

2021 **FACTS & FIGURES**

U.S. AEROSPACE & DEFENSE



AIA
AEROSPACE
INDUSTRIES
ASSOCIATION



EXECUTIVE SUMMARY

American life changed dramatically in 2020, forcing extraordinary—and previously unimagined—shifts in the Aerospace & Defense (A&D) industry. This year's Facts & Figures: Aerospace & Defense helps us examine these shifts to better understand the position in which industry now finds itself, as well as the opportunities for our workforce and our businesses that are on the horizon.

COVID's impact on aerospace and defense was immediate and profound. Commercial aviation ground to a near halt as our nation and world contended with massive headwinds that COVID-19 generated. The defense sector also faced challenges as a patchwork of government mandates and restrictions initially complicated operations. As a consequence, the shared A&D supply chain, comprising thousands of small and medium-sized companies across the country, faced immense financial and logistical challenges to support existing defense sector contracts and replace lost civil sector sales. Circumstances began to improve, however, when the A&D workforce was designated essential beginning in the spring of 2020. This recognition by federal and state policymakers set the stage for AIA's member companies to continue supporting U.S. military personnel and national security operations with minimal interruption, while also stepping forward to play a role in the public health response.

Now, midway through 2021, the defense sector continues to help stabilize the overall industry as its government customers maintain their national security missions and take steps to help strengthen the shared supply chain with crucial resources including cash flow. On the civil side, with vaccinations increasing, the recovery of commercial aviation—and the American economy – is slowly underway, but risk remains. The fragile nature of recovery is outlined in depth throughout this report, helping quantify the damage inflicted by the pandemic across the A&D industry.

Employment is one leading indicator of COVID's impact on the industry. The damage to our workforce presents a challenge for the industry in the short, medium, and long terms. While government aid packages like the CARES Act helped prevent the worst-case scenarios in the civil aviation sector, the industry's workforce still shrunk by more than 87,000 jobs. These losses were mirrored in the industry's revenues, which declined significantly during the year.

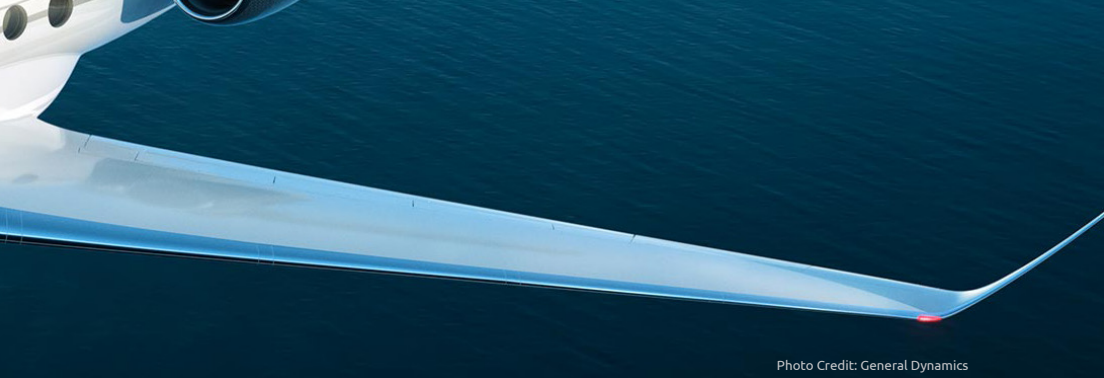


Photo Credit: General Dynamics

Trade is another place where COVID's impact is evident, as worldwide demand for U.S. civil aviation products dropped significantly. Total industry exports decreased by 39 percent from the previous year. Imports were also impacted, dropping from \$68.7 billion in 2019 to \$50 billion in 2020. One notable bright spot: despite the substantial decline in overall demand for U.S. civil aviation products, the industry still managed to maintain a positive industry trade balance of \$40.6 billion.

Yet, even as the pandemic gripped the country and the headlines were grim, there were many moments when our employees, industry leaders, and our businesses distinguished themselves. In addition to taking myriad steps to protect and support employees and their families, businesses big and small contributed to their communities and to the country's public health response in countless ways. These efforts included financial donations, the donation of Personal Protective Equipment (PPE) to those on the front lines, providing the use of their business fleets for healthcare product and medical supply transportation, and offering factory space for the production of face masks and ventilators.

This edition of AIA's Facts & Figures: Aerospace & Defense report highlights the multitude of challenges faced by our industry over the past year. Together with our economic analysis partner IHS Markit, we have worked to provide a comprehensive picture of our industry as it existed throughout 2020, while also sharing a glimpse of the positive trends and opportunities that will form the basis of our industry's growth in a post-pandemic world.

Eric Fanning
President & CEO
Aerospace Industries Association

For more information, please visit www.aia-aerospace.org.

