10.8	74.3	149.6	269.7	1,499.6	455.4
MRCY	† MERCURY SYSTEMS, INC.		JUL	1.1	6.7	10.8	7.1	8.3	6.1	0.5	3.2	5.3	3.3	3.8	3.0	0.5	4.3	6.4	4.5	5.5	4.2
MOG.A	§ MOOG INC.		OCT	5.1	5.5	0.3	6.0	3.5	5.7	4.5	4.6	0.3	5.6	3.2	4.6	4.5	11.9	0.7	13.7	7.8	12.7
NPK	§ NATIONAL PRESTO INDUSTRIES, INC.		DEC	6.4	7.2	13.3	13.7	12.4	15.9	5.0	6.1	10.8	10.3	9.7	12.9	5.0	7.0	12.7	11.0	10.9	12.1
NOC	[] NORTHROP GRUMMAN CORPORATION		DEC	13.4	19.6	8.7	6.6	10.7	11.0	11.2	16.5	7.2	5.5	8.6	8.2	11.2	59.6	32.9	26.4	42.2	46.3
RTX	[] RAYTHEON TECHNOLOGIES CORPORATION		DEC	7.7	6.0	NM	12.2	15.2	7.6	3.3	2.4	NM	4.0	3.9	4.7	3.3	5.6	NM	8.8	3.9	16.1
TXT	[] TEXTRON INC.		DEC	6.7	6.0	2.7	6.0	8.7	2.2	5.3	4.7	2.0	5.4	8.6	2.0	5.3	11.8	5.4	15.2	22.5	5.5
BA	[] THE BOEING COMPANY		DEC	NM	NM	NM	NM	10.3	9.0	NM	NM	NM	NM	8.9	7.5	NM	NM	NM	NM	985.4	653.1
TDG	[] TRANSDIGM GROUP INCORPORATED		SEP	16.0	14.2	13.7	17.0	25.1	17.0	4.8	3.5	3.8	5.5	7.8	6.0	4.8	NM	NM	NM	NM	NM
TGI	§ TRIUMPH GROUP, INC.	#	MAR	NA	NM	NM	NM	NM	NM	NA	NM	NM	NM	NM	NM	NA	NM	NM	NM	NM	NM
WWD	† WOODWARD, INC.		SEP	7.2	9.3	9.6	9.0	7.8	9.6	4.5	5.1	6.2	6.6	4.8	7.3	4.5	9.9	12.9	15.9	12.4	15.5

Note: Data as originally reported. CAGR-Compound annual growth rate.
[]Company included in the S&P 500. †Company included in the S&P MidCap 400. §Company included in the S&P SmallCap 600. #Of the following calendar year.
Souce: S&P Capital IQ.

Ticker	Company		Yr. End	Current Ratio						Debt/Capital Ratio (%)						Debt as a % of Net Working Capital					
				2022	2021	2020	2019	2018	2017	2022	2021	2020	2019	2018	2017	2022	2021	2020	2019	2018	2017
AEROSPACE AND DEFENSE																					
AIR	§ AAR CORP.	#	MAY	NA	2.9	2.8	3.8	2.7	2.8	NA	8.7	12.1	39.9	13.5	15.9	NA	15.0	22.3	56.8	23.8	29.1
AJRD	§ AEROJET ROCKETDYNE HOLDINGS, INC.		DEC	1.4	1.4	1.1	1.6	1.4	1.7	31.4	32.6	54.6	34.7	43.6	85.2	77.1	71.8	137.4	56.0	91.3	140.2
AVAV	§ AEROVIRONMENT, INC.	#	APR	NA	3.6	4.2	7.5	10.5	6.4	NA	22.6	23.5	0.0	0.0	0.0	NA	66.5	61.4	0.0	0.0	0.0
AXON	[] AXON ENTERPRISE, INC.		DEC	3.0	2.7	3.8	3.1	3.4	1.9	34.7	0.0	0.0	0.0	0.0	0.0	56.0	0.0	0.0	0.0	0.0	0.0
CW	† CURTISS-WRIGHT CORPORATION		DEC	1.6	1.8	1.6	2.1	2.0	2.4	34.6	36.5	34.9	30.0	33.2	34.8	192.7	183.4	195.4	96.9	116.1	100.4
