

sb0574swed.pdf

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Position: FAV



Maryland Senate Budget and Taxation Committee
c/o Senator Guy Guzzone and Senator Jim Rosapepe
3 West, Miller Senate Office Building
Annapolis, MD 21401

February 5, 2024

Dear Chair Guzzone & Vice Chair Rosapepe,

I respectfully write to the Committee today and its members for a favorable report for MD 2024 SB 0574 - HB 0557 Sales Tax Exemption - Aircraft Parts and Equipment - Repeal of Reporting Requirement and Sunset.

One of Wicomico County's and the Lower Eastern Shore's greatest economic assets is the Salisbury-Ocean City: Wicomico Regional Airport (SBY). Scheduled airline service is provided by Piedmont Airlines to Philadelphia and Charlotte and SBY overall has an economic impact to our region exceeding \$150 million annually. We're investing \$3 million at SBY to establish an Aviation Maintenance Technician school to train Airframe and Powerplant (A&P) mechanics for the aviation and aeronautical industry. Our first graduates are anticipated in 2025, just as the Sales & Use Tax Exemption is set to sunset.

Repealing this sunset allows SBY and our region to better compete for aviation and aeronautical jobs, grow general aviation activities at SBY and create great jobs for residents throughout our region.

Your favorable report of SB-0574 and HB-0557 is valued and appreciated. Thank you.

Respectfully,

A handwritten signature in black ink, appearing to read 'D. Ryan', is written over a light blue horizontal line.

David J. Ryan
Executive Director

2017-18_MD_EIS_Summary.pdf

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Table ES-2 Summary of Impacts Generated by Maryland's Public-Use Airports, 2017

Total Impacts Airport	Jobs				Personal Income (\$1,000)				Revenue (\$1,000)	Local Purchases (\$1,000)	Taxes (\$1,000)	
	Direct	Induced	Indirect	Total	Direct	Induced	Indirect	Total				
Bay Bridge Airport	65	23	26	115	\$1,819	\$1,513	\$1,053	\$4,385	\$6,789	\$2,217	\$1,011	
Bennett Airport	0	0	0	1	\$0	\$0	\$0	\$54	\$63	\$22	\$11	
Cambridge/Dorchester Regional Airport	84	32	44	161	\$2,653	\$2,369	\$1,714	\$6,737	\$6,432	\$3,583	\$1,224	
Carroll County Regional Airport	134	54	73	261	\$4,659	\$4,196	\$3,425	\$12,280	\$77,167	\$7,494	\$7,629	
Claremont Airport	13	5	1	19	\$451	\$443	\$49	\$942	\$798	\$123	\$163	
Clearview Airpark	2	1	1	4	\$66	\$57	\$28	\$151	\$318	\$61	\$42	
College Park Airport	32	15	7	53	\$1,424	\$1,381	\$347	\$3,152	\$4,318	\$738	\$680	
Crisfield-Somerset County Airport	6	2	3	11	\$170	\$143	\$118	\$431	\$621	\$271	\$96	
Davis Airport	13	6	1	20	\$571	\$563	\$57	\$1,191	\$108	\$105	\$131	
Easton Airport	254	109	130	494	\$10,198	\$9,449	\$6,267	\$25,914	\$48,506	\$13,752	\$6,667	
Essex Skypark	2	1	2	4	\$105	\$104	\$102	\$311	\$225	\$148	\$51	
Fallston Airport	0	0	0	2	\$0	\$0	\$0	\$121	\$40	\$19	\$16	
# 4 Frederick Municipal Airport	565	267	297	1,128	\$27,200	\$25,877	\$13,538	\$66,615	\$101,661	\$37,666	\$15,239	21.2mm
Freeway Airport	27	10	11	48	\$779	\$724	\$595	\$2,098	\$2,326	\$1,134	\$408	
Garrett County Airport	34	12	14	60	\$932	\$768	\$529	\$2,230	\$3,272	\$1,146	\$499	
Greater Cumberland Regional Airport	74	36	15	125	\$3,766	\$3,637	\$749	\$8,152	\$3,801	\$1,665	\$1,152	
# 3 Hagerstown Regional Airport	842	406	516	1,763	\$41,816	\$40,335	\$22,164	\$104,316	\$130,104	\$50,804	\$21,463	306.7mm
Harford County Airport	43	17	11	71	\$1,343	\$1,231	\$453	\$3,028	\$2,253	\$1,195	\$497	
Havre de Grace Seaplane Base	0	0	0	2	\$0	\$0	\$0	\$109	\$132	\$17	\$22	
Kentmorr Airpark	0	0	0	1	\$0	\$0	\$0	\$70	\$180	\$1	\$18	
Lee Airport	24	8	8	41	\$544	\$504	\$358	\$1,406	\$2,887	\$857	\$383	580mm
# 2 Martin State Airport	1,201	637	567	2,405	\$71,259	\$69,141	\$28,879	\$169,280	\$297,214	\$71,502	\$41,931	
Maryland Airport	13	6	9	28	\$507	\$478	\$551	\$1,536	\$866	\$1,096	\$229	
Massey Aerodrome	6	2	2	10	\$35	\$35	\$3	\$73	\$638	\$7	\$19	

1 - BWI - 106,000 jobs - 9.3 billion - 2018

Table ES-2 Summary of Impacts Generated by Maryland's Public Use Airports, 2017 (Continued)

Total Impacts Airport	Jobs				Personal Income (\$1,000)				Revenue (\$1,000)	Local Purchases (\$1,000)	Taxes (\$1,000)
	Direct	Induced	Indirect	Total	Direct	Induced	Indirect	Total			
Mexico Farms Airport	0	1	1	2	\$0	\$0	\$0	\$111	\$217	\$17	\$26
Montgomery County Airpark	80	32	81	193	\$2,482	\$2,394	\$4,784	\$9,661	\$5,753	\$9,773	\$1,468
Ocean City Municipal Airport	188	69	75	332	\$5,548	\$4,693	\$3,017	\$13,258	\$21,188	\$6,473	\$3,112
Pier 7 Heliport	42	18	18	78	\$1,722	\$1,570	\$844	\$4,136	\$7,817	\$1,675	\$1,070
Potomac Airfield	29	13	39	81	\$1,170	\$1,143	\$1,842	\$4,155	\$1,916	\$3,522	\$585
Ridgely Airpark	8	3	3	14	\$25	\$25	\$13	\$63	\$757	\$32	\$11
#5 Salisbury-Ocean City Wicomico Regional Airport	876	383	361	1,620	\$35,739	\$33,918	\$14,716	\$84,375	\$78,251	\$27,728	\$15,134
St. Mary's County Regional Airport	188	105	207	499	\$12,310	\$11,837	\$8,534	\$32,682	\$35,376	\$17,003	\$6,280
Tipton Airport	121	65	82	267	\$7,207	\$7,081	\$4,657	\$18,944	\$23,609	\$9,362	\$3,896
Washington Executive Airport/ Hyde Field	7	4	3	14	\$355	\$350	\$162	\$867	\$1,522	\$458	\$215
TOTAL	4,978	2,341	2,610	9,928	\$237,071	\$226,168	\$119,589	\$582,828	\$867,122	\$271,664	\$131,377

205.5MM

Note: Totals may not add due to rounding.

HGR Hagerstown Regional Airport Brochure 2018.pdf

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Position: FAV

Maryland Benefits from Airports

- Maryland's economic well-being is interconnected with its vibrant airport system and its robust aviation industry. The State's aviation system allows the community at-large to capitalize on an increasingly global marketplace.
- Aviation in Maryland both sustains and leads economic growth and development. Protecting and investing in airports will support the aviation industry and sustain the industry's positive impact on local, regional, and state economies. With continued support, Maryland's dynamic aviation system will continue to provide a significant economic return in the years to come.
- When the regional and local economic impacts of Maryland's 34 public-use general aviation and scheduled commercial service airports (excluding Baltimore-Washington International Thurgood Marshall Airport) are added together, over 9,900 jobs can be traced to the aviation industry. These employees receive more than \$583 million in total payroll, and generate nearly \$1.1 billion in total economic activity – over \$867 million in business revenue and \$272 million in local purchases.
- The total employment numbers for Maryland's public-use general aviation and scheduled commercial service airports includes nearly 5,000 direct jobs created by airport and visitor activity at these airports. Over 2,300 jobs were supported in local economic sectors as a result of purchases for goods and services by those 5,000 directly-employed workers; and, over 2,600 indirect jobs were supported by over \$272 million of local purchases by airport tenants.
- Nearly \$583 million dollars in personal wages and salary income was created in the State of Maryland by the activity at these 34 airports.
- Over \$867 million in business revenue was created from airport tenants, support services, and visitor services performed for the general aviation and scheduled commercial service aircraft and visitors using the 34 airports.
- Maryland's airports provide economic, health, welfare, and safety benefits to our residents from Fixed Base Operators (FBOs), maintenance/avionics businesses, charter aircraft operators, corporate flight departments, flight schools, military operations, and State/local law enforcement operations.



9,929

Jobs Traced to Aviation Industry
(excluding BWI)



\$867M

Business Revenue from Aircraft
Handling Fees & Servicing of Aircraft



\$1.1B

Total Economic Activity

2,610

Indirect Jobs

\$272M

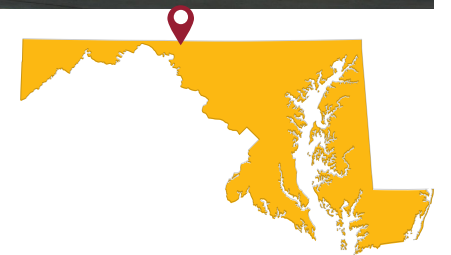
Local Purchases by Airport Tenants

\$583M

Total Payroll



December 2018



Hagerstown Regional Airport Richard A. Henson Field (HGR)

Maryland Economic Impact of Airports

For More Information, Please Contact:

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Hagerstown Regional Airport - Richard A. Henson Field (HGR)
18434 Showalter Road - Hagerstown, MD 21742
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The Maryland Aviation Administration commissioned this study to measure the economic impact of airport activity generated by the State's 34 public-use general aviation and scheduled commercial service airports (excluding Baltimore-Washington International Thurgood Marshall Airport). The approved methodology for this study has successfully been implemented throughout the U.S. to quantify the value of airports and airport systems. The economic contribution of each airport in the Maryland airport system was measured in terms of jobs, personal income, state and local taxes, and revenue generated directly by airport activity, using a base year of 2017 for the analysis.

Determining the Impact

Maryland's airports contribute to both the State and local economy by generating business revenues from all types of aviation-related activities – aircraft operations and fuel sales; cargo and package freight service; goods and services provided to pilots and passengers; and, the rents, leases, and services of on-airport businesses. In turn, these airport-related businesses hire people and, through the salaries paid to those employees, additional spending is generated in the economy. In addition, these on-airport firms also purchase goods and services from local and regional vendors. Ultimately, all these jobholders pay taxes to state and local governments. The graphic below shows the economic impacts created by the airport and the statewide system, which are measured in terms of BUSINESS REVENUE, JOBS, PERSONAL INCOME, and TAXES.

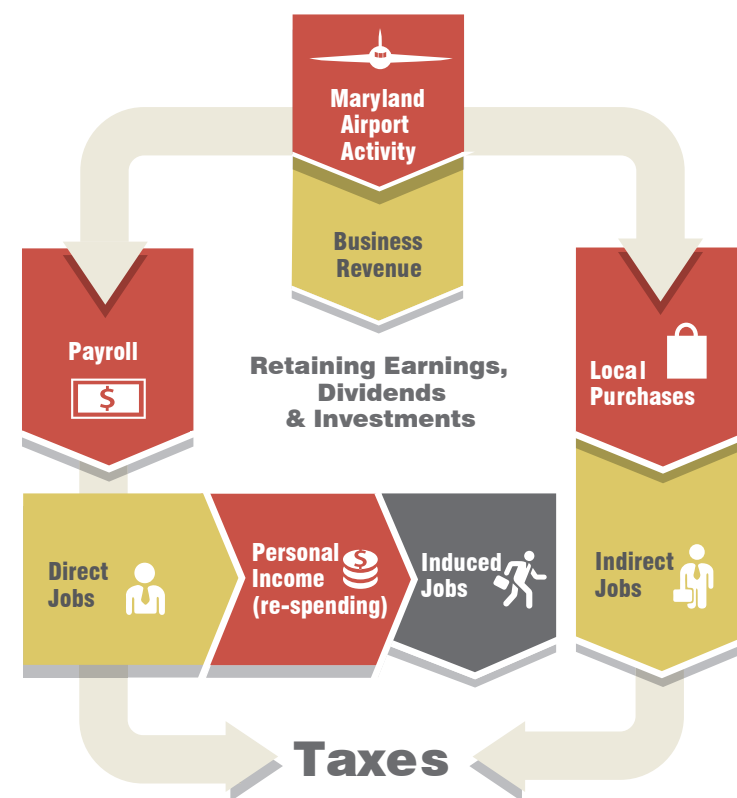
BUSINESS REVENUE: Airport-related business revenue is defined as revenue generated by firms providing the services to the commercial airlines as well as to the general aviation aircraft, military aircraft, and to the flight schools. These firms providing the service and the individuals employed by these firms also pay state, local, and federal taxes.

JOBS: Airport-related employment consists of three levels of job impacts - direct, induced, and indirect employee impact. **DIRECT JOBS** are jobs directly generated by airport activity, which would vanish if activity at the airports were to cease. **INDUCED JOBS** are created throughout the regional economy because individuals directly employed due to airport activity, spend their wages locally on goods and services such as food and housing. **INDIRECT JOBS** are generated due to the purchase of goods and services by firms dependent upon airport activity.

PERSONAL INCOME: Personal Income consists of wages and salaries received by those directly employed by airport activity and includes a re-spending impact which measures the personal consumption activity in the region of those directly employed as the result of airport activity. Indirect personal income measures the wages and salaries received by those indirectly employed.

TAXES: State and local taxes are paid by businesses and individuals involved in providing services in support of airport activity.

Flow of Economic Impact



Hagerstown Regional Airport - Richard A. Henson Field

Hagerstown Regional Airport-Richard A. Henson Field is public-use, publicly-owned airport owned by Washington County. The Airport is located approximately 4 miles north of Hagerstown. The Airport has two asphalt runways. Runway 9/27 is 7,000 feet long by 150 feet wide with a precision approach capability. Runway 2/20 is 3,165 feet long by 100 feet wide. Both runways have a full parallel taxiway. Hagerstown Regional Airport is included in the FAA's National Plan of Integrated Airport Systems (NPIAS), making it eligible to receive federal funds. Its role, as a Primary Airport, is defined as one that receives scheduled commercial passenger service and enplanes more than 10,000 passengers annually.

Allegiant and Southern Airways Express provide scheduled airline service at Hagerstown Regional Airport. Allegiant provides non-stop service to Orlando Sanford International Airport (SFB) and to St. Pete-Clearwater International Airport (PIE), while Southern Airways Express provides daily service to Baltimore/Washington International Thurgood Marshall Airport (BWI) and to Pittsburgh International Airport (PIT). The Airport has an Airport Traffic Control Tower (ATCT) that operates between the hours of 7:00 a.m. and 10:00 p.m. Airport users can obtain aircraft fueling services for 100LL, Jet A, major airframe service, major power plant service, avionics service, and aircraft parking and storage is available on paved tie-downs and in T-hangars. The 162 based aircraft at Hagerstown Regional Airport include primarily single-engine aircraft, numerous multi-engine aircraft, jets, helicopters, and a few ultralight aircraft.

More than 20 aviation-related businesses support the needs of all types of aircraft operators. The Fixed Base Operator (FBO), Rider Jet Center (www.riderjetcenter.com), provides numerous services including aircraft rental, heated hangars, computerized weather, aircraft inspections, and aircraft maintenance/repair. Hagerstown Flight School, LLC (www.hagerstownflightschool.org) provides flight training, discovery flights, and pilot ground school, while V1 Aeronautics also offers flight training, air tours, and FAA testing.

Since 2008, businesses supporting the aero defense industry have landed at Hagerstown Regional Airport bringing with it multi-million dollar defense contract awards. The growth in aero defense spawned local economic development and government officials to bring the Pittsburgh Institute of Aeronautics education program for FAA-approved Aviation Maintenance Technicians to the Airport. HGR offers a Redbird simulator operated by SimFly (www.simflynow.com). In addition to serving the business, recreational, and flight training needs of the community the Airport is the base of operations for an FAA Medical Examiner.



HGR Letter_Sales_Tax_Exemption_Feb_2024_Doran.pdf

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Position: FAV



February 2, 2024

Chair, Budget and Taxation Committee
Miller Senate Office Building, 3 West Wing
11 Bladen Street, Annapolis, MD 21401-1991

RE: Sales and Use Tax Exemption – Aircraft Parts and Equipment

To Whom It May Concern,

The true size and scope of the aircraft maintenance and repair business-footprint in Maryland has perhaps not been well understood by the state's legislature. I shall attempt to briefly describe Hagerstown's historic role and contributions below.

Washington County has had a rich history in the aircraft and aviation industry dating back to the 1920s. Especially prominent were the operations of the Fairchild Aircraft Company, a leading manufacturer of military and civilian aircraft during World War II and the decades afterward. Hagerstown was also famous as the birthplace of Dick Henson and his innovation we now know as the Commuter Airline model. Later his Henson Airlines company relocated to Salisbury and is now known as "Piedmont Airlines".

Today, Hagerstown (HGR) serves as one of the largest bases of aviation employment in the State of Maryland. It could also be the largest center of civilian-sector aviation maintenance-related employment. Also, as one of the largest and most developed airports in our state, HGR accounts for one of the largest total economic impacts among Maryland's 33 public-use airports, ranking 2nd or 3rd in the state after Baltimore-Washington International Airport. **Each year, HGR's tenant businesses contribute some \$300-\$350 million in annual impact to our local and state economies.**

Here below is a partial list of the companies with aircraft maintenance-related operations at HGR:

- **Pittsburgh Institute of Aeronautics (PIA)** – *Maryland's first and exclusive FAA-certified Part 147 Airframe & Powerplant training provider.*
- **Sierra Nevada Corporation (SNC)** *Part 145-certified. 450 jobs. government contract work. integrated mission systems aircraft modification, FAA Certification, project management, engineering, manufacturing.*
- **Royal Aircraft Services, LLC** – *Part 145-certified. aircraft painting, corrosion removal, detailing, hail damage repairs, overhaul, parts sourcing, annual inspections, altimeter & transponder certifications, aircraft and engine repair and maintenance. authorized Cirrus service & paint warranty center.*
- **Plane Care, LLC** – *Part 145-certified. aircraft maintenance and repair, painting, interiors, avionics, aircraft brokerage, damaged aircraft retrieval, airframe repair, engine repair, inspections, modifications.*
- **DS Technologies, LLC. ("DST") /Aviation Solutions of America, Inc./ M84.** *Part 145 – certified. aircraft modifications. government contract work.*
- **South Mountain Aviation** – *aircraft maintenance and repair, jet maintenance, avionics.*
- **Terry's A&P Service** – *aircraft maintenance and repair, inspections.*
- **R&M/REH Enterprises** – *aircraft maintenance and repair, inspections.*
- **AirTech, LLC.** – *Part 145-certified. Large airliner maintenance and repair, inspections, painting, avionics, interiors*

18434 Showalter Road | Hagerstown, MD 21742 | Phone: 240.313.2777 | Email: HGRinfo@washco-md.net

- **Life Support Systems, LLC** - *Part 145-certified. life raft repairs.*
- **Telford Aviation** - *Part 145-certified. www.Telford.aero*
- **MAG Aerospace/MAG, Inc.**
- **Rider Jet Center, Inc.** – *full-service FBO with available maintenance services*
- **Martin’s Famous Potato Shoppe, Inc.** - *Part 145-certified.*

Of interest to legislators should also be the wages earned by aviation-maintenance-sector workers in Maryland. According to 2022 data published by the United States Bureau of Labor Statistics (BLS), Maryland is home to some 1,550 Aircraft Mechanics and Service Technician jobs with those individuals earning the second-highest annual mean wage among the fifty US states (\$41.34 hourly or \$85,980 annually). Source: <https://www.bls.gov/oes/current/oes493011.htm>

In the past, HGR-based businesses lost out on sales opportunities to other states that already enjoyed this tax exemption. Today, nearly all the surrounding states and those in the northeast enjoy broad tax exemptions on maintenance and repair parts and labor. HGR and the Maryland aviation community have experienced the positive benefits of the multi-year exemption measure that was enacted just a few years ago. We ask that this be continued and additionally urge you to consider making the exemption a permanent change.