2020 HIGHLIGHTED STATISTICS



2.09M
WORKERS

Photo Credit: HEICO



\$874B
IN TOTAL INDUSTRY
SALES REVENUE

Photo Credit: HEICO



\$90.6B
IN EXPORTS

Photo Credit: General Dynamics



\$104,577
AVERAGE A&D INDUSTRY
WAGE AND BENEFITS

Photo Credit: General Dynamics



Photo Credit: Textron

COVID-19 IMPACTS

The full impact of the COVID-19 pandemic on our industry is extraordinarily difficult to quantify due to its wide-ranging impacts. Currently available statistics, however, demonstrate the influence this unprecedented event had on the aerospace and defense workforce and the industry's economic footprint

IMPACTS TO THE CIVIL AVIATION SECTOR

Civil aviation, our industry's second largest end-user (final product manufacturing) industry, saw record-setting declines in customers and operating revenue, leading to dramatic cuts in expenditures on new aircraft, spare parts, and other related products. As a direct result, U.S. civil aviation manufacturers were forced to downsize their workforces. While the A&D industry is diversified, civil aviation manufacturing makes up a significant portion of all direct employment in the industry, accounting for nearly half of all such jobs in the year prior to the pandemic.

In September 2020, AIA released a preliminary report on the impact of the pandemic on air travel and the civil aviation sector titled AIA's Roadmap

to Recovery. This report identified a potential loss of over 220,000 jobs across the industry without immediate government action. So far, thanks to government action and a growing rebound in air travel, it appears that our industry has been spared from the full magnitude of this forecasted loss; however, the full impact of the pandemic on our industry may take years to unfold and understand.

Of particular concern to the overall health of this sector was the dramatic slowdown in civil aircraft manufacturing by Original Equipment Manufacturers (OEMs). Compared to the prior year, global production of wide-body and narrow-body civil aircraft dropped by 40 percent in 2020. While this number was better than the expected 50 percent drop forecasted in AIA's Roadmap to Recovery, this is still a dramatic loss in production with significant ripple effects across the industry. Because a great deal of this sector is anchored in the massive production supply chains of civil aircraft manufacturers, these slowdowns will have a significant long-term impact on suppliers until production numbers rebound to pre-Pandemic levels.

Looking ahead, the continued recovery of air travel, both domestic and international, will be a key progress marker for the civil aviation sector. As our industry's civil aviation customers see steady and sustainable recovery in business and international air travel, the demand for civil aircraft is expected to rebound in kind. For this reason, AIA strongly supports efforts to restore confidence in air travel through enhanced health and safety measures that ensure the continued protection of passengers and aircrew while onboard commercial aircraft.

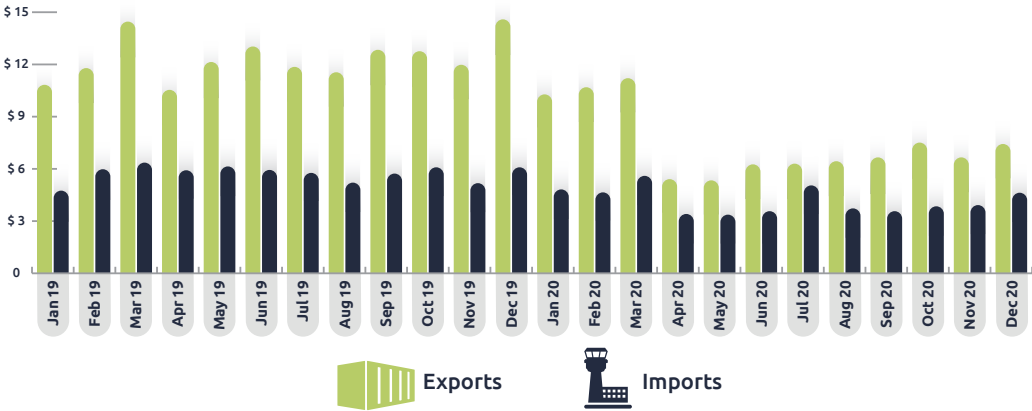
IMPACTS TO THE SHARED SUPPLY CHAIN AND DEFENSE SECTOR

Despite the massive losses seen in businesses supporting civil aviation, the defense sector continued to support national security throughout the pandemic. However, due to the shared nature of the aerospace supply chain, significant impacts reverberated throughout the A&D manufacturing base, regardless of end-use application. Pandemic-related disruptions halted production lines, delayed transportation of materials and goods, and caused financial distress, particularly among small businesses. The magnitude of COVID-19 impacts across the A&D supply chain necessitated government action to help preserve our suppliers and the hundreds of thousands of workers they employ.