GD	[] GENERAL DYNAMICS CORPORATION		DEC	1.4	1.4	1.3	1.2	1.2	1.4	33.2	37.3	39.0	39.2	53.0	25.8	161.5	174.6	179.2	258.4	356.3	76.1
HXL	† HEXCEL CORPORATION		DEC	2.2	2.5	2.9	2.2	2.1	2.5	31.8	35.6	38.2	42.1	41.7	35.0	178.7	222.9	265.1	274.5	271.2	204.2
HWM	[] HOWMET AEROSPACE INC.		DEC	2.1	2.2	2.2	1.4	1.9	2.3	53.6	54.6	56.8	51.6	51.6	58.3	250.6	284.8	233.5	285.6	193.6	192.5
HII	[] HUNTINGTON INGALLS INDUSTRIES, INC.		DEC	0.9	1.1	1.1	0.9	1.0	1.6	41.8	54.0	47.0	44.7	45.8	42.1	NM	908.5	773.4	NM	NM	159.1
KAMN	§ KAMAN CORPORATION		DEC	3.4	4.5	2.6	4.6	2.6	3.0	45.2	19.4	20.1	18.2	31.1	38.4	184.5	44.8	50.6	25.0	60.0	78.7
LHX	[] L3HARRIS TECHNOLOGIES, INC.		DEC	1.2	1.4	1.6	1.6	1.2	1.1	24.6	26.3	24.9	22.7	52.1	55.0	619.8	381.3	284.7	290.8	932.1	2,364.6
LMT	[] LOCKHEED MARTIN CORPORATION		DEC	1.3	1.4	1.4	1.2	1.1	1.4	62.5	51.6	65.9	78.2	94.0	106.1	302.3	200.6	214.3	365.2	774.4	294.3
MRCY	† MERCURY SYSTEMS, INC.		JUL	4.2	4.3	5.0	5.9	4.6	3.4	22.7	11.9	0.0	0.0	20.2	0.0	72.7	40.6	0.0	0.0	75.0	0.0
MOG.A	§ MOOG INC.		OCT	2.1	2.0	2.3	2.2	2.2	2.6	36.8	37.0	42.8	38.6	41.4	44.1	91.0	96.9	103.0	92.3	108.0	96.0
NPK	§ NATIONAL PRESTO INDUSTRIES, INC.		DEC	6.1	6.5	6.5	8.6	7.4	7.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NOC	[] NORTHROP GRUMMAN CORPORATION		DEC	1.1	1.3	1.6	1.1	1.2	2.3	43.5	49.7	57.4	59.2	63.8	66.9	1,310.2	441.2	247.4	1,020.8	1,001.5	151.6
RTX	[] RAYTHEON TECHNOLOGIES CORPORATION		DEC	1.1	1.2	1.2	1.3	1.1	1.3	29.8	29.6	29.8	48.7	52.0	44.9	938.1	475.1	414.6	266.4	1,030.0	299.5
TXT	[] TEXTRON INC.		DEC	2.2	2.6	2.5	2.1	2.1	2.2	30.9	31.8	35.4	31.4	35.1	35.4	72.9	64.7	64.2	61.9	70.4	70.7
BA	[] THE BOEING COMPANY		DEC	1.2	1.3	1.4	1.1	1.1	1.1	145.8	136.5	142.1	183.6	95.4	82.4	259.2	208.0	177.5	370.8	136.2	76.1
TDG	[] TRANSDIGM GROUP INCORPORATED		SEP	4.0	4.2	4.3	3.2	4.1	2.4	126.6	119.7	127.5	123.5	119.7	138.5	463.5	369.0	374.4	510.1	464.3	926.9
TGI	§ TRIUMPH GROUP, INC.	#	MAR	NA	1.6	2.2	1.6	1.3	1.9	NA	200.2	173.2	177.9	165.4	75.1	NA	435.8	231.7	310.8	545.3	146.4
WWD	† WOODWARD, INC.		SEP	2.4	4.0	3.1	1.8	1.9	2.4	29.6	26.1	28.3	41.9	47.8	31.4	99.9	71.4	96.2	192.4	242.4	103.2

Note: Data as originally reported. CAGR-Compound annual growth rate.