As aircraft are, by definition, an extremely mobile commodity, aircraft owners can and do fly easily to other maintenance and repair businesses in neighboring, competing states to obtain their needed services. As a relatively small, compact state, a few minutes in the air saves pilots hundreds or in some cases thousands of dollars to procure aviation-maintenance services in other states such as Pennsylvania or Virginia. We ask that the legislature consider supporting Maryland’s aviation maintenance and repair businesses so we can keep those spent dollars here within our state and that this vital revenue doesn’t, quite literally “fly away”.

We believe making the tax exemption permanent will stimulate aviation-sector jobs, increase revenue, and help our state’s businesses to grow. Thank you for your support.

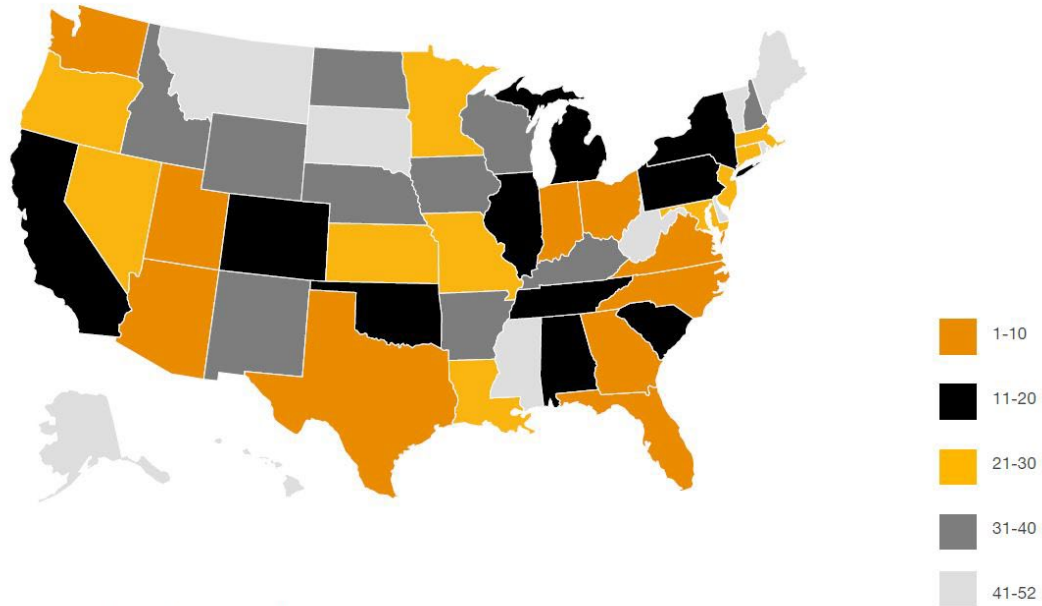
Should you have any questions or need additional information, please feel free to contact me at (240) 313-2764 or n.doran@flyHGR.com.

Sincerely,



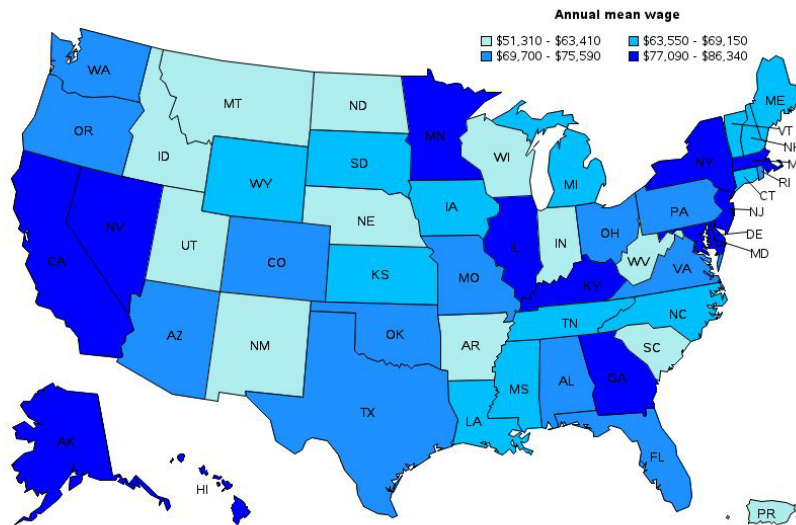
Neil R. Doran, C.M., A.C.E., A.S.C.
Airport Director

Source: <https://www.pwc.com/us/en/industries/industrial-products/library/aerospace-manufacturing-attractiveness-rankings.html>



19 2022 Aerospace manufacturing attractiveness rankings

Annual mean wage of aircraft mechanics and service technicians, by state, May 2022



Blank areas indicate data not available.

Top paying states for Aircraft Mechanics and Service Technicians:

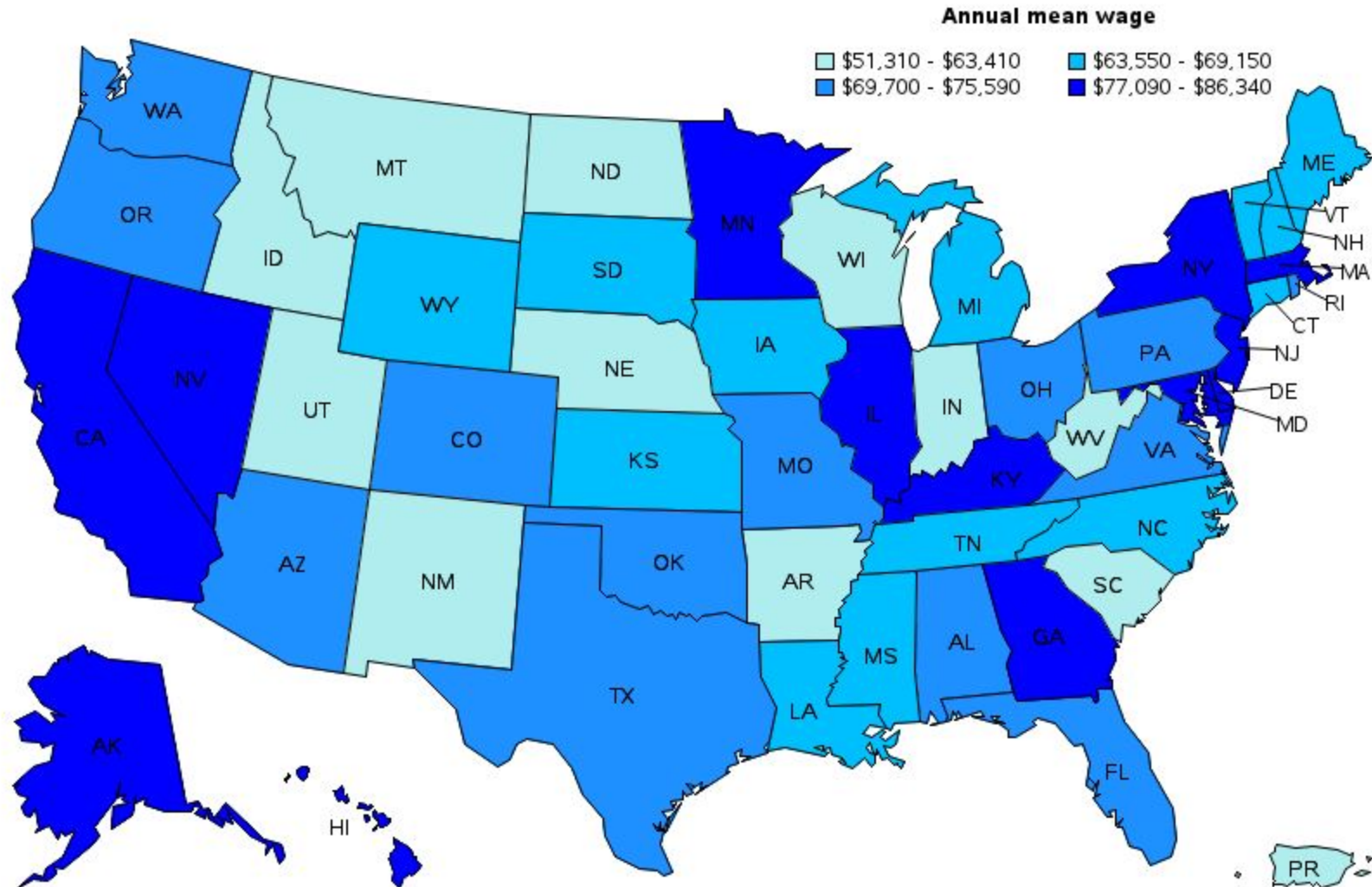
State	Employment (1)	Employment per thousand jobs	Location quotient (9)	Hourly mean wage	Annual mean wage (2)
New Jersey	1,720	0.42	0.46	\$ 41.51	\$ 86,340
Maryland	1,550	0.59	0.65	\$ 41.34	\$ 85,980
New York	3,220	0.35	0.39	\$ 40.35	\$ 83,920
Nevada	1,580	1.12	1.23	\$ 39.76	\$ 82,690
Illinois	3,480	0.59	0.65	\$ 39.49	\$ 82,140

MD_Wages.pdf

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Position: FAV

Annual mean wage of aircraft mechanics and service technicians, by state, May 2022



Blank areas indicate data not available.


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pwc-2022-aerospace-manufacturing-attractiveness-ra

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The background of the slide features a photograph of a fighter jet on a runway at sunset. The scene is overlaid with white technical line art, including circuit-like patterns and aircraft schematics. The main title is contained within a black rectangular box.

2022 Aerospace manufacturing attractiveness rankings

A geographic assessment for aerospace manufacturing investments

January 2023

PwC's ninth annual aerospace manufacturing attractiveness rankings offers a guide to — and a ranking of — promising geographic locales for aerospace development. Our attractiveness index examines relative strengths across numerous key variables for locations globally and within the United States. We hope that this edition will provide data that can inform investors and manufacturers in both the civil/commercial and defense spheres as they seek locations that support their strategic vision.

Overview

This year's rankings suggest a rapidly evolving investment landscape across the global civil and military aviation manufacturing industries as they strive to respond to an economy drastically altered by war in Europe and ongoing pandemic-related challenges. This picture contrasts with our data on the US domestic A&D industry that shows impressive resilience in the face of both expected and unexpected market changes.

To provide essential context for our rankings, let's begin by surveying recent developments affecting outcomes and prospects in both the countries and the states we highlight this year. Compared to our 2021 rankings report, there's often surprising news across the entire sector, in both civil aviation (including cargo) and military aerospace. And for manufacturers and investors in both areas, greening all aspects of the industry emerged in 2021-22 as an ever more urgent priority.





Civil aviation manufacturing's trajectory rises.

Civil aviation manufacturing demand is naturally most directly driven by the demand for passenger (pax) travel, which airlines constantly strive to anticipate. Travel demand recovery in 2021 and 2022 was bifurcated, with pax demand surging in large domestic markets such as the US, Brazil and China, while long-haul international travel — both business and leisure — remained slack. Overall, international travel demand isn't expected to recover to 2019 levels until 2025 — while, in most countries, domestic demand recovery is expected to get there in 2023.¹

With domestic pax demand rebounding and sustaining high levels, the core challenge for airlines is not so much filling seats as managing costs. Airlines currently have the advantage of considerable pricing power. Ticket prices in 2022 rose about 25%,² a surge that travelers proved overall willing to accept: online spending for domestic flights, for example, rose to \$8.8 billion in March — 28% higher than its pre-pandemic level.³ Travel demand surges continue to encounter capacity constraints in some key markets caused by persistent shortages in such support functions as security screeners and ground crew.⁴

A return to industry-wide prosperity may depend heavily on addressing supply chain challenges. Parts shortages disrupted pax travel in mid-2022, compounding airlines' staffing shortages. While A&D manufacturing infrastructure has largely survived the 2020-21 pandemic demand shock intact, component and assembly providers below the OEM and Tier 1 levels are facing a liquidity crunch that may inhibit a smooth return to 2019 production levels.⁵ A widespread shortage of highly skilled aviation engineers also intensified in 2021-22, as many had left the field for other industries.⁶ In fact, high-level international concern on the engineer shortage dates back more than a decade.⁷ Only concerted long-term investment in education and training will ultimately resolve this problem, which appears to be even more severe than the much-commented-upon pilot shortage affecting many airlines.⁸

Rising pay is likely to be a top incentive to attract and retain talent in the cockpit. An agreement between Delta and its pilots' union (still to be ratified as of January 2023) would increase salaries by more than 30% over four years and include a raft of enhanced benefits.⁹ Once ratified, the deal is likely to be influential across the industry.

One increasingly concerning consequence of the war in Ukraine is the A&D industry's dependence on Russia as a source of titanium, an indispensable commodity for aviation manufacturing. While Russia produces only 13% of the world's titanium, supply chains for the metal mined in many other countries run through Russia.¹⁰ Airbus relies on Russia for about half of its titanium needs, Boeing about one-third.¹¹ No sanctions have yet been levied on the Russian commodities exporters involved, such as VSMPO-AVISMA, but aviation manufacturers are bracing for supply disruptions and rising prices.



Boeing and Airbus orders and deliveries rebound. Just as in 2021, 2022 was a year of recovery for civil aviation manufacturers after the 2020 plunge that interrupted a decade of inexorable growth. Still, a return to pre-pandemic output levels appears to be some way off. Supply chain problems continue to hinder both Boeing and Airbus as they strive to fulfill a slew of new orders from carriers seeking to expand, rejuvenate and/or green their fleets.¹² In 2021 Airbus edged out Boeing in both net orders and deliveries for the third consecutive year.¹³ Airbus is likely to lead in deliveries in the near to medium term, given its deeper backlog.¹⁴

There was news in 2022 surrounding several safety-related developments at Boeing.

- One of the consequences of the 737 Max crashes in 2018 and 2019, which led to a two-year global ban on the model, is renewed FAA restrictions of Boeing's self-regulation privileges.¹⁸
- US investigators concluded that the China Eastern Airlines Boeing 737-800 crash in March 2022 was probably intentional (on the part of one of the pilots), not an accident.¹⁹
- In September 2022, Boeing settled with the SEC for \$200 million in a securities fraud suit in which the regulator accused the company of misleading investors regarding problems with the 737 Max.²⁰
- Delta announced in July an order for 100 737 Max 10s, expressing confidence that the model will win regulatory approval, with delivery expected in 2025 and an option for an additional 30 planes. The jets will have a higher seating capacity and will be 20% to 30% more fuel efficient than the aircraft they will replace.²¹



For the full year 2021, Boeing delivered 340 aircraft, compared to 157 in 2020 and 380 in 2019. These figures are well below the company's 2018 record of 806 jets — before COVID-19 and the 737 MAX grounding — a level Boeing could reach again by 2025.²² Meanwhile, in 2021 Airbus delivered 611 aircraft (up from 566 in 2020, but far below the 2019 record of 863).²³ New orders versus backlog for both companies also diverged. In 2021, Boeing booked 479 net new orders while Airbus booked 507. By the end of October 2022, Airbus had reported a backlog of 7,397 jets (92% A220 and A320ceo/neo narrowbodies). Boeing's backlog was 5,323 aircraft (80% 737 NG/MAX narrowbodies).²⁴ However, Boeing received a boost of good news in December 2022 with United's announcement that it intends to buy 100 787 twin-aisle Dreamliner jets, with deliveries to begin in 2024 and an option to buy 100 more. The aircraft, which will largely replace aging and less fuel-efficient 767s and 777s, brought United's total orders at Boeing to 700 planes by 2032.²⁵

Boeing's manufacturing volume has its greatest impact in Washington State (7th in our rankings this year), where the company has four factories, as well as in North Carolina (3rd place this year) and Louisiana (28th), where Boeing has assembly facilities. Airbus' prospects affect not only France (16th this year), where the company is headquartered, but also Alabama (13th), Canada, the UK and Spain (all featured in our rankings below).

In business travel, corporate private jet purchases surged in 2022 as spending in the sector reached a ten-year high.²⁶ That could be good news for the world's largest producers of such aircraft, including Canada's Bombardier and Brazil's Embraer. In the US, Gulfstream (Savannah), Honda Aircraft Co. (Greensboro, NC), Nextant (Cleveland), as well as Beechcraft and Cessna (both headquartered in Kansas) all could stand to benefit from this trend. Whether this represents a serious

long-term shift in corporate travel away from commercial flights to company-owned planes remains to be seen. By fall 2022, US domestic business travel had reached about two-thirds of its pre-pandemic level, while international business travel remained at about half.²⁷ Business flight's prospects for 2023 remain highly uncertain as companies cut back on nonessential expenses and brace for inflationary headwinds.



While air cargo declined in 2022, long-term prospects appear bright. Global air cargo declined slightly overall in 2022 beginning in March,²⁸ after outperforming pax traffic from the pandemic's 2020 outbreak through 2021 (and providing a critical cash flow lifeline to many passenger airlines) with 18 months of record-setting volumes and revenues.²⁹ Lower cargo volumes were due mainly to reduced consumer online shopping and a post-lockdown shift from goods to services, as well as somewhat restored pax bellyhold space. Meanwhile, demand for main-deck freighter conversions continued to soar through 2022 as long-haul pax traffic remained relatively diminished.³⁰ Growth prospects in 2023 will likely be tied to high inventory levels and the future trajectory of China's strict anti-COVID-19

policies, which were relaxed in December for the first time following widespread protests. Nonetheless, long-term growth prospects for the air freight industry appear very promising. Boeing forecasts global air cargo traffic to double over the next two decades, increasing the world's freighter fleet by 60%, to more than 3,600 jets (with two-thirds of the fleet being conversions).³¹ Small- to medium-size cargo craft will likely also continue to undergo technological experimentation and innovation to develop greener civil fleets.

Military aviation: War in Europe spurs growth and innovation

The central narrative of the world's defense industry over the last decade — and its trajectory for the decade to come — is likely to be unrelenting growth.³² Total global military spending in 2021 surpassed the \$2-trillion mark for the first time, increasing by 0.7% in real terms and rising to USD\$2.113 trillion.³³ The five largest contributors to this record all-time high were the US, China, India, the UK and Russia, which together accounted for 62% of defense expenditures.³⁴ However, with 2021's steep economic recovery over the prior pandemic lockdown year, military spending fell marginally as a share of global GDP, from 2.3% in 2020 to 2.2% in 2021.³⁵ Collectively, the top ten global defense companies earned \$485.5 billion, with average revenue growth of 7.1%.³⁶ Revenues of the world's top 100 defense companies likewise climbed for the sixth year in a row.³⁷

For military aviation manufacturing, Russia's invasion of Ukraine could have profound, long-lasting consequences. The Ukraine war has amounted to a "beta test" for some newer, advanced Western weapons systems, including Delta, an American real-time information system used for precision targeting.³⁸ The US and other NATO countries are also draining arsenals of many weapons directly related to aviation,



new and old, and struggling to replenish them.³⁹ The list includes missiles, rockets and drones of many kinds as well as anti-aircraft and other surface-to-air defense systems. It also includes aircraft such as light attack jets from Lithuania,⁴⁰ helicopters from the UK⁴¹ and various models of Soviet-era MiG jets from former Soviet-bloc nations⁴² — to name just a few. Many older (especially Soviet) systems cannot and should not be replenished by more of the same. Eastern European members of NATO are especially eager to acquire newer and more advanced Western munitions and materiel.⁴³ The Biden administration announced \$2.2 billion in military aid in September 2022 to 18 nations, from the Baltic to the Mediterranean, precisely to address this urgent need.⁴⁴

Meanwhile, Ukraine's creative innovations in drone warfare,⁴⁵ which have given it an edge over a much bigger adversary,⁴⁶ could have a transformative effect on both military technology and tactics. Some ad hoc, homemade adaptations of commercial drones have been surprisingly effective.⁴⁷ A late-October strike on the Crimean port of Sevastopol revealed that Kyiv had even invented a clever — and devastating — sea-surface drone, apparently based on a jet-ski.⁴⁸

Strikes on airfields and other targets deep inside Russian territory in early December⁴⁹ appeared to show that Ukraine had developed an aerial drone with the astonishing range of up to 1,000 kilometers.⁵⁰ Apparently based on a Soviet-manufactured surveillance UAV, the weapon could reach most of European (western) Russia.⁵¹ As Russia struggled to respond, the two countries by late 2022 were in effect fighting “the first full-scale drone war” ever⁵² — potentially a turning point in military aviation history.