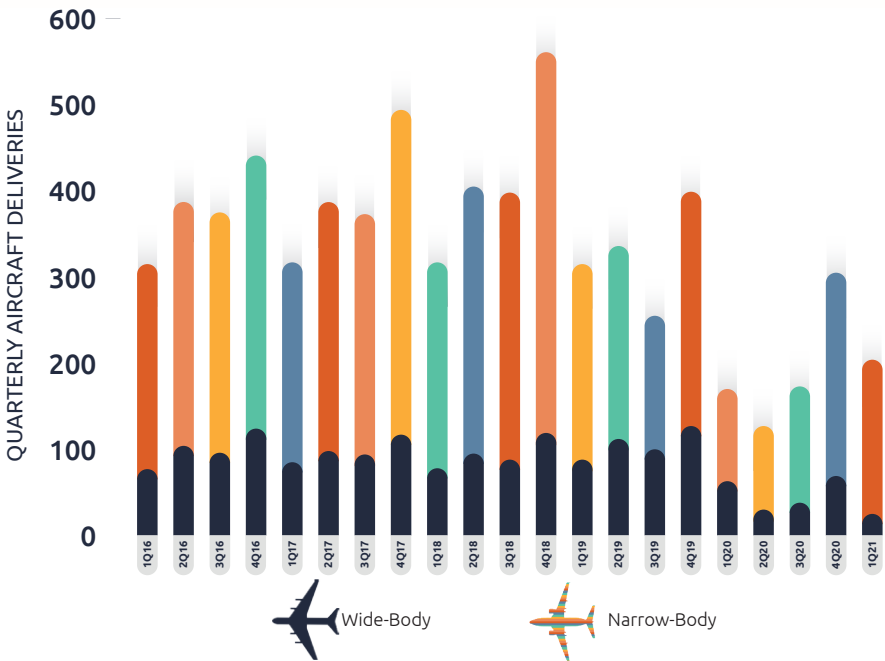


A&D INDUSTRY MONTHLY TRADE 2019-2020

Value in Billions (USD)



GLOBAL AIRLINER PRODUCTION (2016-2021)



IMPACT OF GOVERNMENT AID

Though the A&D industry encountered countless challenges posed by the pandemic, the government took critical steps to soften the economic blow, from increasing progress payment rates for defense contracts to implementing the relief and support measures in the Coronavirus Aid, Relief, and Economic Security (CARES) Act. These steps facilitated the cash flow necessary to help ensure the stability –and the viability – of businesses of all sizes.

The impact of advanced progress payments to the supply chain as a result of policy changes at the Department of Defense are significant. In 2020 alone, the DOD advanced progress payments totaling \$4 billion across 1,400 government contracts to help support the A&D supply chain. While these payments were made through defense contracts, the cash flow helped mitigate imminent financial distress for many members of the shared supply chain and customers in both subsectors.

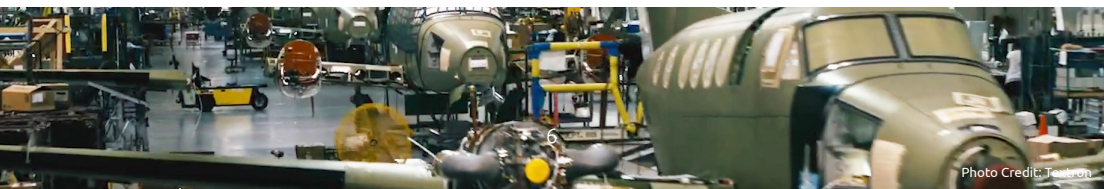
THE A&D INDUSTRY SUPPORTING AMERICA'S HEALTHCARE HEROES

When the COVID-19 crisis devastated our global community, aerospace and defense industry leaders stepped up to help those in need. From cash donations to ramping up production of PPE to partnering with the healthcare sector to produce ventilators, our industry has gone above and beyond to equip our nation's healthcare heroes and others on the front lines.

To date, our member companies have publicly donated at least \$500 million to assist the most vulnerable around the world. This assistance took many forms, ranging from supplying meals to food-insecure families, providing financial assistance to essential workers, supporting local businesses suffering from loss of revenue, providing laptops to remote learning students, and helping local non-profits provide social and financial services in their communities. Companies also invested in vaccine and research efforts centered around COVID-19.

In addition to production and financial contributions, our member companies also donated much-needed medical supplies to protect our frontline workers. Over three million pieces of essential medical equipment were donated, including personal protective equipment like masks, gloves, and sanitizer. Not only were these supplies used to support American COVID-19 efforts, but supplies were also shared with international communities in need as well.

Individual employees made remarkable personal contributions as well, logging thousands of volunteer hours throughout 2020. They setup laptops for grade school students, helped staff hospital testing centers, supported those in isolation by providing social contact, made or donated face masks, and fundraised for various relief efforts in their free time. While the aerospace and defense industry is no stranger to answering the call in support of our country, we are incredibly proud of the individual and company contributions made throughout this pandemic.



EMPLOYMENT TRENDS

Job loss is one of the most critical economic indicators in 2020 and the U.S. aerospace and defense industry was not immune from the declines in employment. Air travel slowed to a near halt, the demand for new aircraft and maintenance, repair, and overhaul services evaporated, and facilities were forced to temporarily close in accordance with government health orders. Consequently, the industry saw a net loss of more than 87,000 employees, a 4 percent decline when compared to 2019 industry employment. While there were some bright spots as defense companies filled new or open positions, the overall employment totals decreased to slightly more than two million workers, which is just under the size of the A&D workforce in 2018. Of these losses, 64 percent were attributed to the hard-hit shared supply chain comprising thousands of small businesses across the country.

Though the industry suffered significant job losses, its workforce still accounted for 1.4 percent of total employment in the United States in 2020. Additionally, the industry continued to offer its highly skilled and educated workers with some of the highest paying jobs in the nation. At \$104,577, the A&D industry's average wages and benefits remained 41 percent above the comparable national average. In total, the industry paid out \$218.6 billion in compensation in 2020, or roughly 2 percent of total U.S. labor income.