[]Company included in the S&P 500. †Company included in the S&P MidCap 400. §Company included in the S&P SmallCap 600. #Of the following calendar year.
Souce: S&P Capital IQ.

Ticker	Company		Yr. End	Price/Earnings Ratio (High-Low) 2022	2021	2020	2019	2018	2017	Dividend Payout Ratio (%) 2022	2021	2020	2019	2018	2017	Dividend Yield (High-Low, %) 2022	2021	2020	2019	2018	2017
AEROSPACE AND DEFENSE																					
AIR	§ AAR CORP.	#	MAY	23 - 14	44 - 17	420 - 76	242 - 146	109 - 78	23 - 13	0.0	0.0	0.3	243.2	140.0	66.0	0.0 - 0.0	0.0 - 0.0	2.0 - 0.0	3.2 - 0.6	0.9 - 0.6	0.9 - 0.7
AJRD	§ AEROJET ROCKETDYNE HOLDINGS, INC.		DEC	61 - 40	29 - 22	32 - 18	29 - 18	22 - 14	NM - NM	3.6	0.0	0.0	0.0	0.0	0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0
AVAV	§ AEROVIRONMENT, INC.	#	APR	NM - NM	142 - 59	42 - 27	60 - 26	77 - 37	57 - 39	0.0	0.0	0.0	0.0	0.0	0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0
AXON	[] AXON ENTERPRISE, INC.		DEC	93 - 41	NM - NM	NM - NM	5163 - 2886	145 - 48	277 - 214	0.0	0.0	0.0	0.0	0.0	0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0
CW	† CURTISS-WRIGHT CORPORATION		DEC	24 - 16	21 - 16	31 - 16	20 - 14	23 - 15	26 - 17	9.8	10.7	14.0	9.2	9.5	11.5	0.5 - 0.4	0.6 - 0.4	0.7 - 0.5	0.9 - 0.5	0.6 - 0.5	0.6 - 0.4
GD	[] GENERAL DYNAMICS CORPORATION		DEC	21 - 17	18 - 13	17 - 10	16 - 13	20 - 13	22 - 18	40.4	40.4	39.2	33.1	32.1	33.9	2.5 - 2.0	2.5 - 2.0	3.0 - 2.3	4.1 - 2.2	2.5 - 2.0	2.2 - 1.5
HXL	† HEXCEL CORPORATION		DEC	43 - 33	336 - 228	211 - 71	24 - 16	23 - 17	20 - 16	26.7	0.0	44.8	17.7	17.5	15.0	0.8 - 0.6	0.8 - 0.0	0.0 - 0.0	2.5 - 0.0	1.1 - 0.7	1.1 - 0.7
HWM	[] HOWMET AEROSPACE INC.		DEC	35 - 27	60 - 40	57 - 18	30 - 16	23 - 12	NM - NM	9.4	7.4	4.2	12.1	18.5	NM	0.4 - 0.4	0.5 - 0.2	0.3 - 0.0	0.3 - 0.0	1.5 - 0.3	1.4 - 0.8
HII	[] HUNTINGTON INGALLS INDUSTRIES, INC.		DEC	18 - 12	16 - 12	16 - 8	19 - 14	14 - 9	24 - 18	33.2	34.2	24.7	27.1	15.8	24.0	2.6 - 2.1	2.7 - 1.8	2.9 - 2.0	3.0 - 1.5	1.9 - 1.5	1.7 - 1.1
KAMN	§ KAMAN CORPORATION		DEC	NM - NM	38 - 22	NM - NM	9 - 7	39 - 27	33 - 26	NM	50.9	NM	10.6	41.3	43.1	4.0 - 3.0	4.1 - 1.8	2.3 - 1.4	2.7 - 1.2	1.5 - 1.2	1.4 - 1.1