An era of sustained, elevated demand in military aerospace is almost certainly upon us. While the precise contours of the surge cannot yet be mapped, the industry may well look back on Russia's invasion of Ukraine as a moment in military aviation history as decisive as either of the twentieth century's world wars. And in July 2022, industry leaders took note of an ominous unprecedented joint address by FBI and MI5 officials warning against the threats posed by Chinese espionage to long-term global economic security.⁵³ As they said, echoing statements by Taiwanese officials, a Chinese invasion of Taiwan, were it ever to take place, would dwarf the Ukraine war's disruptions.⁵⁴



Technological innovation: Leaders seek to green the global fleet

Demand for more fuel-efficient aircraft and cleaner fuels has been building for years. The unprecedented, record-setting spikes in jet fuel prices⁵⁵ sparked largely by the Ukraine war has only intensified the urgency for greener aviation. Indeed, this partly explains 2022's surge in green-aviation start-ups, as explained in our recent deep-dive analysis based on the 2022 edition of PwC's global aerospace and defense: Annual performance and outlook. The accelerating demand to decarbonize aviation is already stimulating technological research that could lead to important breakthroughs.⁵⁶ Looking ahead, we foresee that the aircraft of the future will be lighter, and some may be radically different in form from what we know today.⁵⁷ A raft of new battery technologies could help accelerate the development of electric and hybrid-electric aircraft, and even potentially enable so-called flying cars to transform commuting around major cities through urban air mobility — before the end of this decade.⁵⁸

American Airlines gave a strong boost to electric aviation in 2021-22 by pre-ordering 250 VX4 “flying taxis”⁵⁹ from the UK firm Vertical Aerospace (VA),⁶⁰ with electrical power units (EPUs) developed by Rolls-Royce in place of engines. Pending regulatory approval, the craft could be in service in 2025. VA announced it has 1,400 other such conditional pre-orders from top airlines globally. United likewise has placed a big bet on electric aircraft, announcing in September 2022 an order for 200 planes from Eve Air Mobility, an Embraer subsidiary, on top of 200 the airline ordered in 2021 from California's Archer Aviation. It's not only urban commuting that's greening: Hawaiian Airlines is investing in “seaglidors,” all-electric craft that fly just a few feet above water and could partly replace conventionally fueled interisland flight by 2028.⁶¹



At the same time, growing industry-wide commitments to developing sustainable aviation fuel (SAF)⁶² — synthetic and biofuels — are also driving innovation, with support from the US Department of Energy.⁶³ The widespread adoption of SAF for large commercial airliners faces significant challenges,⁶⁴ and hovers today at around just 1% of fuel available on the market.⁶⁵ Nonetheless, the target of 10% SAF by 2030 has become widely accepted by both PAX and freight companies over the last two years.⁶⁶ Meanwhile, multiple US government agencies have adopted the goal of 100% SAF by 2050.⁶⁷ And IATA has set a convergent goal of achieving net zero by the same date, with 65% SAF.⁶⁸

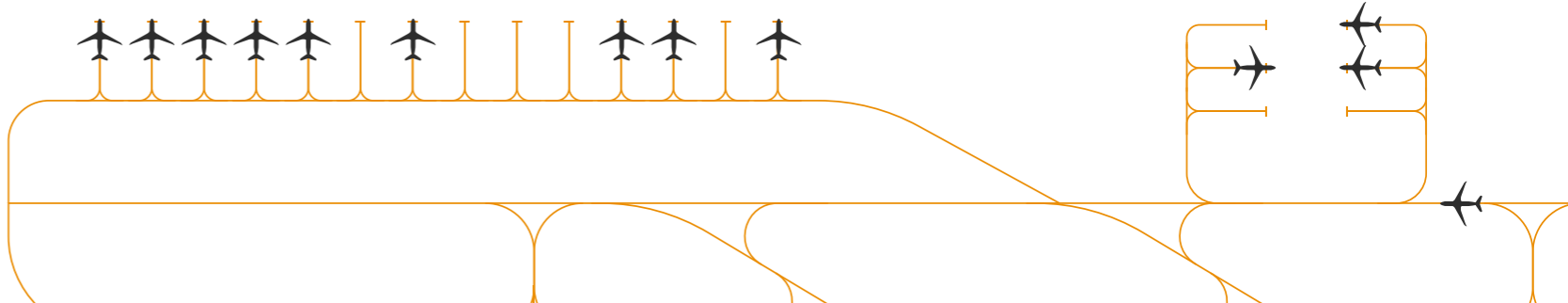
Close analysis of carbon offset programs,⁶⁹ including those popular in civil aviation, underscores the urgency of SAF R&D: the carbon offset market is still far from the maturity needed to make it truly effective in reducing emissions. However, as PwC has reported with regard to EU SAF targets, analysis also indicates that SAF production at scale will dramatically lower costs and could result in more rapid adoption.

Meanwhile, experiments in making conventional fuel-burning engines more efficient continue: Airbus announced plans in mid-2022 to test open-fan turbine engine on an A380 that could reduce carbon emissions by 20%,⁷⁰ and the Australian company Aviation H2⁷¹ announced in May 2022 its plans for the first ammonia-powered jet flight in 2023.⁷²

Supersonic civil aircraft are attracting investor and major airline interest as well. For example, both United and American have committed to purchasing Boom’s supersonic Overture jet, which is designed to be the world’s fastest sustainable supersonic airliner, capable of flying on 100% SAF.⁷³ Overture has also attracted defense interest, with Northrop Grumman Corporation and Boom Supersonic announcing

that the companies will work together to offer the US government and US allies a supersonic special-mission aircraft.⁷⁴ A field long dominated by defense contractors saw acceleration in 2022 of a shift toward civil aerospace startups such as Atlanta-based Hermeus,⁷⁵ which raised \$100 million in funding in March.⁷⁶ The full disruptive potential of passenger or cargo craft that could, say, cross the Atlantic in two hours may not be realized for a decade or more. Yet advances in AI, heat-resistant materials and engine technology are likely to keep the industry on a rising trajectory toward hypersonic craft. Years (and billions of dollars) further off still are single-stage-to-orbit hypersonic planes launching satellites and other cargo out of Earth’s atmosphere. Other US companies in the field to keep an eye on are Houston-based Venus Aerospace⁷⁷ and Radian Aerospace⁷⁸ in Bellevue, Washington.

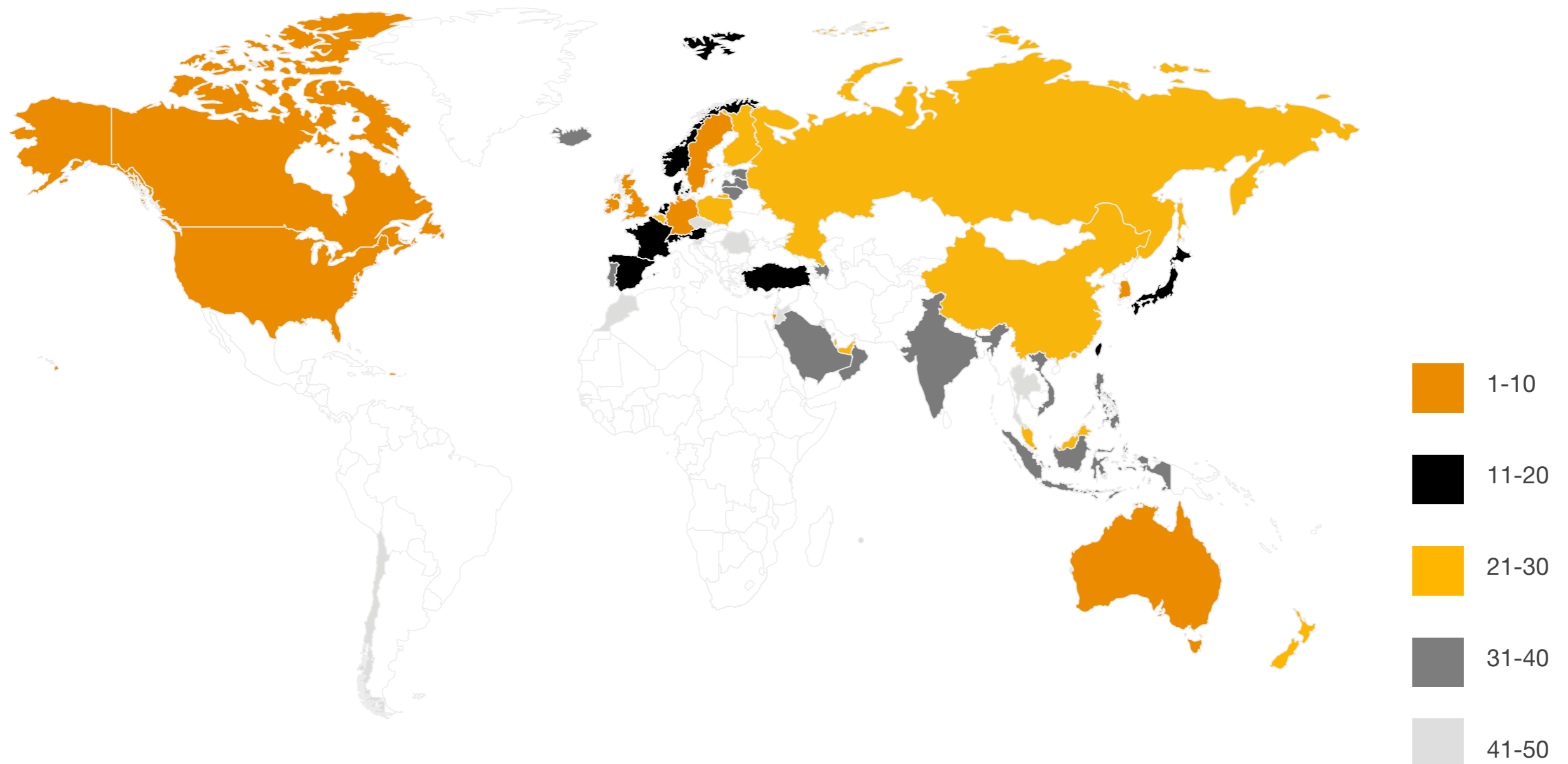
Speed need not be aviation’s only new story. A long-defunct mode of air travel gave signs of reawakening in 2022: airships. In an intriguing development linking this year’s 4th- and 5th-ranked countries in our rankings, the Spanish airline Air Nostrum ordered a fleet of 10 Airlander 10 100-passenger helium airships⁷⁹ manufactured by Hybrid Air Vehicles (HAV)⁸⁰ in Yorkshire. The blimps are slated to go into service in 2026 on regional routes in Spain. They will boast a range of 4,000 nautical miles, cruising low and slow, at up to 20,000 feet and 80 mph. Compared to comparable-capacity jets, the HAV craft could reduce emissions by 75% (a diesel model) to 90% (a hybrid model), while also being able to take off and land almost anywhere. As more countries announce mandates for decarbonizing short-haul domestic and regional routes, could we witness a new era of dirigibles?



Country rankings

Our rankings

The PwC rankings are based on a weighted score of category and subcategory rankings. The categories for our country rankings are cost, economy, geopolitical risk, infrastructure, labor, industry and tax policy. The categories for our state rankings are the same, with one exception: since we consider geopolitical risk to be similar for all states, we exclude it from state rankings. Each category comprises multiple discrete metrics that are aggregated and weighted to arrive at the final rankings. While both state and country rankings use comparable metrics, there are slight differences in each measure's relevance to the ranking and the availability of quantitative information.



Top 10 country/region rankings for aerospace manufacturing attractiveness

Country/ region	Final Rank	Cost	Labor	Infrastructure	Industry	Geo Political Risk	Economy	Tax Policy
Singapore	1	14	4	4	5	1	7	7
United States	2	4	3	8	2	2	6	25
Canada	3	2	1	20	7	5	12	19
United Kingdom	4	17	7	10	8	13	4	27
Israel	5	7	13	22	13	21	13	13
Ireland	6	3	16	28	20	18	25	4
Germany	7	20	12	7	3	7	16	46
South Korea	8	16	28	2	19	26	5	21
Australia	9	4	21	17	11	12	10	28
Sweden	10	15	11	15	14	11	27	31

Below is a closer look at the top five countries in our ranking. Our top-three countries this year — Singapore, the US and Canada — have all maintained a top-three status since 2017, for an impressive five years running. Just below the medalists' podium, however, there is news, as the UK rises from 7th place in 2020 to 4th this year, while Israel shoots up to 5th from 18th. (It is worth noting that 2020's 4th- and 5th-place finishers, South Korea and Australia, respectively, both retain top-ten status in our survey and remain highly appealing targets for investment.)

Singapore

Singapore, which has never ranked below third place in our survey, tops our list this year with a significant uptick in our metric for geopolitical risk (to 1st place, from 12th) despite dropping from 3rd to 14th place in cost.


Government support for the industry in 2020-21 that focused on labor force investment — mainly reskilling in anticipation of an altered sector post-pandemic ecosystem⁸¹ — appears to have paid off. Singapore aviation is expected to have restored up to 90% of its workforce by end 2022,⁸² and its A&D industry is projected to grow with a CAGR of 12% in 2023-28.⁸³ Singapore typically accounts for 10% of global MRO output, and 2022 saw important investments in this area, as major players expanded their operations. In February, Collins Aerospace announced a long-term MRO agreement with Singapore Airlines and Scoot, the carrier's low-cost subsidiary, to support their fleet of 55 Boeing 787s.⁸⁴ Safran Electronics & Defense Services Asia also announced a major expansion of MRO activity at its Singapore site.⁸⁵

As in many other countries, the Singaporean aviation defense sector was well insulated from pandemic demand shock and even grew in 2020. In an effort to counter Chinese military threats, Singapore launched a significant procurement expansion program in 2022, including the inauguration of a new Digital and Intelligence Service branch, which could drive defense sector growth and attract foreign investment going forward.⁸⁶

United States

In 2021, the A&D sector continued to support nearly 2 million US jobs.⁸⁷ The US A&D market is expected to grow from \$700.3 billion in 2021 to \$755.24 billion by the end of 2022 (i.e., at a CAGR of 7.8%) and to reach \$1047.07 billion in 2026 (CAGR of 8.5%).⁸⁸ Final figures for US A&D exports for 2021-22 are not yet available as of this report's publication but will likely be driven by massive American donations of materiel to Ukraine. There is little doubt that exports will grow and solidify A&D as a leading US export industry. Foreign direct investment in US aerospace reached \$22.4 billion in 2020, strongly led by UK firms.⁸⁹ US aerospace FDI grew slightly in 2021, though the number of projects recorded remained at about half of 2019 figures.⁹⁰

Federal legislation passed in 2022 constitutes a major effort to secure US microchip supply chains and is likely to have significant consequences for US A&D. The problem at issue: US firms account for 48% of global microchip sales, but domestic manufacturers today make only 12% of them (down from 37% in 1990).⁹¹ The law, Creating Helpful Incentives to Produce Semiconductors for America, passed in July 2022 and known as the CHIPS Act, seeks to restore US semiconductor R&D and manufacturing — and especially to protect the sector from industrial espionage and competition.⁹² The CHIPS Act could have profound implications for the entire US semiconductor ecosystem, as PwC has detailed — and perhaps especially for A&D. However, the 117th Congress ended without voting on the Facilitating American-Built Semiconductors (FABS) Act,⁹³ which would have added investment tax credits for US semiconductor manufacturers to the mix. Some of the FABS Act's provisions might, however, be revived in future legislation.



A convergent trend dating back to over a decade that has attracted renewed attention recently is the nearshoring of US (and Canadian) A&D components manufacturing to Mexico.⁹⁴ This long-term trend has seen explosive growth in recent years, fueled by the United States–Mexico–Canada Agreement (USMCA), which went into effect in July 2020 — NAFTA 2.0, in effect — and by pandemic supply chain disruptions, as well as the ongoing trade tensions with China. Nearshoring by US companies to Canada in the aerospace sector could also emerge as a growing trend, especially in the area of software development, a niche that Canadian federal and provincial government policy supports⁹⁵ and in which top Canadian firms⁹⁶ have considerable expertise.

US military spending in 2021 reached \$801 billion, a drop of 1.4% from 2020 (representing a slight decrease in GDP terms, from 3.7 to 3.5%).⁹⁷ Regarding prospects for aviation manufacturing investment, a perhaps more important trend in priorities at the Pentagon is a strong shift toward R&D. Between 2012 and 2021, US funding for military R&D rose by 24%, while arms procurement funding fell by 6.4%.⁹⁸ Convergently, while military R&D spending fell by just 1.2% in 2021 vs. 2020, arms procurement spending fell by 5.4%.⁹⁹ However, military suppliers in several states were buoyed by the release of the Air and Space forces combined budget proposal for FY2022, including \$156.3 billion for the Air Force and \$17.4 billion for the Space Force, reflecting increases of 3% and 13.1% over FY2021, respectively.¹⁰⁰ Budgetary priorities — likely to entail significant upsides for manufacturers in both cases — emphasize modernization of the Air Force and rapid evolution of the Space Force. The latter’s procurement budget, growing by \$456 million to acquire National Security Space Launch Vehicles for the anticipated launch of security and intelligence satellites, could prove especially stimulative to R&D innovation.

Canada

Canada holds its 2020 bronze medal this year, shooting up from 36th to 11th place for economy while ranking number one in labor for the third year in a row. With 5% of worldwide sales in aerospace (the province of Québec alone has 3%), Canada is among the globe’s largest A&D markets, ranking first in civil flight simulator production, third in civil engine production and fourth in civil aircraft production.¹⁰¹ Canada’s aerospace sector is strongly civil oriented (about 80% of production) and intensely active in R&D (five times more R&D intensive than the Canadian average for manufacturing).¹⁰² Montréal ranks third behind Seattle and Toulouse among world aerospace hubs and alone accounts for over 70% of Canadian aerospace R&D.¹⁰³ The MRO subsector, 41% of which is located in Western Canada, has grown 26% over the last decade to account for 31% of sector activity today (with the remaining 69% in manufacturing).¹⁰⁴

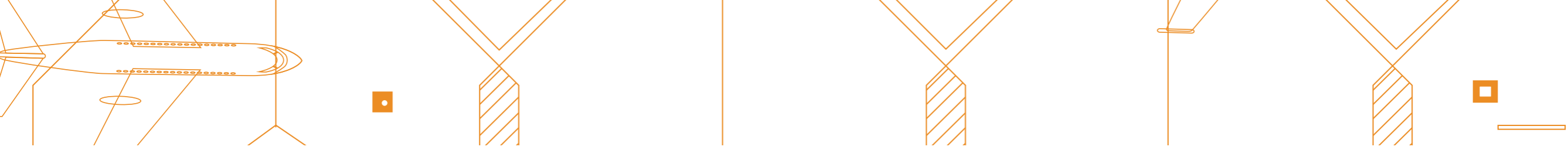
Aviation supply chains across the 49th parallel are tightly integrated in a relationship of mutual import-export: Canada sent nearly 57% of its A&D manufactures to the US in 2021, while about 60% of total sector exports arriving in Canada were American in 2019.¹⁰⁵ Multiple bilateral agreements favor US aerospace companies investing in Canada over other foreign markets, while ensuring that US and Canadian firms compete on a level playing across the continent. Major players include Bombardier, Bell Textron, Pratt & Whitney Canada, Safran, Goodrich, Boeing, GE, Rolls Royce and Lockheed Martin. Given the country’s vast landmass and thinly spread population, successful foreign investment typically relies on long-term relationships with local sales representation and/or bespoke distributorships.