U.S. AEROSPACE & DEFENSE INDUSTRY WORKFORCE 2016-2020

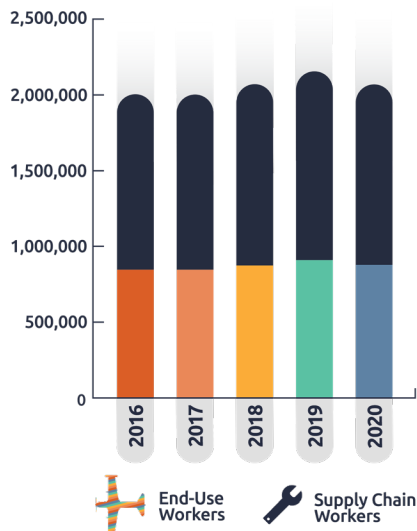




Photo Credit: General Dynamics

INDUSTRY OUTPUT

As an engine for growth, the industry continued to support the American economy despite strong headwinds.

Mirroring the impacts to our workforce, the industry's revenues experienced a decline in 2020. Between 2019 and 2020, the total industry revenues dropped 2.8 percent to \$874 billion, with the supply chain feeling a far greater burden at a loss of more than 3 percent. While greater than the total industry revenue recorded in 2018, the impact of the pandemic on the industry is unmistakable.

Though suffering significantly from the pandemic, the industry continues to boast impressive contributions to the American economy. In 2020, the A&D industry's sales activity contributed 18.8 percent of all non-food manufacturing revenue in the nation. Additionally, the industry accounted for 1.8 percent of total U.S. GDP, a figure of around \$382 billion.

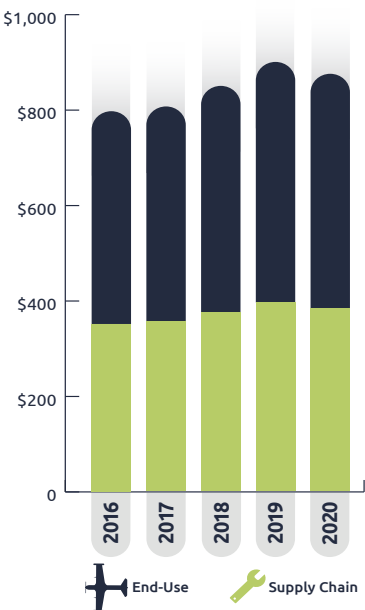
Contributions to government revenues also continued in 2020. The industry made considerable tax payments to federal, state, and local tax authorities, even at a time of intense impacts to such accounts due to losses in other industries and sectors. Overall, the industry's combined tax contributions combined for a total of \$59 billion nationwide.



Photo Credit: HEICO

FULL INDUSTRY OUTPUT/SALES

Value in Billions (USD)



FULL INDUSTRY CONTRIBUTION TO U.S. GDP

Value in Billions (USD)

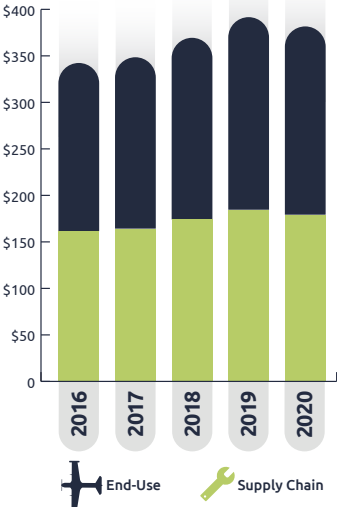




Photo Credit: General Dynamics

TRADE

The impact of COVID-19 on U.S. aerospace & defense trade cannot be understated. Despite significant loss, however, A&D exports still accounted for 6.3 percent of all U.S. exports in 2020.

Between 2019 and 2020, American A&D exports dropped by \$57.5 billion, or 39 percent. This decline dwarfed the previous record for decreases in A&D exports during the previous three decades, nearly tripling the 13.3 percent export decline of 1993. Civil aviation exports dropped from \$126.5 billion in 2019 to \$72.8 billion in 2020. Defense exports saw a less substantial decline of 17 percent.

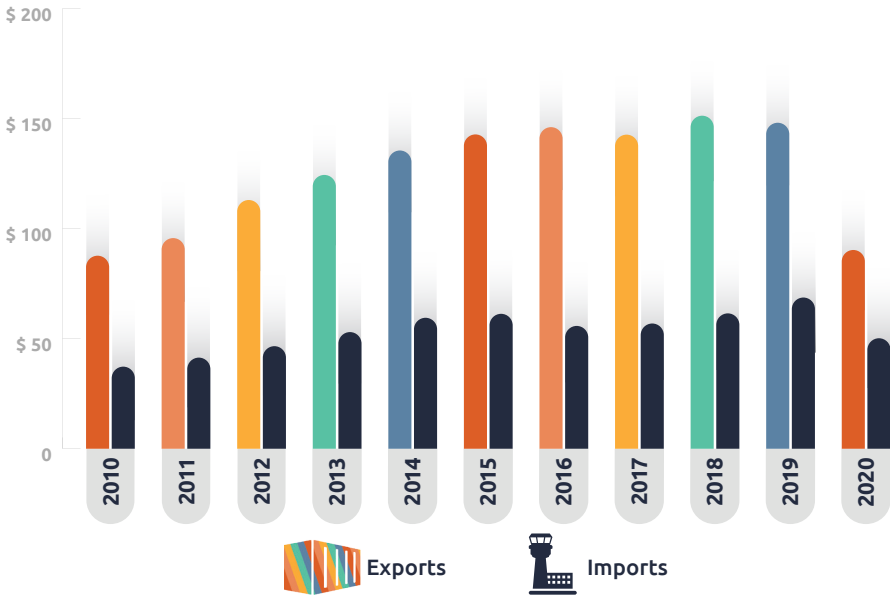
As with previous years, civil aviation exports were the dominant category of U.S. A&D products shipped during 2020. These items, which include civil aircraft, engines, replacements parts, and similar products, accounted for 80 percent of all A&D exports. Defense aerospace products, which include military aircraft, space systems, missiles, and similar aviation or space-related platforms and parts, made up 15 percent of the annual total. Products that are utilized for defense purposes, but are not aerospace in nature such as tracked vehicles, ships, artillery, small arms munitions, and similar items accounted for the remaining 5 percent of U.S. A&D exports.