LHX	[] L3HARRIS TECHNOLOGIES, INC.		DEC	49 - 37	27 - 19	44 - 29	29 - 17	30 - 22	33 - 23	81.4	44.3	64.8	41.0	38.9	48.3	2.5 - 1.9	2.2 - 1.7	2.4 - 1.7	2.3 - 1.3	2.2 - 1.3	1.9 - 1.3
LMT	[] LOCKHEED MARTIN CORPORATION		DEC	23 - 16	17 - 14	18 - 11	18 - 12	20 - 14	47 - 37	52.6	46.6	40.5	41.0	46.5	110.2	2.7 - 2.4	3.4 - 2.4	3.4 - 2.6	3.5 - 2.2	3.6 - 2.2	3.1 - 2.2
MRCY	† MERCURY SYSTEMS, INC.		JUL	344 - 223	78 - 51	59 - 36	77 - 41	62 - 36	75 - 37	0.0	0.0	0.0	0.0	0.0	0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0
MOG.A	§ MOOG INC.		OCT	19 - 14	19 - 13	345 - 126	19 - 14	34 - 27	23 - 14	21.2	20.4	273.9	20.0	18.8	0.0	1.4 - 1.1	1.5 - 1.2	1.6 - 1.1	2.9 - 1.0	1.4 - 1.0	1.4 - 1.1
NPK	§ NATIONAL PRESTO INDUSTRIES, INC.		DEC	30 - 21	32 - 22	14 - 10	22 - 13	24 - 16	16 - 12	34.2	27.5	15.0	16.6	17.5	13.2	6.7 - 5.0	7.8 - 5.4	7.7 - 5.3	8.9 - 6.2	7.4 - 4.6	6.6 - 4.3
NOC	[] NORTHROP GRUMMAN CORPORATION		DEC	17 - 12	9 - 7	20 - 14	29 - 18	19 - 12	19 - 14	21.5	14.0	29.9	39.1	25.4	24.0	1.6 - 1.3	1.8 - 1.3	2.0 - 1.5	2.0 - 1.4	2.1 - 1.4	1.9 - 1.2
RTX	[] RAYTHEON TECHNOLOGIES CORPORATION		DEC	30 - 23	36 - 25	NM - NM	23 - 16	22 - 16	22 - 19	60.2	76.5	NM	44.1	41.2	45.6	2.5 - 2.1	2.7 - 1.9	2.9 - 2.2	5.9 - 1.9	2.7 - 2.0	2.4 - 2.0
TXT	[] TEXTRON INC.		DEC	19 - 14	23 - 14	38 - 16	16 - 12	15 - 9	50 - 39	2.0	2.4	5.8	2.2	1.6	6.8	0.1 - 0.1	0.1 - 0.1	0.2 - 0.1	0.4 - 0.2	0.2 - 0.1	0.2 - 0.1
BA	[] THE BOEING COMPANY		DEC	NM - NM	NM - NM	NM - NM	NM - NM	22 - 16	21 - 11	0.0	0.0	NM	NM	37.7	40.4	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	2.4 - 0.0	2.8 - 1.9	2.4 - 1.7
TDG	[] TRANSDIGM GROUP INCORPORATED		SEP	51 - 38	66 - 44	73 - 27	40 - 23	23 - 16	37 - 27	0.0	0.0	0.0	0.0	0.0	0.0	0.0 - 0.0	0.0 - 0.0	7.1 - 0.0	13.2 - 5.0	0.0 - 0.0	0.0 - 0.0
TGI	§ TRIUMPH GROUP, INC.	#	MAR	NM - NM	NM - NM	NM - NM	NM - NM	NM - NM	NM - NM	0.0	0.0	0.0	NM	NM	NM	0.0 - 0.0	0.0 - 0.0	4.7 - 0.0	0.9 - 0.5	1.4 - 0.6	0.8 - 0.5
WWD	† WOODWARD, INC.		SEP	46 - 29	39 - 23	33 - 13	28 - 16	29 - 24	24 - 18	26.2	17.3	15.7	15.0	18.9	14.8	1.0 - 0.7	0.9 - 0.5	0.6 - 0.3	2.2 - 0.4	0.8 - 0.5	0.8 - 0.6

Note: Data as originally reported. CAGR-Compound annual growth rate.