While the pandemic disrupted Canada’s aerospace industry, it is now rebounding. Alberta’s Edmonton International announced in 2022 a proactive program to build infrastructure to accommodate hydrogen fuel aircraft by 2025 as part of a comprehensive ESG initiative, hoping to take the lead in stimulating demand for the green fuel (a win-win for the province, which currently produces 60% of Canada’s hydrogen).¹⁰⁶ On the other side of the country, Canada signed a “hydrogen alliance” with Germany in December 2022 to create a “transatlantic Canada-Germany supply corridor” by 2025.¹⁰⁷ The plan is to provide hydrogen and ammonia generated by wind power off the west coast of Newfoundland to help Germany to not only decarbonize its industries — and aviation specifically — but to reduce its dependency on Russian energy.

Approval of military spending in Canada is typically a protracted and politically fraught process. In 2010, for example, a Conservative government announced a CDN\$9-billion program to replace the country’s CF-18 fighter jets with US-made F-35s. Prime Minister Trudeau’s incoming Liberal administration canceled the still pending purchase in 2015, yet is now once again in discussion with Lockheed Martin to buy the jets.¹⁰⁸ Russia’s unprovoked invasion of Ukraine — and in particular Russia’s claimed use of hypersonic missiles¹⁰⁹ — has changed the budgetary calculus, with potentially significant consequences for defense aviation manufacturing in both countries. In June 2021, Canada announced the commitment of CDN\$5 billion over six years to comprehensively modernize the badly aging systems¹¹⁰ of the North American Aerospace Defense Command (NORAD).¹¹¹ The sole Canadian-American joint military program, NORAD was launched in 1958 to track and counter incoming nuclear-armed Soviet bombers and last upgraded four decades ago. The parameters of the upgrade are not yet clear, but it’s likely to involve an AI component for rapid incoming threat analysis. Some experts contend that NORAD should even be expanded to include Greenland if it is to effectively protect against not

only Russia but also Chinese and North Korean missiles.¹¹² Canada’s long-anticipated announcement in November of 2022 of a new Indo-Pacific strategy to confront Chinese military and cyber threats will also likely lead to increased military spending, though by exactly how much remains to be seen, since much of the committed USD\$1.7 billion will allocated to cyber security.¹¹³





United Kingdom

The UK climbs from its 2021 7th spot to 4th this year, with improvement in our metrics for economy (from 13th to 4rd) and cost (from 29th to 7th), owing in part to the pound's recent weakness. The UK's A&D industry is the world's second largest, after the US, and is intensely export-driven, despite not producing any large civil aircraft.¹¹⁴ In 2021, the UK's civil aerospace turnover amounted to \$32 billion, with 98% of production exported. Its defense industry turnover was \$33 billion, with nearly half exported, and its space industry turnover was \$22 billion, with \$8 billion exported.¹¹⁵

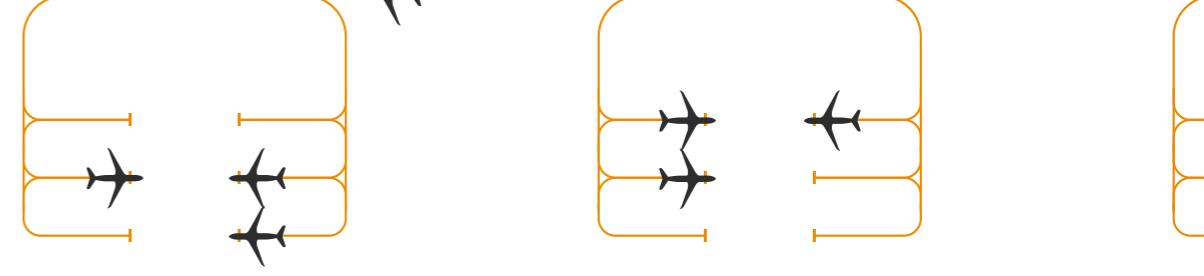
The UK's highly mature supply chain discourages new entrants unable to dedicate significant resources to break in. However, in the aftermath of Brexit, the UK is actively encouraging foreign investment, and acute and persistent backlogs for British Tier 2 A&D suppliers (and below) widen prospects for new market entrants to increase capacity and simplify local supply chains. Top R&D and manufacturing opportunities include aerodynamics, propulsion, structures and advanced systems (such as avionics), with an emphasis on advanced digital tools.¹¹⁶

More than 3,000 aerospace companies operate in the UK, providing nearly 300,000 jobs directly and indirectly.¹¹⁷ The UK is a global leader in R&D and manufacturing of engines, landing gear and wings — including the wings for all Airbus platforms, assembled in Broughton¹¹⁸ — and boasts a thriving MRO sector. Boeing's first European manufacturing site is in Sheffield¹¹⁹; while Rolls-Royce produces engines for more than 35 types of aircraft.¹²⁰ The UK also leads in helicopter manufacturing, dominated by Leonardo and an Airbus subsidiary.¹²¹ Some estimates foresee that drone-related business, both civil and military, could increase the UK's GDP by \$53 billion by 2023 and create up to 600,000 new jobs,¹²² offering major market opportunities for providers of related platforms, sensors and software. The growing space sector is especially

strong in small and nano-scale satellites, with seven new launch sites currently planned. Non-UK companies seeking local business relationships could consider the Harwell Space Cluster,¹²³ which hosts nearly 100 top space organizations, as well as the National Space Propulsion Test Facility, opened in 2021.¹²⁴

The government released an ambitious General Aviation Roadmap in 2021. This strategic infrastructure scheme seeks to expand capacity for manufacturing, MRO, aviation services and R&D across the country's network of local, regional and national/international airfields.¹²⁵ Investment opportunities could emerge for companies able to articulate specific projects that align with the Roadmap's broadly outlined goals, especially in the area of decarbonization and zero-emission aviation technologies, which are given priority.





Israel

Israel rockets to 5th place this year — its highest ranking ever, and up from 18th in 2021 — on the strength of significant growth in our metrics for cost, labor, industry and geopolitical risk.

Israel's defense-heavy A&D industry is the inverse of Canada's civil-dominated sector. Israeli defense spending averages \$15–18 billion annually.¹²⁶ The US provides Israel \$3.3 billion in Foreign Military Financing each year, and current US military aid to Israel (FY2019-28) is committed at \$33 billion.¹²⁷ The Israeli and American A&D industries are closely linked. In particular, Israel is a market for US-made components/subsystems, including in aerospace. Israel has ranked as the world's 10th-largest arms exporter for the last five years.¹²⁸ Israel's top weapons exports, at 20% of the total, are all aviation-related: missiles, rockets and air-defense systems.¹²⁹ Israeli companies also have leading expertise in space and airborne reconnaissance systems, radar, UAVs and avionics.¹³⁰

The most important recent development in the sector is a gigantic boost in Israeli weapons exports, which hit a record \$11.3 billion in 2021 (a 33% increase over 2020), largely as a result of the Abraham Accords.¹³¹

Israeli companies, including the parastatal (but publicly owned) Israel Aerospace Industries (IAI; one of the country's top-three defense firms)¹³² sold defense systems to Morocco, Bahrain and the UAE for \$800 million in 2021.¹³³ The surge in weapons sales underscores one of the strongest underlying motivations behind the treaties as well as their most significant effect to date. Israel's military contractors have benefited more from the Accords than any other economic sector of any of the countries involved.¹³⁴ The Israeli Ministry of Defense estimates that Israel's defense exports to Arab countries will surpass \$1 billion in 2022 (including IAI's sale of the Barak-8 surface-to-air missile system to Morocco for \$560 million, which will be counted toward 2022 export figures).¹³⁵ Moreover, in the wake of Russia's invasion of Ukraine, many European countries that have previously been reluctant to buy arms from Israel because of the situation in the Occupied Territories have dropped their objections. Europe is now the top regional purchaser of Israeli weapons systems (at 41% of Israeli defense exports). This factor in part accounts for another decisive change in the Israeli A&D industry: the surge in government-to-government transactions, which shot up from \$900 million to \$3.4 billion in 2022.¹³⁶



Notable events in other countries

Ireland

Ireland has landed 12th to 14th in our rankings in every year but one since 2014. This year's impressive rise to 6th place reflects improvements in metrics for cost (from 14th to 3rd place), labor (28th to 16th) and geopolitical risk (from 36th to 18th). This last figure likely reflects Ireland's relative political stability and economic resilience (compared to many other European nations and some members of NATO in current wartime-like conditions) and its favorable investment and trade climate (compared to uncertainties in the post-Brexit UK).

The world's aircraft leasing market was valued at some \$50.4 billion in 2021 and is expected to expand at a CAGR of 3.1% to reach about \$60.5 billion by 2027.¹³⁷ Ireland is the center of the industry,¹³⁸ hosting the global or regional headquarters¹³⁹ of most of the world's major aviation leasing companies,¹⁴⁰ including AerCap,¹⁴¹ the world leader, while accounting for about half of the global leased fleet.¹⁴² Aircraft Leasing Ireland, comprising C-suite executives from leasing companies doing business in the country, advocates for the industry with the Irish government.¹⁴³ One challenge to the industry is the confiscation — theft, effectively — of more than 400 leased aircraft by Russian operators since the invasion of Ukraine began (116 owned by AerCap alone). By mid-2022, Russian airlines had returned just a handful of leased jets.¹⁴⁴ However, the Kremlin announced a policy encouraging purchase of leased craft in September¹⁴⁵ — a plan that may not materialize so long as restrictions on financial operations with Russia imposed by the US and EU remain in place. While the insurance claims and litigation now underway¹⁴⁶ may take years to resolve, the long-term profitability of the leasing industry as a whole — and of leasing companies based in Ireland — is unlikely to be highly impacted.

Ireland's aerospace industry has emphasized MRO in recent years, with recent expansions by Panasonic Avionics and Dublin Aerospace,¹⁴⁷ as well as aviation software development.¹⁴⁸ As in Canada and the UK, local end-users strongly prefer international suppliers to have locally based partners/representatives. Aerospace product and parts manufacturing companies active in Ireland are highly diverse and mainly small to midsize players.¹⁴⁹

In February 2022, the republic's government published an in-depth review of the country's entire defense capability,¹⁵⁰ which led in turn to the approval of a High Level Action Plan¹⁵¹ that foresees Ireland's defense budget rising to €1.5 billion by 2028. The plan includes important upgrades to military radar capabilities and the purchase of new helicopters and long-range aircraft.¹⁵² These priorities could provide US defense technology suppliers, among others, with significant procurement opportunities over the next five years.





Spain

Among countries landing just below our top ten, Spain stands out for the biggest upward leap, to 13th place this year from last year's 26th. Even more notable are Spain's improvements in multiple metrics: in cost, from 42nd place in 2020 to 11th in 2021; in labor, from 40th to 26th; and in economy, from 73rd to 26th. In fact, Spain's showing this year reflects not only improvement in the sector's outlook in 2021-22 but at least a decade of steady growth.

The Spanish A&D industry overall has recovered impressively to very nearly its 2019 level and is now rated a best prospect sector by the US Department of Commerce, offering excellent opportunities for investment (local partnerships are typically crucial).¹⁵³ Spain's aerospace sector ranks 5th in Europe in terms of turnover and employment and 8th in turnover globally; rapid growth has been fueled by sustained investment in R&D, to which Spanish companies have dedicated more than 11% of turnover for a decade.¹⁵⁴ The industry is concentrated around Madrid and in Andalusia. Likely prospects for US and other firms in this market involve manufacturing of new aircraft and engines, as well as highly technical products such as composites, in which local industry has well-developed expertise.

The Spanish space industry is undergoing a shift from launches to satellite operations. Space centers in Spain include the European Space Astronomy Center, NASA's Madrid Deep Space Communication Complex and Boeing's European Center for Research and Technology; the country will launch its own Spanish Space Agency in 2023. The government has identified the aerospace sector as a strategic priority for to invest economic recovery, planning €4.5 billion by 2025 (with about 50% private-sector matching).¹⁵⁵ The government has also announced dramatic increases in military spending, in part to meet Spain's NATO commitments.¹⁵⁶

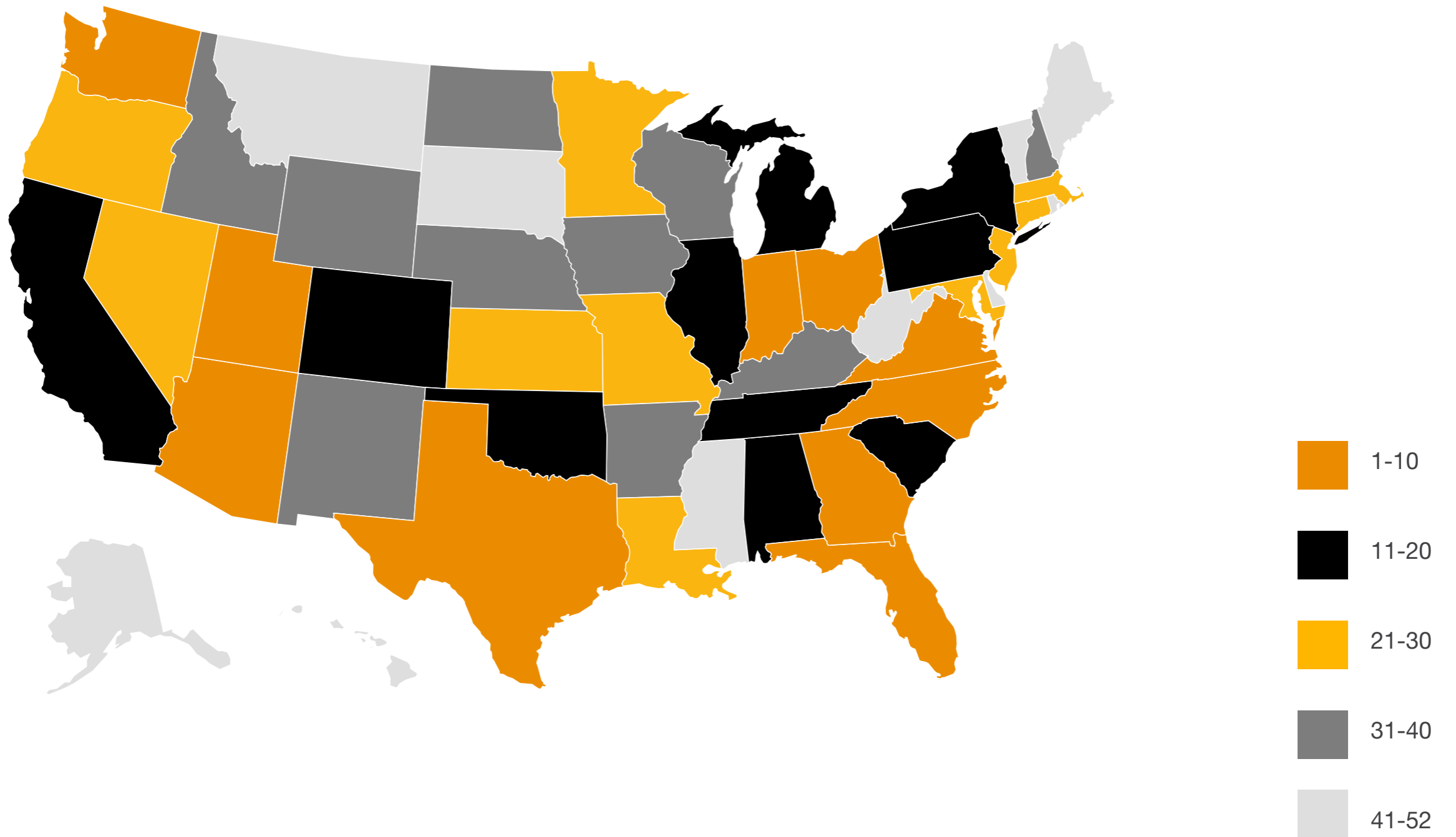


Considerations for your business

Our country rankings this year suggest a global aerospace industry in a state of flux. This comes as no surprise, given the complexity of doing business in the current phase of late-pandemic recovery. Across civil aviation, in both PAX and cargo, patterns of traffic and leasing remain shifting and unsettled. The sudden increase in military procurement triggered by the war in Ukraine, especially in the NATO countries, is also altering the global A&D picture. Despite current economic uncertainties, opportunities for successful investment abound in many markets.

The improved rankings for the UK, Israel, Ireland and Spain noted above provide particularly strong evidence of this changing landscape. So do other noteworthy shifts in our rankings: last year's top ten, for example, included countries that have fallen this year, with Japan sinking from 6th to 18th place and Switzerland from 9th to 12th. Our survey this year also shows that, while every sector of the global A&D industry is ever more globalized, securing the reliability, resiliency and transparency of manufacturers' supply networks has never been more critical. Strong collaborative relationships remain a key to success on a regional and global scale, as does support by investors of local training and education pipelines.

State rankings



Top 10 state rankings for aerospace attractiveness

Country/ region	Final Rank	Cost	Labor	Infrastructure	Industry	Economy	Tax Policy
Texas	1	28	8	13	2	1	1
Georgia	2	25	13	4	3	9	23
North Carolina	3	16	21	8	6	8	16
Ohio	4	36	32	4	4	10	7
Indiana	5	18	33	16	8	2	13
Arizona	6	17	10	13	5	21	15
Washington	7	49	3	16	7	16	1
Florida	8	37	23	9	9	5	14
Virginia	9	9	7	11	23	26	27
Utah	10	7	9	26	22	23	21

Let's take a closer look at notable industry initiatives or other indications of significant emerging or potential growth and opportunity among the five highest ranked states. This year's top-five states are perennial leaders. All ranked in last year's top ten, as all five have done since 2016.

In fact, our top-ten lists for 2020 and 2021 include the same states in an only slightly reshuffled order, with just two exceptions. Virginia notches up to 9th place this year from 11th in 2020, while last year's tenth-place Kansas drops to 21st place. A plunge in the sunflower state's infrastructure metric (down from 2nd to 25th place) largely accounts for Kansas's slide in our ratings. However, the launch in mid-2022 of the Kansas Infrastructure Hub could soon restore the state's strength on this score. The Hub is designed mainly to coordinate the efficient spending of some \$3.8 billion in federal funds via state agencies and local entities. It could be worth keeping an eye on.¹⁵⁷



Texas

Texas, never below the top four in our survey since its inception, holds its 2021 top spot this year, also coming in first, notably, in our metrics for economy and tax policy. The Texan A&D industry directly employs more than 138,000 Texan workers at more than 1,800 installations that represent 18 of the world's top 20 aerospace manufacturers. Texas ranks 3rd in the nation in aerospace product and part manufacturing firms and 2nd in exports (valued at \$8.43 billion in 2022). The state is home to 15 military bases, including six active Air Force bases and NASA's Lyndon B. Johnson Space Center. The state also has two FAA-licensed spaceports, the Houston Spaceport and the Midland International Air and Space Port. SpaceX maintains commercial launch sites in Boca Chica and McGregor, and Blue Origin launches space tourism flights from Van Horn. Texas-based firms are also pioneers in urban air mobility R&D.¹⁵⁸ The state's colleges and universities invest heavily in aviation-related R&D and are national leaders in sector workforce development. Among several recent labor force-related initiatives, one stands out: In October 2022, the US Department of Labor's North Texas Job Corps Center announced a new partnership with the US Aviation Academy, the North Texas Job Corps Airframe and Powerplant Mechanics Advanced Training Program, to fast-track aviation maintenance technicians' training (compressing 24 months of training into just 12) — addressing a pressing industry-wide need.¹⁵⁹ That could prove a model for other states to emulate.