Photo Credit: HEICO

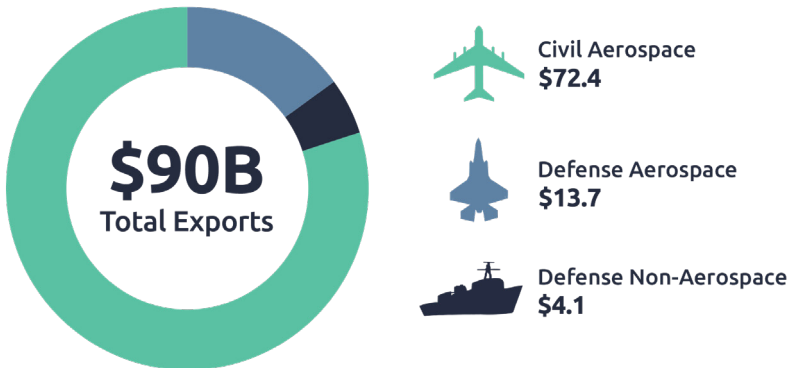
U.S. A&D TRADE 2010-2020

Value in Billions (USD)



A&D EXPORTS BY SUBSECTOR IN 2020

Value in Billions (USD)



The leading destinations for U.S. A&D exports in 2020 were Germany, France, Canada, the United Kingdom, and Japan. Exports to these five nations collectively amounted to \$36.1 billion, around 40 percent of all U.S. A&D exports. Noticeably absent from these top export partners compared to 2019 is China, which dropped to seventh in the ranking at only \$4.5 billion in exports. This is attributed to a significant decline in civil aviation exports. Taking its place is Japan, which rose from being to sixth largest export partner to the fifth largest export partner.

The value of all U.S. A&D imports in 2020 totaled \$50 billion, down 27 percent from the previous year. The leading countries of origin for U.S. A&D imports remained relatively unchanged from 2019, though the value of goods from those countries generally decreased. France was once again a leading origin for A&D imports, though the value of those imports dropped by 33 percent to \$11.4 billion. Other top national origins for A&D imports included Canada, the United Kingdom, Germany, and Japan, largely mirroring the nation's export destinations and making clear the strength of America's trade relationship with those countries.

Despite seismic shifts in trade values, the A&D industry maintained its positive industry trade balance at a value of \$40.6 billion. While nowhere near the \$79.3 billion industry trade balance achieved in 2019, A&D retained its status as a leading export industry for the United States.

Despite massive losses in 2020, the final months of the year showed a small, but promising, recovery. In Q3 and Q4 of 2020, exports rose by 14 percent and 11 percent respectively. This resurgence strongly correlates with the global aviation recovery, which the U.S Bureau of Transportation Statistics has found to be trending in a positive direction as of Spring 2021.

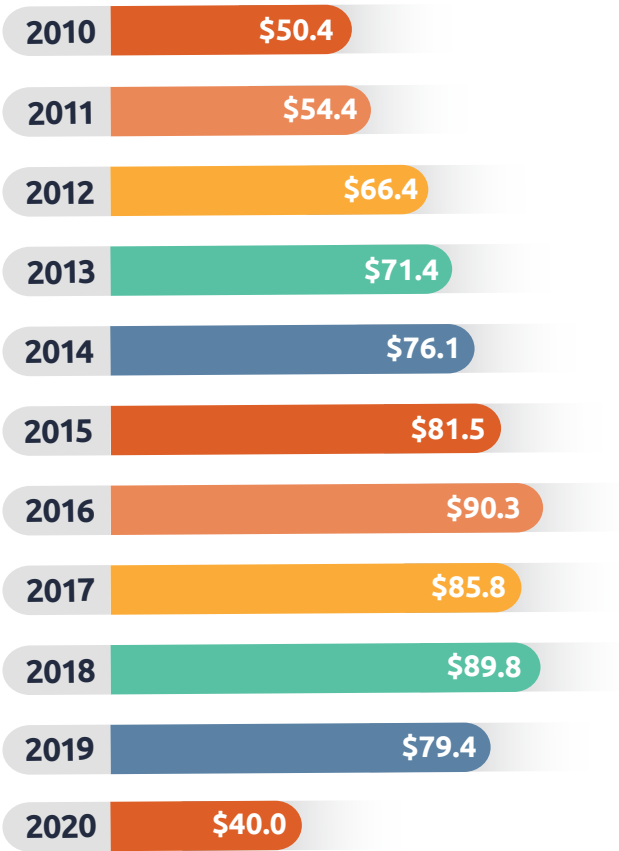




Photo Credit: HEICO

U.S. A&D TRADE BALANCE 2010-2020

Value in Billions (USD)