[]Company included in the S&P 500. †Company included in the S&P MidCap 400. §Company included in the S&P SmallCap 600. #Of the following calendar year.

Souce: S&P Capital IQ.

Ticker	Company		Yr. End	Earnings per Share ($)						Tangible Book Value per Share ($)						Share Price (High-Low, $)											
				2022	2021	2020	2019	2018	2017	2022	2021	2020	2019	2018	2017	2022		2021		2020		2019		2018		2017	
AEROSPACE AND DEFENSE																											
AIR	§ AAR CORP.	#	MAY	NA	2.2	1.0	0.1	0.2	0.4	0.0	25.6	23.6	22.4	22.2	22.9	52.8	33.8	45.5	30.9	48.0	8.6	52.8	29.8	51.5	33.9	44.0	31.2
AJRD	§ AEROJET ROCKETDYNE HOLDINGS, INC.		DEC	0.9	1.8	1.7	1.7	1.8	-0.1	4.4	4.1	0.4	4.7	2.5	-2.0	56.2	35.5	53.5	39.9	57.3	32.1	52.8	30.1	38.9	24.4	36.3	17.7
AVAV	§ AEROVIRONMENT, INC.	#	APR	NA	-0.2	1.0	1.7	2.0	0.7	0.0	7.1	7.8	20.5	19.5	17.3	114.1	52.0	143.7	53.5	99.8	45.0	95.4	48.6	121.3	41.6	59.0	24.7
AXON	[] AXON ENTERPRISE, INC.		DEC	2.0	-0.9	0.0	0.0	0.5	0.1	16.9	13.9	14.8	8.5	7.3	2.5	193.9	82.5	212.4	115.6	134.7	50.1	77.7	42.4	76.5	24.5	28.2	20.6
CW	† CURTISS-WRIGHT CORPORATION		DEC	7.6	6.6	4.8	7.2	6.2	4.8	-4.5	-4.5	-6.8	3.0	0.3	2.3	182.6	124.4	140.0	103.6	149.9	70.6	144.8	99.0	143.4	95.2	125.0	82.8
GD	[] GENERAL DYNAMICS CORPORATION		DEC	12.2	11.6	11.0	12.0	11.2	9.6	-13.1	-16.0	-22.8	-27.7	-36.3	-4.0	256.9	200.6	210.2	144.5	190.1	100.6	193.8	152.4	230.0	143.9	214.8	172.4
HXL	† HEXCEL CORPORATION		DEC	1.5	0.2	0.4	3.6	3.1	3.1	15.4	14.5	14.7	13.9	13.9	15.0	65.8	47.4	65.0	42.9	80.5	24.5	87.0	56.1	73.4	53.5	63.9	49.2
HWM	[] HOWMET AEROSPACE INC.		DEC	1.1	0.6	0.6	1.0	1.3	-0.3	-2.4	-2.8	-2.7	-0.3	0.2	-1.4	39.8	29.4	36.0	22.9	34.3	9.9	32.0	16.1	31.2	15.6	30.7	18.6
HII	[] HUNTINGTON INGALLS INDUSTRIES, INC.		DEC	14.4	13.5	17.1	13.3	19.1	10.5	-3.7	-24.5	-5.6	-6.8	-5.7	0.7	260.0	177.2	224.1	156.4	279.7	136.4	260.8	186.7	276.7	173.8	253.4	183.4
KAMN	§ KAMAN CORPORATION		DEC	-1.7	1.6	-2.5	7.5	1.9	1.7	-2.4	15.0	12.6	20.6	13.6	6.0	46.5	18.9	59.8	33.9	67.5	29.4	68.2	54.4	75.1	51.3	60.4	45.5
LHX	[] L3HARRIS TECHNOLOGIES, INC.		DEC	5.5	9.1	5.2	7.4	5.8	4.4	-25.0	-29.0	-29.1	-26.9	-26.1	-29.6	279.7	202.3	246.1	168.7	231.0	142.0	217.3	129.5	175.5	123.2	144.9	99.1