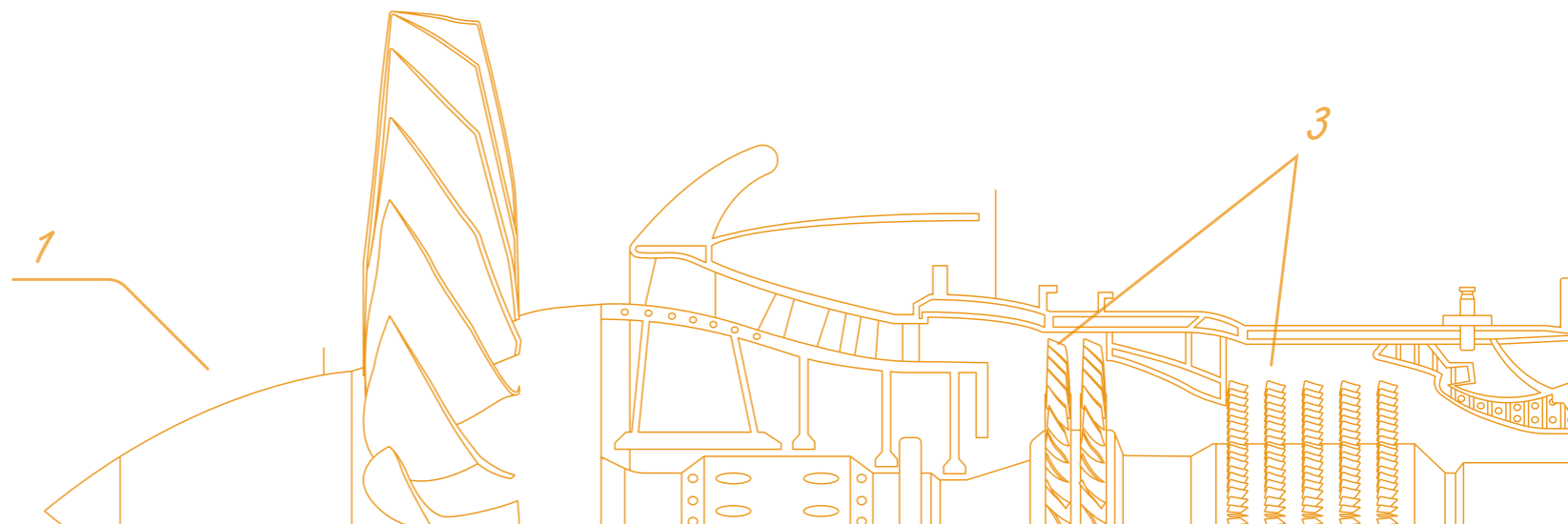


Georgia

Georgia, which has placed in the top four in our ranking since 2015, lands a strong 2nd this year. Aerospace products are the state's top export (\$9.19 billion in 2021) and its second-biggest manufacturing industry, with more than 800 companies and some 200,000 employees in aerospace-related industries generating \$57.5 billion in economic impact. Sector leaders active in the state include Lockheed Martin Aeronautics, Gulfstream Aerospace, Airbus, Hermeus, Pratt & Whitney and Universal Alloy Group, among others.¹⁶⁰ The Georgia Center of Innovation for Aerospace promotes collaborative business relationships to foster the state's growth in A&D.¹⁶¹ The state also has a robust aerospace education pipeline lead by Georgia Tech and reaching across several universities offering degrees in aerospace engineering and to five technical colleges with aviation programs, as well as a dozen high schools that offer training in the field. The state boasts many leading firms at the technological edge of aviation, including SpaceWorks, which is developing an array of solutions to the challenges of hypersonic and suborbital flight.¹⁶² The state also has advanced and growing capabilities in the area of unmanned systems (UAVs),¹⁶³ an area well poised to attract further investment. Archer Aviation Inc.¹⁶⁴ announced plans in late 2022 to locate an electric vertical take-off and landing (eVTOL) aircraft manufacturing facility in Covington, near the city's municipal airport. The site is expected to eventually create over 1,000 jobs and be capable of expanding to produce up to 2,300 aircraft annually, with production beginning in late 2024.¹⁶⁵

North Carolina

North Carolina, a top-ten finisher in our rankings in seven of the last eight years, reaches the number three spot this year, its best showing ever, with notable improvements in cost and infrastructure. Public investment led sector recovery and growth in 2022, with significant investment in two areas: infrastructure development at the state's 72 airports, and R&D in low-altitude civil drone applications and integration — an area in which the state has long been a national leader.¹⁶⁶ In January 2022, Boom Supersonic announced Piedmont Triad International Airport in Greensboro as the site for the Overture Superfactory, its first full-scale manufacturing facility.¹⁶⁷ The Superfactory expects to create 2,400 jobs by 2032 and to grow the state's economy by at least \$32.3 billion over 20 years. Boom will integrate workforce training by offering 200 internships through 2032 for students who attend publicly funded North Carolina universities, community colleges and technical schools. Also on track for 2022-23 is expansion of the state's hangar capacity for corporate aircraft¹⁶⁸ as well as a multi-business-partner program to develop the infrastructure and workforce needed to support growth in advanced air mobility market (including self-driving "flying cars" — aka passenger drones — and pilotless electric delivery aircraft).¹⁶⁹ Late 2022 saw two important ribbon cuttings: Summit Aviation's new parts manufacturing space in Greensboro¹⁷⁰ and Pratt & Whitney's turbine airfoil production unit in Asheville.¹⁷¹

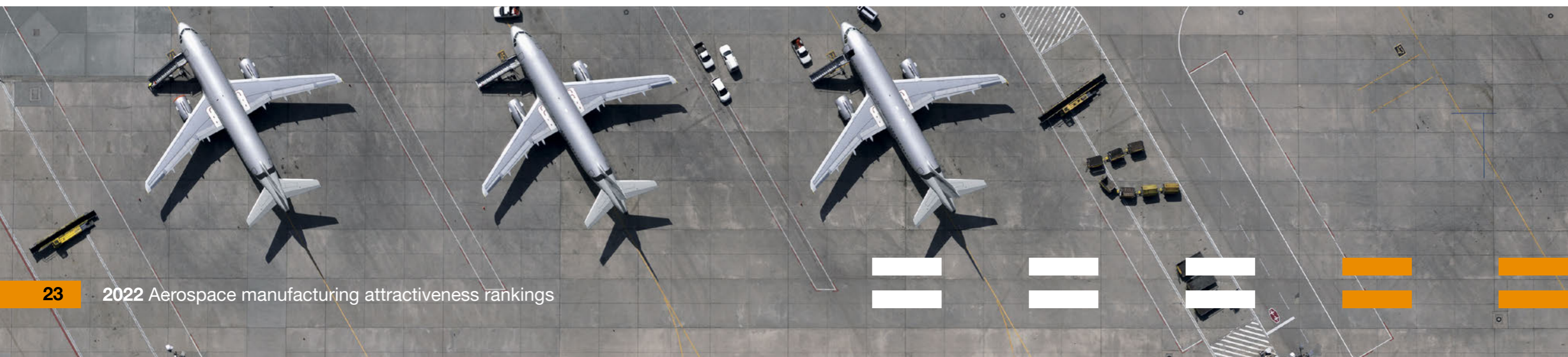


Ohio

Ohio, in the top nine in our survey since 2014 and the top three since 2016, slips slightly to 4th place this year, with a somewhat less robust showing on our labor, economy and tax policy metrics. Ohio's A&D sector¹⁷² encompasses some 550 aerospace companies, including OEMs and systems/components suppliers, employing about 37,000 people, and leads all states in supplying systems and parts to both Airbus and Boeing.¹⁷³ Other major players cover a wide spectrum of civil and military aviation, including GE Aviation, Eaton, Honeywell, the NASA Glenn Research Center (the agency's leading R&D facility), the Ohio Unmanned Aircraft Systems Center, Battelle Air Force Research Laboratory and Wright Patterson Air Force Base (the state's largest single-site employer). Ohio has recently developed particular strength in R&D and production capacity in UAV technology. Among the Ohio A&D employers who announced new hiring initiatives in 2022 were Hartzell Propeller,¹⁷⁴ Parker Hannifin, at its Gas Turbine Division Headquarters in Mentor,¹⁷⁵ and ZIN Technologies¹⁷⁶. Other 2022 news that reinforces the state's leading position in UAVs R&D included development of a new aircraft tracking system that could improve drone safety and of an unmanned system for training US fighter pilots.¹⁷⁷

Indiana

Indiana has cruised into a slot ranging from 5th to 8th place in each of the last seven years in our rankings and regains 5th place this year, where the state last landed in 2017. One major factor is improvement in cost — up to 18th from 28th place last year. Indiana's aerospace industry boasts an exceptionally high level of A&D export growth (nearly 29% on average since 2002)¹⁷⁸ and an impressive ratio of total economic output to workforce size.¹⁷⁹ The industry is relatively dispersed throughout all major urban areas across the state, and includes such pacesetters as Parker Aerospace, GE and Rolls-Royce, among many others.¹⁸⁰ As part of the state's recovery from the pandemic's acute phase, there has been some focus on clarifying multiple issues of property taxation affecting the state's 140-odd airports.¹⁸¹ As is also the case in other states leading in A&D, Indiana is also stressing workforce development and resiliency as the industry reemerges from the pandemic. The National Center for the Advancement of Aviation Act of 2021, passed in the state House in September 2022, would establish a private, tax-exempt organization to foster all aspects of aviation and aerospace education/training, promote sector employment (including support for military personnel seeking to transition to the civil sector) and aggregate economic and workplace safety data for the industry.¹⁸²



Notable events in other states

Alabama

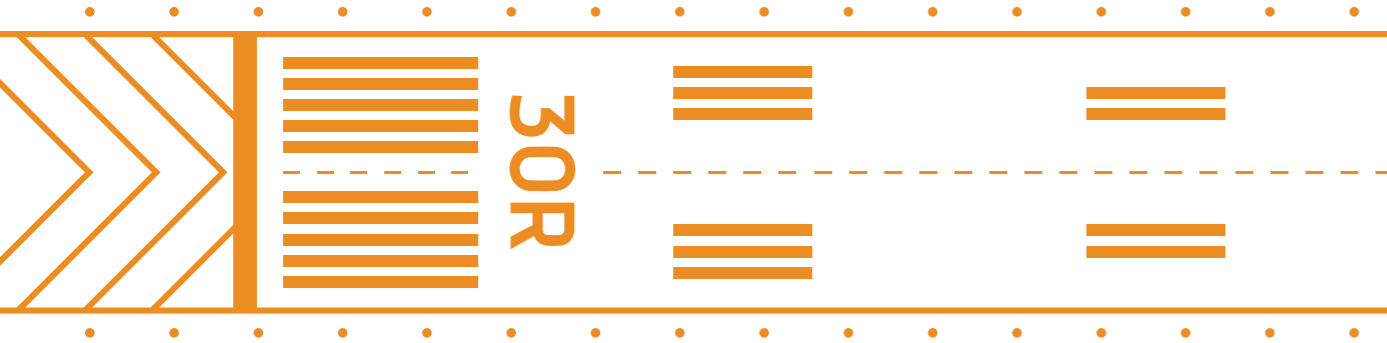
Alabama has landed at 11th to 13th place in our rankings in six of the last eight years and ranks 13th this year. The state’s A&D industry received a big boost in 2021 Q4 when Lockheed Martin inaugurated a 65,000-square-foot advanced hypersonic strike production facility in Courtland, where the company has maintained a manufacturing unit since 1994. The new facility will add 70 employees to the approximately 2,600 that Lockheed Martin already has in state.¹⁸³

Michigan

The Michigan Aerospace Manufacturers Association (MAMA) is developing the Michigan Launch Initiative (MLI), an ensemble of three sites founded on a public-private partnership model that together would constitute the Midwest’s first spaceport.¹⁸⁴ Separate vertical and horizontal launch sites would primarily focus on sending satellites into low-earth orbit, with a separate command-and-control center. The plan is controversial, however, partly owing to environmental concerns.¹⁸⁵ If the MLI is realized as currently conceived, it would have transformative effects on the space sector — in-state, regionally and even nationally — with revenues projected to reach about \$500 million by 2033.

Florida

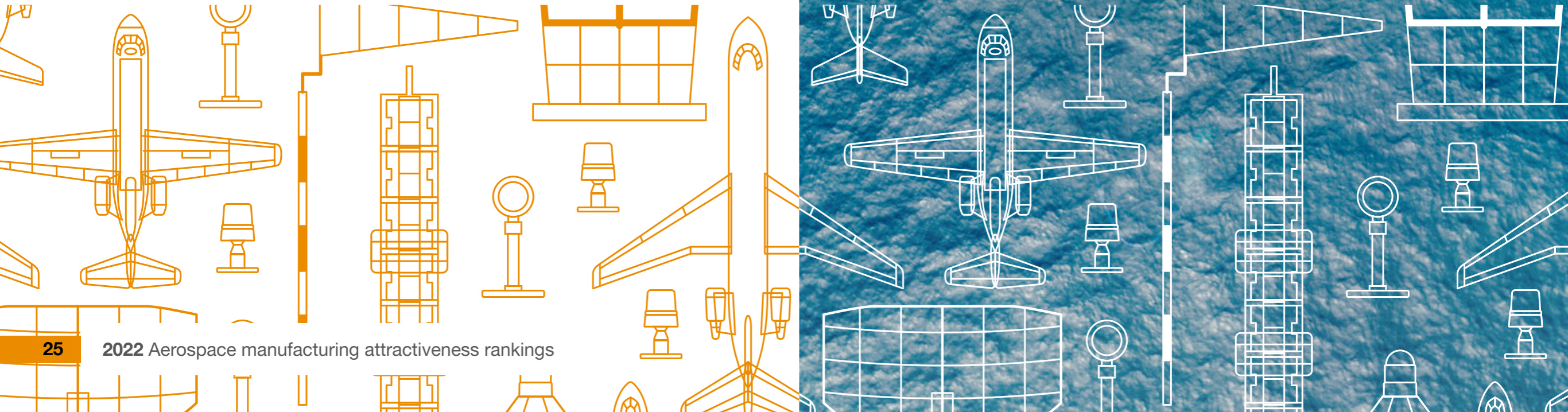
While the aerospace sector has been booming in Florida for many years, it has faced capacity challenges and stiff competition from other states. Space Florida, the state’s 16-year-old space agency, is aiming to grow the state’s skilled aerospace workforce with a multi-pronged effort.¹⁸⁶ In that context, Boca Raton-based Terran Orbital’s 2021 announcement of a \$300-million nanosatellite factory to produce up to 1,000 satellites annually was welcome.¹⁸⁷ As the first tenant of a 400-acre industrial park surrounding Cape Canaveral’s former space shuttle runway (unused since 2011), the site is expected to employ 2,100 people when it reaches full production in 2025. While Florida is well known for the diversity of its burgeoning A&D sector, the emphasis on workforce growth (as distinct from scale of investment or production) as a sector target is an interesting development — and one that other states might emulate.



Considerations for your business

This year’s state rankings emphasize the impressive resilience of US civil aviation manufacturing, despite the demand and supply-chain shocks of the COVID-19 era and the uncertainties of the current inflationary period. The need for workforce development — growth, diversification, education and (re-)training — and the efforts underway to address that need also emerge strongly as themes in many states.

States with well-developed supply networks to the US military, especially those that have invested in R&D capability enhancement in recent years, could expect strong growth in and beyond 2023. Competition among top states to attract space sector investment and green aviation startups reveals a growing emphasis on public-private collaborations and the development of new technologies that cross the boundaries among the civil, defense and space areas. Whereas innovation in past decades was often likely to cascade down into civil aviation from NASA and military R&D, today the reverse is just as plausible. Above all, the urgent priority to decarbonize all aspects of flight ensures that, while it is hard to predict which technologies will take the lead, the pace of change is likely to accelerate.



Endnotes

1. International Air Transport Association (IATA), [“Air Passenger Numbers to Recover in 2024”](#) (press release), 1 Mar. 2022.
2. Brad Holzhauer, [“Airline ticket prices are up 25%, outpacing inflation”](#) CNBC Select, 3 Nov. 2022.
3. Taylor Rains, [“Why airfare is so high in 2022.”](#) Insider, 18 Apr. 2022.
4. Joann Muller, [“Airline staff shortages expected to last into 2023.”](#) Axios, 19 July 2022.
5. David Nolletti, [“Fasten your seat belts: What’s ahead for aerospace manufacturing in 2022.”](#) Industry Week, 4 Jan. 2022.
6. [“Shortage of Skilled Aviation Engineers a Major Concern Post Pandemic”](#) JMC Group, 2021.
7. International Civil Aviation Organization (ICAO), [“ICAO Addresses Shortage of Skilled Aviation Professionals,”](#) 2009.
8. Spyros Georgilidakis, [“Pilot shortage? Yes, but aviation needs engineers, too!”](#) Mentour Pilot, 15 July 2022.
9. Lori Aratani, [“Delta, pilots reach proposed agreement that could boost industry pay.”](#) Association of Flight Attendants, 6 Dec. 2022 (originally published in the Washington Post, 6 Dec. 2022).
10. Willy Shih, [“The titanium supply chain for the aerospace industry goes through Russia.”](#) Forbes, 6 Mar. 2022.
11. Pratima Desai, [“Explainer: Importance of Russian titanium to global industry.”](#) Reuters, 1 Mar. 2022.
12. Niraj Chokshi, [“Airlines need new planes, but the supply chain has other ideas.”](#) New York Times (NYT), 26 Oct. 2022.
13. J. Kaspar Oestergaard, [“Airbus and Boeing report October 2022 commercial aircraft orders and deliveries.”](#) Forecast International Defense & Security Monitor, 17 Nov. 2022.
14. Ibid.
15. David Shepardson, [“U.S. says Chinese government blocking Boeing airplane purchases.”](#) Reuters, 28 Sept. 2021.
16. Su Wu, [“Boeing is ready to resume deliveries of the 737 MAX in China.”](#) Simple Flying, 21 Aug. 2022. See also: Scott Hamilton, [“Pontifications: Signs point to China OK soon for Boeing deliveries, orders.”](#) Leeham News and Analysis, 29 Aug. 2022.
17. Associated Press, [“Chinese airline receives first domestic long-range jetliner.”](#) ABC News, 9 Dec. 2022.
18. Niraj Chokshi, [“F.A.A. limits self-regulation privileges for Boeing.”](#) NYT, 31 May 2022.
19. Ben Schlappig, [“Report: China Eastern Boeing 737 crash was intentional.”](#) One Mile at a Time, 17 May 2022.
20. US Securities and Exchange Commission, [“Boeing to Pay \\$200 Million to Settle SEC Charges That It Misled Investors about the 737 MAX”](#) (press release), 22 Sept. 2022.
21. Niraj Chokshi, [“Delta Air Lines orders 100 Boeing 737 Max planes.”](#) NYT, 18 July 2022.
22. Oestergaard, [“Airbus and Boeing report.”](#) (see note 13).
23. Ibid.
24. Ibid.
25. Niraj Chokshi, [“United Airlines orders 100 wide-body Boeing 787 jets.”](#) NYT, 13 Dec. 2022.
26. Grace Kay, [“American companies’ spending on private jets hit a 10-year high”](#) Insider, 28 June 2022.
27. Jane L. Levere, [“Business travel’s rebound is being hit by a slowing economy.”](#) NYT, 27 Nov. 2022.
28. IATA, [“Air Cargo Demand Shows Resilience in August”](#) (press release), 6 Oct. 2022.