Germany

\$ 4.3 billion



France

\$ 11.4 billion



United Kingdom

\$ 4.5 billion



Canada

\$ 9.5 billion



Japan

\$ 4.0 billion



Brazil

\$ 2.0 billion



Mexico

\$ 2.0 billion



Germany

\$ 8.3 billion



France

\$ 7.7 billion



United Kingdom

\$ 7.3 billion



Canada

\$ 7.0 billion



Japan

\$ 5.5 billion



Brazil

\$ 4.9 billion



China

\$ 4.5 billion



Photo Credit: © Photos by David Bohrer for Click Bond, Inc

THE OUTLOOK FOR A&D

THE A&D INDUSTRY IN A POST-PANDEMIC WORLD

The support and understanding of policy makers will be critical to ensuring a full return to the robust A&D industry employment and trade metrics seen during the 2010s. While our industry has persevered previous challenges, a date certain for a full recovery for our workforce and customers is unclear.

Investments in both immediate priorities elevated by the pandemic and enduring ones, such as national security and infrastructure, will be critical to ensuring a full recovery for our industry, our nation, and the global economy. With continued collaboration between industry, government, and other stakeholders, the U.S. and the world can emerge from this crisis stronger than before.

The health of the air travel industry will be a key element of our industry's recovery, and continued government support from this sector in the form of economic aid and regulatory support will be vital to a full recovery. To ensure travelers around the world can return to the skies with confidence, the American A&D industry is also working with our partners across the global travel ecosystem. Our industry stands ready to support the development of strategic policies that encourage the free and fair trade essential to the global recovery effort, as well as the health of America's manufacturing supply chain and our nation's continued leadership in aerospace and defense.





EMERGING SECTORS

While the past year was grim for U.S. aerospace and defense, there are beacons of hope for the future of our sector. Emerging technologies in both terrestrial and space applications appear poised to change our world dramatically in the coming decades. The new sectors they create will form a key element of our industry in the post-pandemic era and are likely to bring with them dramatic societal changes that the A&D industry has brought about on many previous occasions.

ADVANCED AIR MOBILITY

A 2021 joint study between AIA and Deloitte, “Advanced air mobility: Can the United States afford to lose the race?”, estimates that the market for Advanced Air Mobility (AAM) vehicles is projected to grow to \$115 billion by 2035. These vehicles are likely to revolutionize passenger and cargo travel in the coming decades, and the manufacture of them is expected to employ more than 280,000 people annually by 2035.

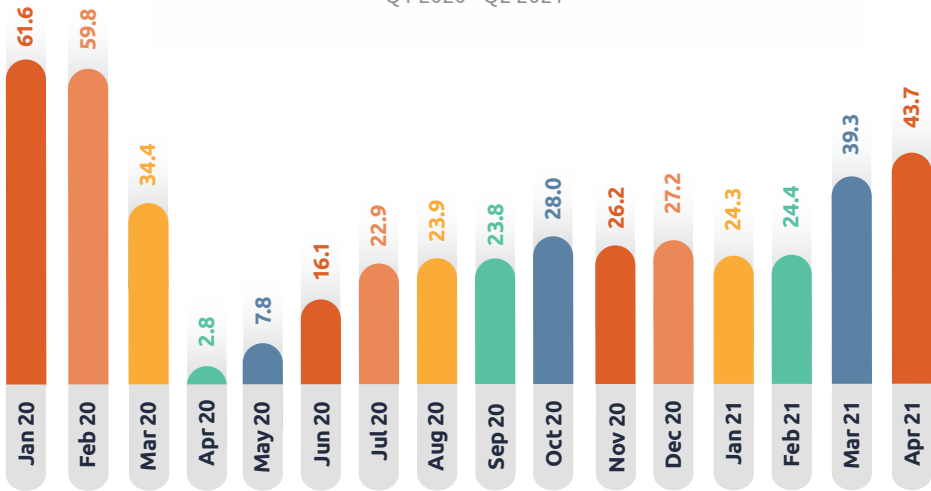
SUSTAINABLE AVIATION FUELS

As air travel starts making its comeback, sustainability efforts in aviation become all the more necessary to consider. U.S. airlines have already improved their efficiency by 130 percent since 1978, but commercial aviation was still responsible for 10 percent of the transportation sector’s greenhouse gas emissions in 2019. Sustainable aviation fuel (SAF) provides a potential answer to the question of how to reduce the aviation industry’s carbon footprint.