LMT	[] LOCKHEED MARTIN CORPORATION		DEC	21.7	22.8	24.3	22.0	17.6	6.8	-19.3	-12.3	-30.4	-40.0	-47.4	-55.7	499.0	353.0	397.0	319.8	442.5	266.1	400.0	256.8	363.0	241.2	323.9	248.0
MRCY	† MERCURY SYSTEMS, INC.		JUL	0.2	1.1	1.6	1.0	0.9	0.6	4.4	6.7	10.3	9.5	2.1	4.7	72.3	40.5	88.8	44.4	96.3	52.2	89.4	43.0	57.3	30.1	55.0	29.3
MOG.A	§ MOOG INC.		OCT	4.8	4.9	0.3	5.0	2.6	3.9	17.2	13.8	10.5	13.2	9.5	9.3	90.0	70.3	92.0	67.8	95.9	32.5	98.5	74.0	93.9	68.4	90.0	60.3
NPK	§ NATIONAL PRESTO INDUSTRIES, INC.		DEC	2.9	3.6	6.7	6.0	5.7	7.6	45.7	48.2	50.7	49.9	50.7	50.5	89.1	60.0	117.9	78.3	97.9	66.6	133.1	80.4	140.3	88.8	121.4	91.8
NOC	[] NORTHROP GRUMMAN CORPORATION		DEC	31.5	43.5	19.0	13.2	18.5	16.3	-16.9	-33.1	-46.3	-65.1	-69.5	-30.9	556.3	364.6	408.0	282.9	385.0	263.3	383.9	237.1	360.9	223.6	311.2	223.9
RTX	[] RAYTHEON TECHNOLOGIES CORPORATION		DEC	3.5	2.6	-2.6	6.4	6.5	5.7	-12.3	-13.4	-15.0	-22.5	-42.4	-18.0	106.0	80.3	92.3	65.0	158.4	48.1	151.1	103.2	144.2	100.5	128.5	106.9
TXT	[] TEXTRON INC.		DEC	4.0	3.3	1.4	3.5	4.8	1.1	23.4	21.5	16.3	14.8	12.6	12.6	79.5	57.1	78.2	44.4	51.5	20.3	58.0	42.3	72.9	43.3	57.7	43.7
BA	[] THE BOEING COMPANY		DEC	-8.3	-7.2	-20.9	-1.1	17.9	13.9	-43.9	-43.5	-50.2	-35.6	-19.3	-11.0	229.7	113.0	278.6	185.3	350.0	89.0	446.0	309.4	394.3	292.5	299.3	155.2
TDG	[] TRANSDIGM GROUP INCORPORATED		SEP	13.4	10.4	9.0	13.8	16.2	7.9	-278.9	-258.6	-265.9	-251.7	-186.2	-200.5	684.7	499.6	688.0	517.4	673.5	200.1	597.9	324.9	377.7	265.3	295.0	203.7
TGI	§ TRIUMPH GROUP, INC.	#	MAR	NA	-0.7	-8.6	-0.6	-6.6	-8.6	0.0	-21.5	-22.5	-32.3	-31.8	-13.1	27.9	7.8	24.5	10.5	26.2	3.0	29.4	11.2	30.1	11.4	34.8	19.7
WWD	† WOODWARD, INC.		SEP	2.7	3.2	3.7	4.0	2.8	3.2	11.2	13.5	9.2	5.1	0.4	10.5	129.1	79.3	130.8	101.3	129.1	46.5	124.8	70.6	89.3	68.4	82.9	65.2

Note: Data as originally reported. CAGR-Compound annual growth rate.
[]Company included in the S&P 500. †Company included in the S&P MidCap 400. §Company included in the S&P SmallCap 600. #Of the following calendar year.
Souce: S&P Capital IQ.

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