Endnotes

29. Eric Kulisch, [“Air cargo execs more nervous over consumer pullback.”](#) FreightWaves, 15 Nov. 2022.
30. Nolletti, [“Fasten Your Seat Belts”](#) (see note 5). See also: Simon G. Spells, [“The current challenges of passenger-to-freighter conversions.”](#) Reed Smith, 12 Jan. 2022.
31. Boeing, [“Boeing Forecasts Air Cargo Traffic to Increase Twofold over Next 20 Years”](#) (press release), 18 Nov. 2022.
32. Business Research Company, [“Global Defense Market Trends and Strategies of Major Players in the Defense Market 2021–2030”](#) (press release), 17 June 2021.
33. Stockholm International Peace Research Institute (SIPRI), [“World military expenditure passes \\$2 trillion for first time.”](#) 25 Apr. 2022.
34. Ibid.
35. Ibid.
36. GlobalData, [“Top 10 Global Defense Companies in 2021 by Revenue.”](#) 2023.
37. Joe Gould, [“Defying fiscal disruption: Defense revenues on Top 100 continue to climb, despite supply chain turmoil.”](#) Defense News, 8 Aug. 2022.
38. Lara Jakes, [“For Western weapons, the Ukraine war is a beta test.”](#) NYT, 15 Nov. 2022.
39. Steven Erlanger and Lara Jakes, [“U.S. and NATO Scramble to arm Ukraine and refill their own arsenals.”](#) NYT, 29 Nov. 2022.
40. Shephard News Team, [“Ukrainian Air Force awaits donated L-39ZA aircraft.”](#) Shephard News, 12 Nov. 2021.
41. Gastōn Dubois, [“UK donates three Sea King helicopters to Ukraine.”](#) Aviationonline, 23 Nov. 2022.
42. Peter Weber, [“Ukraine says its pilots are in Poland picking up donated MiG-29 fighter jets”](#) 1 Mar. 2022.
43. Paul McLeary and Lara Seligman, [“As he arms Ukraine, Biden readies new weapon pipelines for Eastern Europe.”](#) Politico, 8 Sept. 2022.
44. Sergiy Voloshyn and Simon Lewis, [“Blinken visits Ukraine to offer new US military aid for counteroffensive.”](#) 8 Sept. 2022.
45. Dr. Julie Muravska, [“Drones and defence innovation in Ukraine: consolidating wartime ingenuity.”](#) King’s College London, 29 Nov. 2022.
46. Andrew E. Kramer, [“Ukraine’s experimentation with drones gives it a technological advantage.”](#) NYT, 10 Aug. 2022.
47. David Axe, [“Ukraine’s \\$10,000 Drones are dropping tiny bombs on Russian troops.”](#) Forbes, 13 Apr. 2022. For Ukraine’s most recent innovations as of January 2023, in a quest to deliver tank-killing grenades via commercial small quadcopter drones, see also: Thomas Gibbons-Neff and Natalia Yermak, [“In a Ukraine workshop, the quest to build the perfect grenade.”](#) NYT, 7 Jan. 2023.
48. Luke Harding and Isobel Koshiw, [“Russia’s Black Sea flagship damaged in Crimea drone attack, video suggests.”](#) Guardian, 30 Oct. 2022.
49. Michael Crowley, [“State Department walks careful line on Russian attacks.”](#) NYT, 27 Dec. 2022.
50. Luke Harding, [“Strikes deep inside Russia highlight Ukraine’s tactical ingenuity.”](#) Guardian, 5 Dec. 2022.
51. Patrick Smith, [“What Ukrainian drone attacks on airbases inside Russia could mean for Putin’s war.”](#) NBC News, 6 Dec. 2022.
52. Isabelle Khurshudyan, Mary Ilyushina and Kostiantyn Khudov, [“Russia and Ukraine are fighting the first full-scale drone war.”](#) MSN, 2 Dec. 2, 2022 (originally published in The Washington Post, 2 Dec. 2022).
53. Guardian staff and agencies, [“FBI and MI5 leaders give unprecedented joint warning on Chinese spying.”](#) Guardian, 7 July 2022.
54. Emma Farge, [“China attack on Taiwan would hit global trade more than Ukraine war, says Taiwan.”](#) Reuters, 14 June 2022.
55. Helwing Villamizar, [“Jet fuel prices hit unprecedented high.”](#) Airways, 5 May 2022.
56. Ben Morris and Theo Leggett, [“Greener planes of the future . . . or just pretty plans?”](#) BBC News, 8 Jan. 2021.
57. Cade Metz, [“Your batteries are due for disruption.”](#) NYT, 8 Sept. 2021.

Endnotes

58. Cade Metz and Erin Griffith, [“What is a flying car?”](#) NYT, 12 June 2021.
59. Stephen Jones and Taylor Rains, [“American Airlines has ordered 250 electric flying taxis to ferry passengers around cities at speeds of up to 200 mph. Take a look at the VX4.”](#) Insider, 21 July 2021.
60. See: [Vertical Aerospace](#).
61. Sean Cudahy, [“Hawaiian Airlines investing in ‘seaglidors’ that fly a few feet above the water.”](#) The Points Guy, 12 May 2022.
62. IATA, [“Developing Sustainable Aviation Fuel \(SAF\).”](#) (policy statement), 2023.
63. US Department of Energy, Office of Energy Efficiency & Renewable Energy, Bioenergy Technologies Office, [“Sustainable Aviation Fuel Grand Challenge”](#) (press release, with additional media resources).
64. Peter Wilson, [“Airliners powered by sustainable fuel remain a distant goal.”](#) NYT, 29 June 2022.
65. Kelsey Reichmann, [“Sustainable aviation fuels aren’t sustainable, not yet at least.”](#) Avionics International, 5 Aug. 2021.
66. Ron Kotrba, [“60 companies support goal for SAF to be 10% of global jet-fuel market by 2030.”](#) Biobased Diesel Daily, 27 Sept. 2021. See also: World Economic Forum, [“10% Sustainable Aviation Fuel by 2030”](#) (PowerPoint presentation), 22 Sept. 2021.
67. US Department of Energy, [“Sustainable Aviation Fuel”](#) (see note 63).
68. IATA set its 2050 net zero goal at its annual general meeting in 2021. See: IATA, [“Our Commitment to Fly Net Zero by 2050.”](#)
69. Maggie Astor, [“Do airline climate offsets really work? Here’s the good news, and the bad.”](#) NYT, 18 May 2022.
70. Ryan Erik King, [“Airbus to test an open-fan turbine engine on an A380.”](#) Jalopnik, 21 July 2022.
71. See: [Aviation H2](#).
72. [“Loz Blain, First ammonia-powered jet flight in 2023: A roadmap to clean aviation.”](#) New Atlas, 8 May 2022.
73. Taylor Rains, [“United has ordered 515 electric and supersonic aircraft with the first carrying passengers as soon as 2024”](#) Yahoo! News, 16 Sept. 2022 (originally published in Business Insider, 16 Sept. 2022).
74. Northrop Grumman, [“Northrop Grumman and Boom Supersonic Collaborate on New Supersonic Aircraft for Quick-Reaction Missions”](#) (press release), 19 July 2022.
75. See: [Hermeus](#).
76. Maia Anderson, [“VCs are pumping millions into hypersonic flight as private startups take on tech long dominated by the military.”](#) Insider, 20 June 2022.
77. See: [Venus Aerospace](#).
78. See: [Radian Aerospace](#).
79. David Zarley, [“Spanish airline Air Nostrum orders a fleet of airships.”](#) Big Think, 3 July 2022.
80. See: [Hybrid Air Vehicles](#).
81. Leila Lai, [“Singapore air transport sector gets help to regroup, reskill amid Covid-19 outbreak.”](#) Business Times, 2 March 2020.
82. Helwing Villamizar, [“Singapore aviation to restore 90% of workforce in 2022.”](#) Airways, 28 May 2022. See also: US Department of Commerce, International Trade Administration (ITA), [“Singapore—Country Commercial Guide: Aerospace.”](#) 11 Aug. 2022.
83. [Singapore Aerospace and Defense Market—Growth, Trends, Covid-19 Impact, and Forecasts \(2023–2028\)](#), Mordor Intelligence, 2023.

Endnotes

84. Collins Aerospace, [“Singapore Airlines and Scoot Sign 787 MRO Agreement with Collins Aerospace.”](#) (press release) 17 Feb. 2022. This agreement builds on a previous deal signed in 2020; see [“Collins Aerospace Signs 12-Year Service Agreement to Provide Support to Singapore Airlines’ 787 fleet.”](#) (press release) 10 Feb. 2020. Collins also plays a leading role in Singapore’s MRO sector through the MRO innovation hub that the company established there in 2019; see [“Collins Aerospace to Establish Aerospace Innovation Hub in Singapore to Improve Maintenance, Repair and Manufacturing Capabilities”](#) (press release), 17 June 2019; and [“Redefining MRO Operations: Collins Aerospace Advances Singapore Innovation Hub”](#) (press release) 11 Feb. 2020.
85. Safran, [“Safran Electronics & Defense Services Asia Invests in New MRO Capabilities in Singapore”](#) (press release), 21 Feb. 2022.
86. Vanessa Lim, [“SAF formally establishes Digital and Intelligence Service.”](#) CNA, 28 Oct. 2022; Mike Yeo, [“Singapore unveils new cyber-focused military service.”](#) Defense News, 2 Nov. 2022. See also: MINDEF (Ministry of Defense) Singapore, [“Fact Sheet: The Digital and Intelligence Service.”](#) 28 Oct. 2022.
87. Aerospace Industries Association, [2021 Facts & Figures—U.S. Aerospace and Defense.](#)
88. ReportLinker, [Aerospace & Defense Global Market Report 2022.](#)
89. ITA, [“SelectUSA—Foreign Direct Investment \(FDI\): Aerospace”](#) (based on latest available data as of 24 Aug. 2021).
90. Glenn Barklie, [“FDI in aerospace in 2021: The state of play.”](#) Investment Monitor, 18 Aug. 2021.
91. Semiconductor Industry Association, [“Turning the Tide for Semiconductor Manufacturing in the U.S.”](#)
92. National Institute of Standards and Technology, [CHIPS Act, 2022.](#)
93. A one-pager on the FABS Act is available from the US Senate Committee on Finance at: [The Facilitating American-Built Semiconductors \(FABS\) Act.](#) The text of the FABS Act is available at: [H.R. 7104—117th Congress: FABS Act, 2022.](#) See also: Gregory Arcuri, [“The FABS Act: An essential component for incentivizing semiconductor manufacturing in the United States?”](#) Center for Strategic & International Studies, 9 Feb. 2022.
94. Aerospace Manufacturing and Design, Manufacturing Group, [“Nearshoring and the Aerospace Industry.”](#) 30 March 2011.
95. Information relating to the Canadian federal government’s funding and support for R&D and innovation generally is available at [Innovation funding and support.](#) The National Research Council Canada’s support for technology innovation is detailed at: [Support for technology innovation.](#) Statistics Canada surveyed the growth of the software development and computer services industry in Canada in 2020 in a 2022 report, [Software development and computer services, 2020.](#) See also: ITA, [“Canada—Country Commercial Guide: Information and Communications Technology \(ICT\).”](#) 3 Aug. 2022. The Canadian Government’s most recent statistics on the ICT sector are available in its [“Canadian ICT Sector Profile 2020.”](#)
96. See: Goodfirms, [“Top Software Development Companies in Canada.”](#) 2023.
97. SIPRI, [Trends in World Military Expenditure, 2021,](#) 2022.
98. SIPRI, [“World military expenditure”](#) (see note 33).
99. Ibid.
100. United States Space Force, [“FY22 budget gives Air & Space Forces the strength to meet threats”](#) 8 June 2021.
101. ITA, [“Canada—Country Commercial Guide: Aerospace and Defense.”](#) 3 Aug. 2022.
102. Ibid.
103. Ibid.
104. Ibid.
105. Ibid.

Endnotes

106. Alyssa Sporrer, [“Canadian airport betting big on hydrogen.”](#) FreightWaves, 18 May 2022.
107. Mike Moore, [“‘Hydrogen alliance’ formed as Canada, Germany sign agreement on exports.”](#) CBC News, 23 Aug. 2022.
108. Amanda Connolly, [“As Canada moves towards F-35 fighter jet deal, here’s what you need to know.”](#) Global News, 2 Apr. 2022.
109. John Ismay, [“Russia claims to use a hypersonic missile in attack on arms depot in Ukraine.”](#) NYT, 19 Mar. 2022.
110. Ian Austen, [“With new threats looming, Canada commits billions to air defense.”](#) NYT, 24 June 2022.
111. See [North American Aerospace Defense Command](#), the official US government NORAD website.
112. Michael Peck, [“The US and Canada are updating a Cold War-era system to keep an eye on Russian and Chinese missiles. Experts say they need to add a lot more territory too.”](#) Insider, 26 Oct. 2022.
113. David Ljunggren and Ismail Shakil, [“Canada to boost defence, cyber security in Indo-Pacific policy, focus on ‘disruptive’ China.”](#) Reuters, 28 Nov. 2022.
114. ITA, [“United Kingdom—Country Commercial Guide: Aerospace and Defense.”](#) 11 Sept. 2022.
115. Ibid.
116. Ibid.
117. Ibid.
118. Airbus, [“Airbus in the United Kingdom.”](#) 2022.
119. Boeing, [“Boeing Sheffield.”](#) 1995–2022.
120. ITA, [“United Kingdom—Country Commercial Guide: Aerospace and Defense”](#) (see note 114).
121. Ibid.
122. Ibid.
123. UK Research and Innovation, [“Harwell Campus Space Cluster.”](#) 2023.
124. Westcott Space Cluster, [“UK National Propulsion Test Facility.”](#) 2023. See also: UK Space Agency, [“New Satellite Propulsion Test Facility to Propel UK into New Space Age”](#) (press release), 18 Dec. 2020.
125. UK Department for Transport, et al., [“General Aviation in the UK”](#) (release to Parliament), 27 Apr. 2021.
126. ITA, [“Israel—Country Commercial Guide: Aerospace and Defense.”](#) 12 Aug. 2022.
127. Ibid.
128. Luke Tress, [“Israel ranked world’s 10th-largest weapons exporter in past five years.”](#) Times of Israel, 4 Apr. 2022.
129. ITA, [“Israel—Country Commercial Guide: Aerospace and Defense”](#) (see note 126).
130. Ibid.
131. Ibid.
132. See [IAI—Defense: Air](#).
133. ITA, [“Israel—Country Commercial Guide: Aerospace and Defense.”](#) (see note 126).
134. Dion Nissenbaum, [“Israel’s Defense Industry is big winner two years after Abraham Accords.”](#) Wall Street Journal, 9 Oct. 2022.
135. ITA, [“Israel—Country Commercial Guide: Aerospace and Defense”](#) (see note 126).

Endnotes

136. Ibid.
137. Proficient Market Insights, [“Global Aircraft Leasing Market in 2022 to 2027 top companies report covers market-specific challenges, new opportunities planning, and consumption by regional data”](#) Global Newswire, 1 Nov. 2022.
138. Ibec, [“Ireland a global centre for aircraft leasing.”](#) 2023.
139. Mason Hayes & Curran, [“10 Things to Know About the Aviation Industry in Ireland.”](#) 22 Jan. 2018.
140. [“Ireland home to several global leaders in aviation industry”](#) (special report), Irish Times, 24 Jan. 2019.
141. See: [Aercap.](#)
142. Mason Hayes & Curran, [“10 Things to Know.”](#) (see note 139).
143. Ibec, [“Aircraft Leasing Ireland.”](#) 2023.
144. [“Five Russian airlines have returned leased jets—document.”](#) Euronews.next, 1 June 2022 (originally published in Reuters, 1 June 2022).
145. Vladimir Karnozov, [“Kremlin proposes Russian airlines buy seized Western jets.”](#) AINonline, 22 Sept. 2022.
146. [“World’s largest leasing company battles insurers over aircraft stranded in Russia.”](#) NV, The New Voice of Ukraine, 4 Oct. 2022.
147. [“Panasonic Avionics Grows European MRO Footprint with Expansion in Ireland.”](#) IDA Ireland, 17 Oct. 2022; Mark Dwyer, [“Dublin Aerospace expands operations into Belfast.”](#) Flying in Ireland, 15 June 2022. See also: [Gaining Altitude—Ireland’s Aerospace Industry.](#) Aerospace Manufacturing and Design, July 2016; Department of Transport, Tourism and Sport (Ireland), [Economic Evaluation of the Aircraft Maintenance, Repair and Overhaul Sector in Ireland.](#) May 2019.
148. See: Barrie Dowsett, [“How the Aerospace Industry in Ireland Is Booming Thanks to R&D.”](#) Myriad Associates, 26 Feb. 2020; [“Aviation IT startups in Ireland.”](#) Tracxn, 2 Sept. 2022.
149. See: Aerospace Export, [“Aerospace Companies in Ireland.”](#) 2022.
150. Commission on the Defence Forces, Ireland, [Report of the Commission on the Defence Forces](#), 9 Feb. 2022.
151. Department of Defence, Ireland, [High Level Action Plan for the Report of the Commission on the Defence Forces](#), 13 July 2022.
152. ITA, [“Ireland Defense Increase in Investment.”](#) 28 Sept. 2022.
153. ITA, [“Spain—Country Commercial Guide: Aerospace and Defense.”](#) US Department of Commerce, 28 July 2022.
154. Ibid.
155. Ibid.
156. Ibid. See also: Associated Press, [“Spain boosts military spending to close gap with NATO goal.”](#) US News & World Report, 5 July 2022.
157. Kansas Office of the Governor, [“Governor Laura Kelly Announces Statewide Effort to Coordinate Billions in Federal Infrastructure Funds Coming to Kansas”](#) (press release), 30 June 2022.
158. Office of the Governor, Texas Economic Development & Tourism, [“Texas Aerospace, Aviation & Defense Industry”](#) (fact sheet), July 2022.
159. Kim Stevens, [“North Texas Job Corps and US Aviation Academy launch new training program.”](#) State Aviation Journal, 3 Oct. 2022
160. Georgia Department of Economic Development (GDED), [“Georgia Industries: Aerospace Manufacturing.”](#) 2023.
161. GDED, [“Georgia Center of Innovation.”](#) 2023.
162. See SpaceWorks, [“Flight Entry Systems: Flight Vehicle Design and Development.”](#) 2020-22.

Endnotes

163. GDED, [“Unmanned Systems \(UAVs\),”](#) 2023.
164. See: [Archer](#).
165. Kim Stevens, [“Archer Aviation selects Georgia site adjacent to Covington Municipal Airport for manufacturing facility.”](#) State Aviation Journal, 14 Nov. 2022.
166. Kim Stevens, [“Public investment expected to propel North Carolina aviation in 2022.”](#) State Aviation Journal, 12 Jan. 2022.
167. Kim Stevens, [“Boom Supersonic selects Greensboro, North Carolina for first supersonic airliner manufacturing facility.”](#) State Aviation Journal, 26 January 2022.
168. Kim Stevens, [“Pitt Greenville Airport hosts groundbreaking for five corporate aircraft hangars.”](#) State Aviation Journal, 13 July 2022.
169. Kim Stevens, [“ECSU, AeroX, and Piedmont Flight Training join forces to expand aviation workforce.”](#) State Aviation Journal, 3 July 2022.
170. Kim Stevens, [“Summit Aviation celebrates move to Greensboro.”](#) State Aviation Journal, 17 Nov. 2022.
171. Kim Stevens, [“Pratt & Whitney’s world-class North Carolina turbine airfoil production facility nears operational capability.”](#) State Aviation Journal, 18 Nov. 2022.
172. JobsOhio, [“Aerospace & Aviation—Ohio: A Leader in Flight, Space, and Advanced Air Mobility.”](#) 2022.
173. Team Northeast Ohio, [“Aerospace & Aviation.”](#) 2022.
174. Hartzell Propeller, [“Ohio Aviation Manufacturing Company Expanding Workforce to Meet Growing Demand for Aircraft”](#) (press release), 2 Feb. 2022.
175. JobsOhio, [“Parker Hannifin Corporation Grows Gas Turbine Division”](#) (press release), 30 Aug. 2022.
176. JobsOhio, [“NASA Supplier Adds 125 New Jobs in Northeast Ohio”](#) (press release), 28 Mar. 2022.
177. The Ohio State University, College of Engineering, Department of Mechanical and Aerospace Engineering, [“Ohio leading the way with new aircraft tracking system.”](#) 23 Aug. 2022; Air Force Research Laboratory Public Affairs, [“AFRL Program Advances Unmanned Air System Used for Training U.S. Fighter Pilots”](#) (press release), 9 Mar. 2022. See also: [“Fueled by customer demand and exceptional growth, Vantage Robotics expands operations to the Midwest.”](#) Suas News, 19 Jan. 2022; [“FlyOhio Initiative.”](#) UAS Center, n.d..
178. Indiana Economic Development Corporation, [“Aerospace.”](#) 2023.
179. Aerospace Industries Association, [“The Aerospace & Defense Industry in Indiana \[in 2019\]”](#) (fact sheet).
180. Aerospace Export, [“Aerospace Companies in Indiana.”](#)
181. Aviation Association of Indiana, [“Annual Conference Recap \[2022\]: DLGF Assessment of Airport Property.”](#) Aviation Indiana.
182. Kerry Lynch, [“House passes aviation workforce development bill.”](#) AINonline, 29 Sept. 2022.
183. Lockheed Martin, [“Lockheed Martin Opens Intelligent, Advanced Hypersonic Strike Production Facility”](#) (press release), 4 Oct. 2021.
184. Michigan Aerospace Manufacturers Association, [“Michigan Launch Initiative.”](#) 2023.
185. David Rompf, [“The plan to make Michigan the next space state.”](#) New Yorker, 24 Apr. 2022.
186. Space Florida, [“Space Florida: Leading in Space Commerce and the Future Lunar Economy”](#) (press release), 19 Dec. 2022.
187. John Haughey, [“Florida’s aerospace industry booming but faces competition and capacity challenges.”](#) Washington Examiner, 1 Oct 2021.