THE AIR TRAVEL RECOVERY

Value in Millions (U.S. Domestic Passengers)
Q1 2020 - Q2 2021



PROJECTED AAM MARKET GROWTH

Value in Billions (USD)



Passenger Market



Cargo Market

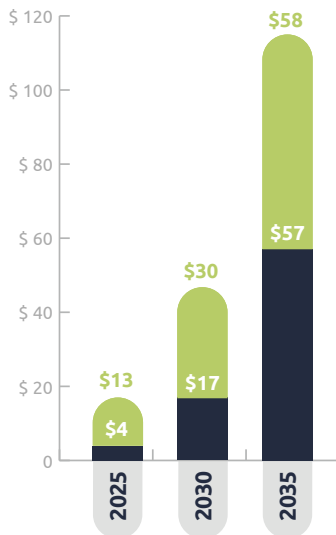




Photo Credit: Textron

SAF is an umbrella term referring to forms of non-traditional fuel that originate from sources ranging from plant oils to municipal waste. SAF can reduce carbon emissions from up to 80 percent in some cases and contains fewer impurities than petroleum-based jet fuel. In March of 2021, Airlines 4 America announced major US airlines' commitment to achieving net-zero carbon emissions by 2050. This goal would be met by making two billion gallons of SAF available to major US aircraft operators by 2030.

Current obstacles to SAF production and deployment include its high cost compared to traditional jet fuel and the lack of low-cost feedstock in volumes large enough to sustain mass production of it. To overcome these challenges and find innovative solutions, private-public partnerships must be forged so that all players of the A&D industry can work towards a greener future.

SMALL UNMANNED AERIAL SYSTEMS

With great similarities to AAM, in both technology and application, the Unmanned Aerial Systems (UAS) sector is yet another area of growth for our industry. In 2020, the FAA issued over 1,400 waivers for its Part 107 UAS regulations. These waivers allow UAS operators to conduct operations outside of the scope of Part 107 regulations, with more than 91 percent of waivers being issued for Part 107.29, which governs daytime operations and prohibits operators without waivers from flying UAS aircraft at night or during twilight hours. Other popular waivers include those for Part 107.39 which governs the operation of UAS over human beings, Part 107.51 which governs the minimum altitude and maximum speeds of UAS operation, and Part 107.31 which prohibits Beyond Visual Line of Sight (BVLOS) operations of UAS aircraft. Since March 2017, the FAA has issued more than 4,486 Part 107 waivers, with 2020 marking a year of record growth.



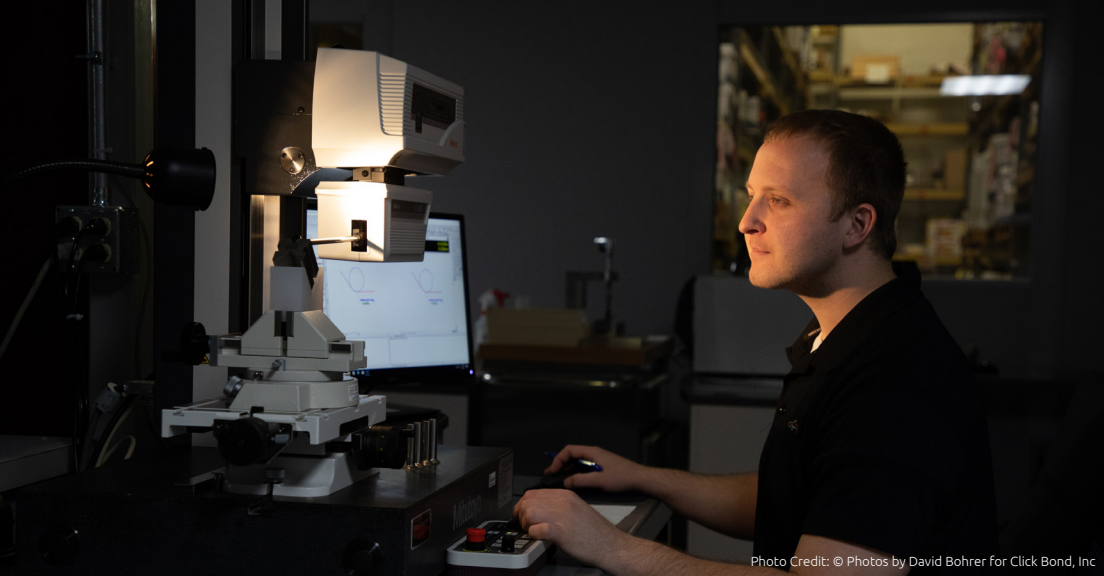
Photo Credit: Ball Aerospace

SPACE COMMERCE

The space systems subsector has received significant media attention in recent years, as the space industry expands into new markets and meets demand for commercial and government space payloads. The past year marked significant milestones for two emerging space markets – in-space servicing of commercial satellites and the commercial space tourism market. A December 2020 report by the U.S. Bureau of Economic Analysis on America’s “space economy,” details the economic impacts of the space industry as a whole on the nation’s economy. This space economy analysis, which extended far broader than AIA’s economic impact analysis, found that the space systems sector, the businesses which supply them, and the customers which purchase and use their products, supported a workforce of over 356,000 jobs in 2018.



Photo Credit: Aerojet Rocketdyne



METHODOLOGY

This report is based on data developed in partnership with IHS Markit and independently by AIA. Data pertaining to the industry's employment, output, wage, and value-added figures are based on data from the U.S. Census Bureau, the Department of Labor, IMPLAN, and proprietary data from IHS Markit.

Data on the industry's foreign trade activity are based on an analysis of trade data from the U.S. International Trade Commission and the United Nations' International Trade Statistics Database. These figures include both Foreign Military Sale (FMS) transfers, as well as Direct Commercial Sale (DCS) transfers.

Data on Airline Revenue Passenger Miles is derived from data published by the U.S. Bureau of Transportation Statistics.

Projections on Advanced Air Mobility (AAM) sector growth and employment are derived from a joint AIA-Deloitte analysis and survey.

Data on the space economy is derived from data published by the U.S. Bureau of Economic Analysis.

AIA defines the U.S. A&D industry as consisting of establishments that manufacture end-use platforms, including civil and military aircraft, rotorcraft, space systems, military vehicles and land systems, naval ships, missiles, and armaments, as well those establishments that constitute the industry's manufacturing and services supply chain.



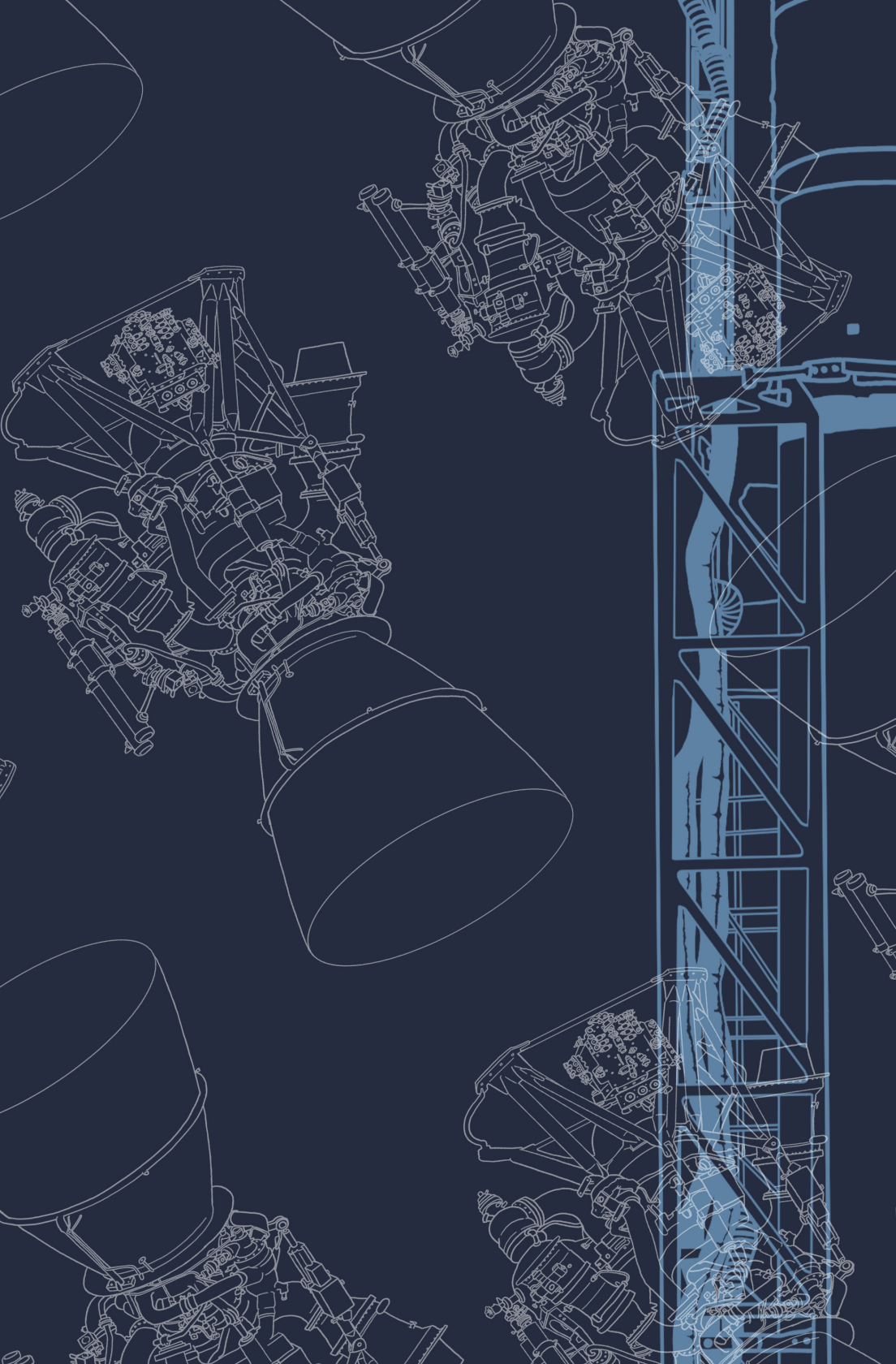
Photo Credit: Northrop Grumman

ABOUT AIA

For over 100 years, the Aerospace Industries Association (AIA) has served as the premier advocate, resource, and convener for the aerospace and defense industry. With over 300 member companies, including manufacturers and suppliers, AIA works with industry and government leaders to shape policy, share the aviation impact on America, and lay the groundwork for this sector and our country's future. From our first flight through the skies to the dawn of the jet age, AIA advocates for policies that prioritize safety, drive aviation innovation, and transform the way our world moves, connects, and explores. For more information, visit www.aia-aerospace.org.



Photo Credit: ViaSAT





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