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2019 Aerospace manufacturing attractiveness rankings

Geographic assessment for aerospace manufacturing investments



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Introduction

The global Aerospace and Defense (A&D) industry reported record operating profit of \$81 billion in 2018, a 9% increase over the prior year. The top 100 A&D companies (by revenue) also recorded \$760 billion in revenue, an increase of 9% over 2017. Industry operating margin improved 10 basis points to 10.7%.¹

The global A&D industry is expected to show continued growth this year, primarily driven by more defense spending in the US and Europe and projected increases in aircraft deliveries. Industry growth is also being bolstered by merger and acquisition activity as well as lower corporate tax rates in the US (which are not reflected in the 2018 data). Commercial revenue passenger miles grew 6.5% in 2018, about twice global GDP growth and the fifth consecutive year above 6%. New aircraft deliveries increased 8%, and the industry set a new record of 1,606 large aircraft deliveries. It was also the ninth consecutive year of profitability for the US airline industry.²

The 2019 index is based on a weighted score of category and subcategory rankings. Ranking categories include cost, economy, geopolitical risk, infrastructure, labor, industry, and tax policy. The geopolitical risk category has been excluded from the state rankings as the risk is similar for all the states. The categories are comprised of many discrete metrics, which are then aggregated and weighted to arrive at the final rankings. While both state and country rankings use comparable metrics, there are slight differences in each measure's relevance to the ranking and the availability of quantitative information. Further details on the methodology can be found in the Appendices.

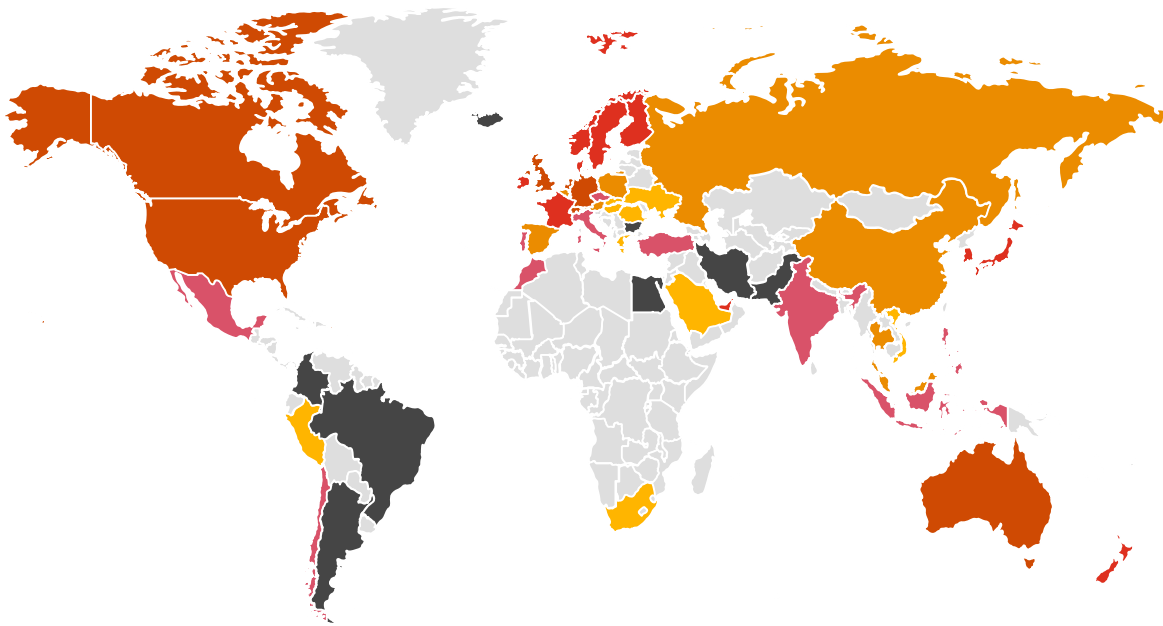
This report, our sixth edition of annual aerospace manufacturing attractiveness rankings by countries (or regions) and states in the US, can be a helpful tool in planning for future growth, enhancing manufacturing supply chains, and reexamining costs. We hope you find it informative and useful. We welcome your feedback on the report and how it might impact your strategic plans.



¹ Aerospace and defense year in review 2018 and forecast, *PwC*, May 2019.

² FAA Aerospace Forecast, Fiscal Years 2018-2038.

Country rankings



Top 10 country/region rankings for aerospace attractiveness

Country/region	Overall Rank	Cost	Labor	Infra-structure	Industry	Geo-political Risk	Economy	Tax Policy
United States	1	2	2	5	1	3	8	37
Canada	2	10	6	15	6	4	28	19
Singapore	3	23	8	20	3	12	4	8
United Kingdom	4	9	5	6	8	14	22	23
Australia	5	1	28	13	19	6	14	26
Switzerland	6	3	18	12	26	16	5	20
Germany	7	34	7	3	7	1	35	43
Netherlands	8	24	14	4	36	10	12	21
Hong Kong	9	26	15	19	28	17	9	1
South Korea	10	25	43	2	20	7	10	24

Below is a closer look at the top five countries in our ranking:

United States

The US remains the global A&D industry leader, with \$244 billion in sales last year. The country's dominant industry size is supported by its GDP of \$19.5 trillion and strong domestic transportation infrastructure. The US was the global leader in A&D exports in 2018, generating \$132 billion in revenue. The country's top ranking was also strengthened by a growth in international and domestic passenger traffic.

Canada

Canada is ranked second in the global A&D industry attractiveness study, supported by an educated labor force, low level of geopolitical risk, and industry size. In 2018, industry revenue increased 7% from the prior year to reach \$18.1 billion. In July 2017, Canada launched the Strategic Innovation Fund with a budget of \$1.26 billion over five years, which encourages R&D efforts to facilitate the growth and expansion of A&D firms in the country and attract and retain large scale investments.

Singapore

With a stable government, strong manufacturing base, and favorable tax policy, Singapore maintains its third position in the rankings. The country is ranked first in the quality of electricity supply and has a healthy GDP year-on-year growth rate of 3.14%. Singapore is Asia's leading solutions provider for aircraft maintenance, repair and overhaul (MRO) needs, contributing 10% to global MRO output.³ This year, local aerospace companies, along with government agencies and several other interested parties, agreed to collaborate on 3D technology that will allow components to be produced in a single piece, accelerating product development and reducing manufacturing costs.⁴

United Kingdom

With revenues of \$46 billion, the UK has a strong A&D industry. However, most of its aerospace production is exported, which may be adversely affected by Britain's exit from the European Union. Uncertainty over Brexit terms and the potential disruption to the country's global supply chains has led to speculation that the industry may have more difficulty attracting global investment going forward, jeopardizing its production timetables.⁵ However, despite a looming Brexit, the UK Defense Minister announced in July that the government is investing £2 billion through 2025 in a next generation fighter jet, the "Tempest," and that Britain would seek international partners to provide additional funding.

In December 2018, a new initiative was launched in which the government agreed to commit up to £125 million as part of the Future Flight challenge, which is focused on developing new technologies, including drones and urban air vehicles. The industry is expected to more than match this investment.⁶

Australia

Australia's ranking is supported by its low costs and relatively low level of geopolitical risk. In 2018, Australia released a long-term vision, "the Defence Industrial Capability Plan," to increase the competitiveness of its defense industry. As part of this plan, the government will increase defense spending over the next decade, earmarking more than \$200 billion for new investment in defense capabilities. In April of this year, Australia unveiled a full-size model of a new unmanned jet fighter, the first one the country has developed since World War II.

³ No.1 in Asia for MRO," *EDB Singapore*.

⁴ "Aerospace sector pushes for 3D technology," *Straits Times*, Sept. 22, 2018.

⁵ Christopher DeNicolo, David Matthews and William Buck, "Industry Top Trends 2019: Aerospace & Defense," *S&P Global Ratings*, Nov.14, 2018.

⁶ "Industrial Strategy – Aerospace Sector Deal," *Gov.UK*, Department for Business, Energy & Industrial Strategy, Dec. 6, 2018.



Considerations for your business

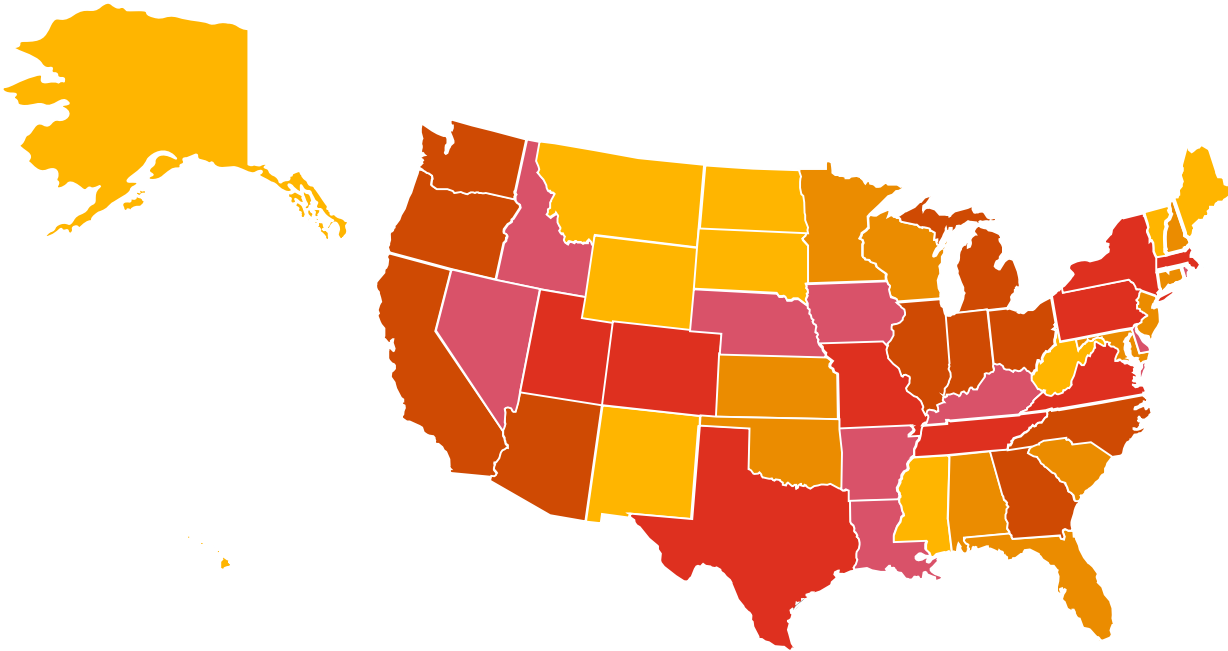
Passenger growth continues to increase as does global defense spending. The current backlog of aircraft orders will take about 6-8 years to clear even with companies hitting record production levels. The US A&D industry performed especially well in 2018, with exports totaling \$151 billion, an increase of 5.8% from the previous year, accounting for 9% of US exports and yielding a \$90 billion trade surplus. Although manufacturers have not

been immediately hurt by tariffs, they may need to rethink their supply chains longer-term, especially those in the Asia-Pacific region. The trade situation continues to evolve rapidly, and companies should have a plan to deal with the potential ramifications of trade wars with various countries and areas around the world. Some companies may consider reshoring all or part of their supply chain as business conditions merit.



State rankings

■ 1-10
 ■ 11-20
 ■ 21-30
 ■ 31-40
 ■ 41-52



Top 10 State rankings for aerospace attractiveness

State	Overall Rank	Cost	Labor	Infra-structure	Industry	Economy	Tax Policy
Washington	1	35	11	1	1	5	26
Georgia	2	8	20	15	7	10	5
California	3	49	13	3	2	2	22
Michigan	4	23	28	23	14	3	1
Illinois	5	40	12	4	11	4	31
Indiana	6	18	41	11	10	7	2
North Carolina	7	19	24	38	6	9	4
Ohio	8	32	35	8	4	8	8
Arizona	9	14	25	17	5	21	9
Oregon	10	24	17	14	19	18	13

Below is a closer look at a few notable industry initiatives or other indications of significant growth among the five most highly ranked States:

Washington

Washington remains in first place this year, with favorable rankings in the categories of industry, infrastructure, and economy. With a total workforce of over 136,000, the state produced 1,400 aircraft and unmanned aerial systems in 2018. It also manufactured nearly 90% (741) of all commercial aircraft in the US. In order to promote innovation, the state offers favorable tax policies, such as tax credits for pre-production development expenditures, and support for several public-private partnerships. The state is host to major players, such as Blue Origin and Boeing Commercial Airplanes (BCA) as well as home-grown companies, including Spaceflight Industries and Planetary Resources. Boeing is not only the largest private employer in the state, but also the world's largest aircraft manufacturer. The company set an industry record in 2018 for delivering 806 commercial airplanes and registering revenues of \$101 billion.⁷

Georgia

Georgia is home to one of the world's most traveled airports, eight regional airports, expanding military bases, and accessibility to the country's fastest growing major port. It is home to more than 800 major aerospace companies, including Lockheed Martin, Gulfstream Aerospace, and Meggitt Polymers & Composites. Companies are attracted to the state's relatively low costs (notably, electricity and hourly wages) and a corporate tax rate of 5.7%. Georgia's universities and colleges spend more than \$2 billion annually in R&D. In October 2018, Airbus collaborated with the Georgia Institute of Technology to open a new center for overall aircraft design activities.

California

California is third in our ranking, mainly due to a strong economy, good infrastructure, and a strong industry presence. The size of its aerospace industry, approximately 850 companies, is second only to Washington State. California is also home to three NASA research centers and the Mojave Air and Space Port, which includes more than 60 companies engaged in aerospace design, flight testing, and research.

Southern California, with its balmy climate and robust technology sector, is growing as a hub for space-related ventures, including SpaceX, Rocket Lab, and a host of small and medium-sized startups.

Michigan

Michigan has a favorable corporate tax structure, with a flat rate of 6%, and a healthy economy. It is also trying to grow its aerospace industry with support from the Aerospace Industry Association of Michigan, which represents about 800 companies, including major global players. Michigan is home to over 18 educational institutions with aerospace and aviation-related degrees and curriculum, providing the state with a pipeline of skilled workers. Also, aerospace companies are taking advantage of the skilled automotive workforce and the large manufacturing base in the state. In the past 18 months, the state has attracted nearly \$750 million in aerospace capital investment. Michigan is targeting space-related ventures, ranging from advanced research to space port site analysis for launching low- earth orbit satellites.

Illinois

Illinois's A&D industry is supported by the state's strong economy and infrastructure. The state's GSP grew 2.3% in 2018 compared to 2017, and its total manufacturing output grew 300 basis points to \$103.75 billion in the same period. Illinois is home to prime contractors and subcontractors that supply systems and components to the US military, NASA, and aerospace manufacturers. In April 2019, Collins Aerospace, a company that provides avionics and information technology systems and services, unveiled plans to launch a high-power, high-voltage \$50 million facility to design and test systems for the next generation of electric aircraft. This facility is part of a larger \$150 million investment that Collins Aerospace expects to make in electric systems over the next three years and builds on the \$3 billion it has spent on advancing its electric architectures over the past decade.⁸ In November 2018, the Army Research Laboratory established the Center for UAS Propulsion (CUP) at the University of Illinois to focus on unmanned aircraft systems technologies.

⁷ "Boeing hires more than 8,500 new Washington employees in 2018," *Boeing*, Jan. 31, 2019.

⁸ "Collins Aerospace unveils plans to redefine the future of electric flight," *Market Watch*, Apr. 4, 2019.

Notable events in other States

New Hampshire

In October 2018, BAE Systems, a leading UK-based aerospace company, announced plans to construct a 220,000 sq. ft. facility in Manchester that could employ as many as 400 workers. The company is already the state's largest manufacturing employer, with over 5,700 workers. In February 2019, GE Aviation won a \$517 million contract to build engines for the US Army's next generation Black Hawk helicopters. As a result, GE's Hooksett plant, which employs more than 1,000 workers, indicated it is planning to add 75 more employees.⁹

Florida

In 2018, Lockheed Martin was awarded a nearly \$400 million contract to produce hundreds of air-to-surface missiles for the Air Force. The work, expected to be completed by 2021, will be done at the company's Orlando facility, which employs about a 1000 people. Early in 2019, Lockheed announced it was opening a new R&D facility in Orlando and that it would add more jobs in the state. Also, RUAG, a Swiss aerospace firm, said it would be increasing investment in Florida (and two other states) to meet anticipated demand from US space ventures.¹⁰ In October, Blue Origin announced it would construct a new \$60 million facility near Cape Canaveral to test and refurbish rockets. SpaceX released plans to build several new facilities at the Kennedy Space Center.



Considerations for your business

The domestic A&D industry is growing along with the overall economy and current unemployment rates are low. As a result, there is increased competition for talent, and A&D companies are under pressure to attract people to their industry. While companies have been creating more outreach programs to broaden the talent pool and include more diverse populations, there is still room for improvement. The industry should increase its appeal to young people to help establish a pipeline of future talent. One program that is helping companies identify promising talent early and guide their career choices is the FIRST Robotics Competition (FRC) for high school students. The aim of the international competition, entering its thirtieth year, is to inspire students to follow science and technology careers. FRC has become so successful that it has spawned similar type programs for elementary and middle school students. Companies can engage with the program in several ways, from funding teams to providing mentors and equipment. It is an opportunity for A&D companies to work closely with students and introduce them to the opportunities the industry has to offer.



⁹ Liisa Rajala, "Growth in international aerospace market fuels increased production in NH," *NH Business Review*, Aug. 8, 2018

¹⁰ Sandra Erwin, "As space business grows, Ruag ramps up U.S. manufacturing," *Titusville Area Chamber of Commerce*, April 19, 2018.

Appendices

Ranking methodology

Ranking calculations

The 2019 country/region and US state rankings were determined through the combination of seven category ranks. The category ranks were all weighted equally, although the measures used to determine category ranks were weighted to account for relevance and the availability of quantitative information. Weight measures were determined through a collaboration between client service professionals and the industry analyst at PwC and can be found in the “Measure Weights for Country and State Rankings” section. Measures with null values were given the lowest possible rank. The formulas below were used to compute ranking calculations:

Provided:

$$\frac{\text{Measure value}}{\text{Measure Weight}}$$

Calculations:

$$\text{Rank}_{\text{Measure } i} = \text{Rank} [\text{Measure value}]$$

$$\text{Score}_{\text{Measure } i} = \text{Weight}_{\text{Measure } i} \times \text{Rank}_{\text{measure } i}$$

$$\text{Rank}_{\text{Category } n} = \text{Rank} [\text{Score}_{\text{Measure } 1} + \text{Score}_{\text{Measure } 2} + \dots + \text{Score}_{\text{Measure } i}]$$

$$\text{Final country rank} = \text{Rank} [\text{Final country score}]$$

Data resources

Seven public and private independent data sources were used in calculating the 2019 country/region rankings. Paid-for subscriptions included IHS and S&P and public domain information was obtained from global associations such as Germanwatch and the World Economic Forum. PwC’s “Paying Taxes 2019” report provided thorough data for the Tax Policy category.

Methodology changes

The country rankings combined a total of 32 metrics and the state rankings were based on a total of 30 metrics this year. The use of such a diverse dataset increases ranking validity.

Measure selection

The measures used in the 2019 Aerospace Manufacturing Attractiveness Rankings came from “Facility Location Selection for Global Manufacturing.”¹¹ In cases where we were unable to obtain detailed data for certain metrics, we used proxy data. The following illustrations show the breakouts of country and US state rankings.

Measures used in country/region rankings

Labor	Infrastructure	Industry	Geopolitical risk	Economy	Cost	Tax Policy
Labor Force Total country labor force	Quality of Roads Quality of Roads	Market Size Total aircraft and spacecraft sales	Population Average annual population	GDP Real gross domestic product (GDP)	Operating Expenses Aerospace operating expenditure as a % of sales	Tax Ranking Based on the overall ranking in PwC’s “Paying Taxes” publication
Basic Education Pupil-to teacher ratio in primary education	Quality of Railroads Railroads	Market Profit Margin Aircraft& spacecraft net profit over sales	Population Growth Annual population growth	GDP Growth Real GDP growth	Trend in Capex Annual changes in aerospace capital expenditure	
Skilled Education Skillset of Graduates	Quality of Port Infrastructure Efficiency of seaport services	Market Maturity Total aircraft and spacecraft consumption	Strategic Risk Overall strategic risk rating	FDI New Foreign Direct Investment (FDI), net capital inflow	Labor Cost Unit labor costs index	
Advanced Education Ease of finding skilled employees	Quality of Air Infrastructure Airport connectivity		Political Risk Overall political risk rating	Interest Rate Interest rate policy	Electricity Prices Electricity price for industrial user	
Union Flexibility Cooperation of labor-employer relations	Internet usage Internet users		Sovereign Risk Credit Risk Rating	Debt Current account balance as a% of GDP	Labor Productivity GDP-to-employed labor force	
	Quality of Electricity Supply Electricity infrastructure		Climate Risk Climate risk index	Unemployment Rate Annual average unemployment rate		

¹¹ A.H. Kalantari, “Facility Location Selection for Global Manufacturing,” UWM Digital Commons at the University of Wisconsin Milwaukee, August 2013.

Measures used in state rankings

Labor	Infrastructure	Industry	Economy	Cost	Tax Policy
Labor Force Production workers annual hours for aerospace manufacturing	Quality of Roads Road condition by average roughness	Industry Size Total value of aerospace shipments & receipts	GSP Real gross state product (GSP)	Energy Cost Average price of electricity to Ultimate consumer	Corporate Income Tax Corporate income tax burden
Basic Education % of people over 25 who have completed high school	Quality of Railroads Number of freight railroads byclass	Industry Profit Margin Total value added in aerospace products and parts mfg.	GSP Growth Real GSP growth	Transportation Cost Transportation expenditure by State & Local Govt.	Individual Income Tax Individual income tax rate
Skilled Education % of people over 25 who have completed a bachelor's degree	Quality of Air Infrastructure Public and private airports, helicopters, and seaplane bases	Industry Maturity Manufacturing share of total gross share product	CPI Consumer price index	Labor Cost Average hourly Wage, manufacturing	
Advanced Education % of people over 25 who have completed a advanced degree	Internet usage % of household with a broadband internet subscription	Industry Growth Growth in manufactured goods exports	Exports Manufactured goods exports	Labor Productivity Industrial production index for total manufacturing	
Union Flexibility Union membership rates by state	Quality of Electricity Supply Number of major disturbances and unusual occurrences	Number of Companies Total number of companies in the industry	Manufacturing Output Total manufacturing output	Construction Cost Total cost over created value of construction	
		Number of Supplier Total number of manufacturing firms	Government Subsidies Subsidies for durable goods manufactured		
		Labor Cost Total annual payroll in aerospace manufacturing			

Category weights and reference metrics

Country/region metrics

Category	Sub-Category	Reference Metric	Source	Weight	Category Sum
Cost	Opex/Sales	(Aircraft & Spacecraft - Operating Expenditures)/(Aircraft & Spacecraft - Sales)	IHS Aircraft & Spacecraft Industry Outlook January 2019	12%	100%
	Trend in Capex	Aircraft & Spacecraft - Capital Expenditures Percent Change	IHS Aircraft & Spacecraft Industry Outlook January 2019	6%	
	Labor Cost	Index: Unit Labor Costs, US\$ basis	IHS Global Economics January 25, 2019	12%	
	Electricity Prices	Electricity Price, Industrial Users, USD/KWh	BMI 2019	30%	
	Labor Productivity	Labor Productivity: GDP-to-Employed Labor Force, US\$	IHS Global Economics January 25, 2019	40%	
Labor	Labor Force	Labor Force	IHS Global Economics February 15, 2018	18%	100%
	Basic Education	Pupil-to-teacher ratio in primary education (Ratio)	WEF Global Competitiveness Index 2018	25%	
	Skilled Education	Skillset of Graduates 1-7 (best)	WEF Global Competitiveness Index 2018	18%	
	Advanced Education	Ease of finding skilled employees 1-7 (best)	WEF Global Competitiveness Index 2018	25%	
	Union Flexibility	Sum of Cooperation in labor-employer relations, 1-7 (best)	WEF Global Competitiveness Index 2018	14%	
Infrastructure	Quality of Roads	Sum of Quality of roads, 1-7 (best)	WEF Global Competitiveness Index 2018	15%	100%
	Quality of Railroads	Railroads 0-100 (best)	WEF Global Competitiveness Index 2018	10%	
	Quality of Port Infrastructure	Efficiency of seaport services 1-7 (best)	WEF Global Competitiveness Index 2018	15%	
	Quality of Air Infrastructure	Airport connectivity	WEF Global Competitiveness Index 2018	30%	
	Internet Usage	Internet users (% of population)	WEF Global Competitiveness Index 2018	15%	
	Quality of Electricity Supply	Electricity infrastructure 0-100 (best)	WEF Global Competitiveness Index 2018	15%	
Industry	Industry Size	Aircraft & Spacecraft - Sales	IHS Aircraft & Spacecraft Industry Outlook January 2019	50%	100%
	Industry Profit Margin	(Aircraft & Spacecraft - Net Profits)/(Aircraft & Spacecraft - Sales)	IHS Aircraft & Spacecraft Industry Outlook January 2019	25%	

Category	Sub-Category	Reference Metric	Source	Weight	Category Sum
Industry	Industry Maturity	Aircraft & Spacecraft - Consumption	IHS Aircraft & Spacecraft Industry Outlook January 2019	25%	
Geopolitical Risk	Population	Population: Total	IHS Global Economics January 25, 2019	40%	100%
	Population Growth	Population: Growth Rate	IHS Global Economics January 25, 2019	5%	
	Strategic Risk	Overall Strategic Risk	IHS Country Risk Ratings January 28, 2019	20%	
	Political Risk	Overall Political Risk	IHS Country Risk Ratings January 28, 2019	20%	
	Sovereign Risk	Credit Risk Rating	S&P Capital IQ December 31, 2018	10%	
	Climate Risk	Climate Risk Index	Germanwatch Climate Risk Index 2019	5%	
Economy	Outside Investment	BOP Direct Investment Balance or Net FDI (Net Capital Inflow), % of GDP	IHS Global Economics January 25, 2019	5%	100%
	Interest Rates	Interest Rate: Policy	IHS Global Economics January 25, 2019	6%	
	Debt/GDP	Current Account Balance as a % of GDP	IHS Global Economics January 25, 2019	5%	
	Unemployment Rate	Unemployment Rate	IHS Global Economics January 25, 2019	35%	
	GDP	Real GDP (Gross Domestic Product), US\$	IHS Global Economics January 25, 2019	40%	
	GDP Growth	Real GDP, Growth Rate, Year-on-Year	IHS Global Economics January 25, 2019	9%	
Tax Policy	Overall Tax Ranking	Overall Tax Ranking	PwC Paying Taxes 2019	100%	100%

State metrics

Category	Sub-Category	Reference Metric	Source	Weight	Category Sum
Cost	Energy Cost	Average Price of Electricity to Ultimate Customers by End-Use Sector, Industrial	EIA Electric Power Monthly (September 2018 and 2017 YTD Data)	25%	100%
	Transportation Cost	Transportation Expenditures by State and Local Governments, Total	DOT BTS State Transportation Statistics	15%	
	Labor Cost	Average Hourly Wage, Manufacturing	US Census Bureau - American Fact Finder	20%	
	Labor Productivity	Industrial Production Index, Total Manufacturing	IHS US Regional Economics 2019	25%	
	Construction Cost	NAICS 023 Construction - Total Costs/Total Value Created	US Census Bureau - American Fact Finder	15%	
Labor	Labor Force	Aerospace product and parts manufacturing - Production Workers Annual Hours	US Census Bureau - American Fact Finder	10%	100%
	Basic Education	Percent of people 25 years and over who have completed high school (includes equivalency)	US Census Bureau - American Fact Finder	5%	
	Skilled Education	Percent of people 25 years and over who have completed a bachelor's degree	US Census Bureau - American Fact Finder	40%	
	Advanced Education	Percent of people 25 years and over who have completed an advanced degree	US Census Bureau - American Fact Finder	40%	
	Union Flexibility	Union Membership Rates by State	Bureau of Labor Statistics	5%	
Infrastructure	Quality of Roads	Table 1-4: Road Condition	DOT BTS State Transportation Statistics	20%	100%
	Quality of Railroads	Table 1-13: Number of Freight Railroads by Class	Association of American Railroads	20%	
	Quality of Air Infrastructure	Table 1-10: Public and Private Airports, Heliports and Seaplane Bases	DOT BTS State Transportation Statistics	20%	
	Internet Usage	Percent of Households with a Broadband Internet Subscription	US Census Bureau - American Fact Finder	20%	
	Quality of Electricity Supply	Major Disturbances and Unusual Occurrences	DOE Office of Electricity Delivery & Energy Reliability	20%	

Category	Sub-Category	Reference Metric	Source	Weight	Category Sum
Industry	Industry Size	Aerospace product and parts manufacturing - Total value of shipments and receipts for services	US Census Bureau - American Fact Finder	20%	100%
	Industry Profit Margin	Aerospace product and parts manufacturing - Value added	US Census Bureau - American Fact Finder	5%	
	Industry Maturity	Mfg share of total GSP	NAM Manufacturing Data Table (2018)	5%	
	Industry Growth	Growth in Manufactured Goods Exports	NAM Manufacturing Data Table (2018)	20%	
	Number of Companies	Aerospace and Defense Firms	Capital IQ Company Screening Report	20%	
	Labor Cost	Aerospace product and parts manufacturing - Annual Payroll	US Census Bureau - American Fact Finder	10%	
	Number of Suppliers	Manufacturing Firms	NAM Manufacturing Data Table (2018)	20%	
Economy	GDP	Real Gross State Product (GSP)	IHS US Regional Economics 2019	10%	100%
	GDP Growth	Real GSP Growth	IHS US Regional Economics 2019	20%	
	Consumer Price Index	Consumer Price Index (CPI)	IHS US Regional Economics 2019	5%	
	Manufacturing Output	Total Manufacturing Output	IHS US Regional Economics 2019	30%	
	Exports	Manufactured Goods Exports	NAM Manufacturing Data Table (2016)	30%	
	Subsidies	Subsidies, Durable Goods Manufacturing	BEA - Regional Data 2018	5%	
Tax Policy	Corporate Income Tax Burdens	Corporate Income Tax Burdens	COST, STIRI, Ernst & Young LLP "FY17 Total state and local business taxes"	75%	100%
	Individual Income Tax	Individual Income Tax Rate	COST, STIRI, Ernst & Young LLP "FY17 Total state and local business taxes"	25%	

Complete country/region rankings

Country/region	Overall Rank	Cost	Labor	Infra-structure	Industry	Geo-political Risk	Economy	Tax Policy
United States	1	2	2	5	1	3	8	37
Canada	2	10	6	15	6	4	28	19
Singapore	3	23	8	20	3	12	4	8
United Kingdom	4	9	5	6	8	14	22	23
Australia	5	1	28	13	19	6	14	26
Switzerland	6	3	18	12	26	16	5	20
Germany	7	34	7	3	7	1	35	43
Netherlands	8	24	14	4	36	10	12	21
Hong Kong	9	26	15	19	28	17	9	1
South Korea	10	25	43	2	20	7	10	24
United Arab Emirates	11	13	3	27	33	25	30	2
Sweden	12	21	13	10	18	13	32	27
Ireland	13	18	23	23	29	37	19	4
France	14	12	26	8	4	5	39	55
Denmark	15	5	33	7	59	18	33	9
Finland	16	8	16	11	35	20	57	11
Japan	17	36	11	1	13	2	7	97
New Zealand	18	14	37	25	31	26	40	10
Taiwan	19	37	29	29	32	9	16	29
Spain	20	15	46	9	2	23	48	34
Norway	21	4	32	22	44	22	27	30
Malaysia	22	38	10	16	11	11	13	72
Qatar	23	19	35	33	46	69	31	2
Belgium	24	6	44	14	23	28	52	60
Israel	25	7	21	17	29	40	17	90
China	26	45	20	26	10	15	1	114
Austria	27	11	40	18	55	27	49	40
Poland	28	20	91	34	21	21	2	69
Russia	29	39	39	42	5	46	29	53
Thailand	30	41	47	37	37	24	3	59
Portugal	31	31	38	23	48	36	46	39
Czech Republic	32	29	57	44	43	33	21	45
Morocco	33	28	75	49	24	32	60	25
Chile	34	40	24	28	47	28	36	76
Mexico	35	32	25	39	9	39	15	116
Indonesia	36	49	17	50	41	19	11	112
India	37	55	4	43	24	38	18	121
Italy	38	30	60	21	12	30	55	118

Country/region	Overall Rank	Cost	Labor	Infra-structure	Industry	Geo-political Risk	Economy	Tax Policy
Philippines	39	54	1	71	58	31	20	94
South Africa	40	47	53	53	38	44	76	46
Turkey	41	33	84	35	16	61	50	80
Romania	42	35	106	67	40	54	24	49
Greece	43	17	78	32	45	66	62	65
Hungary	44	42	119	51	49	35	23	86
Saudi Arabia	45	27	49	31	69	84	34	78
Ukraine	46	56	58	70	13	103	64	54
Slovakia	47	16	140	62	67	53	43	48
Vietnam	48	43	136	55	61	8	6	131
Costa Rica	49	53	42	96	53	100	63	57
Peru	50	44	89	81	62	47	38	120
Argentina	51	22	70	63	54	41	53	169
Colombia	52	57	27	68	64	43	47	146
Brazil	53	46	87	61	17	34	44	184
Sri Lanka	54	62	36	57	50	68	51	141
Bulgaria	55	48	108	59	66	80	70	92
Pakistan	56	63	22	74	27	64	26	173
Iran	57	50	59	65	38	109	65	149
Egypt	58	60	83	54	65	48	42	159
Bahrain	59	86	85	40	55	106	121	5
Iceland	60	59	45	41	76	58	56	33
Kuwait	61	84	132	73	21	94	102	7
Oman	62	116	71	47	51	56	123	12
Nigeria	63	58	56	104	34	67	54	157
Bangladesh	64	80	51	90	15	88	25	151
Panama	65	52	87	55	68	73	59	174
Uruguay	66	61	103	78	72	45	83	101
Luxembourg	67	68	68	30	76	71	68	22
Kazakhstan	68	66	67	64	76	42	37	56
Ecuador	69	73	48	85	42	119	61	143
Ghana	70	82	12	97	51	51	104	115
Slovenia	71	72	63	48	76	76	45	41
Estonia	72	75	90	38	76	63	77	14
Lithuania	73	77	110	45	76	55	73	18
Azerbaijan	74	104	30	46	76	93	66	28
Latvia	75	76	99	51	76	87	79	13
Tunisia	76	78	93	79	63	75	88	133
Kenya	77	117	62	84	60	52	98	91
Cyprus	78	70	52	58	76	90	78	47

Country/region	Overall Rank	Cost	Labor	Infra-structure	Industry	Geo-political Risk	Economy	Tax Policy
Mauritius	79	87	61	82	76	78	84	6
Serbia	80	65	77	75	76	81	80	79
Malta	81	71	81	76	76	99	71	71
Venezuela	82	51	66	110	73	143	75	189
Croatia	83	74	127	36	76	72	67	89
Georgia	84	108	126	66	76	126	86	16
Jordan	85	118	94	60	70	101	120	95
Algeria	86	64	79	83	76	77	74	156
Honduras	87	79	92	107	57	153	115	164
Zambia	88	101	73	127	76	60	122	17
Botswana	89	96	116	108	76	86	85	51
Moldova	90	110	113	94	76	181	82	35
Cameroon	91	93	31	116	75	74	108	182
Senegal	92	118	19	100	74	49	117	171
Montenegro	93	95	50	80	76	149	110	68
Guatemala	94	88	34	103	76	97	103	102
El Salvador	95	69	129	102	76	108	130	62
Albania	96	105	55	77	76	146	87	122
Cape Verde	97	109	80	109	76	122	94	77
Macedonia	98	98	137	112	76	150	93	31
Jamaica	99	100	41	93	76	151	89	123
Uganda	100	101	82	113	76	83	113	87
Namibia	101	91	114	88	76	79	142	81
Rwanda	102	121	69	120	76	50	149	35
Tajikistan	103	113	54	106	76	163	72	136
Ethiopia	104	89	115	101	76	62	95	130
Armenia	105	106	101	86	76	164	125	82
Mongolia	106	121	105	105	76	95	133	61
Seychelles	107	121	112	87	76	116	191	31
Cambodia	108	115	111	89	76	57	135	137
Dominican Republic	109	121	72	72	76	96	99	148
Tanzania	110	107	97	99	76	89	100	167
Bosnia and Herzegovina	111	90	123	92	76	186	92	139
Brunei Darussalam	112	121	130	69	76	82	168	84
Angola	113	91	138	139	76	65	112	104
Nicaragua	114	67	118	115	76	157	141	160
Lebanon	115	121	95	91	76	171	116	113
Kyrgyz Republic	116	114	102	111	76	194	91	150

Country/region	Overall Rank	Cost	Labor	Infra-structure	Industry	Geo-political Risk	Economy	Tax Policy
Mozambique	117	101	131	124	76	114	129	125
Uzbekistan	118	111	143	143	76	70	58	64
Eswatini	119	121	86	98	76	180	193	63
Bolivia	120	118	139	125	71	166	119	186
Cote d'Ivoire	121	121	109	119	76	59	101	175
Belarus	122	99	145	143	76	98	41	99
Lao People's Democratic Republic	123	121	64	114	76	123	132	155
Paraguay	124	121	133	123	76	131	107	127
Trinidad and Tobago	125	121	76	95	76	159	126	166
Benin	126	121	9	126	76	111	154	176
Yemen	127	121	135	136	76	155	144	83
Mali	128	121	96	122	76	125	127	165
Malawi	129	121	107	128	76	104	159	134
Nepal	130	121	125	118	76	113	124	158
Sierra Leone	131	121	120	133	76	165	172	88
Kosovo	132	96	149	143	76	151	105	44
Liberia	133	121	122	134	76	194	188	67
Zimbabwe	134	121	98	117	76	179	146	145
Congo Democratic Republic	135	121	124	129	76	110	106	180
Burkina Faso	136	121	117	132	76	107	138	153
Bhutan	137	121	146	141	76	102	175	15
Gambia	138	121	65	121	76	193	189	169
Puerto Rico	139	80	148	143	76	134	81	162
Lesotho	140	121	121	140	76	182	199	108
Mauritania	141	121	74	130	76	171	176	178
Burundi	142	121	104	137	76	178	196	138
Haiti	143	121	134	131	76	191	156	147
Chad	144	121	100	138	76	141	148	188
Guinea	145	121	128	135	76	127	151	181
Bahamas	146	121	156	143	76	139	150	50
Madagascar	147	121	141	142	76	115	134	132
Turkmenistan	148	94	147	143	76	176	69	190
Andorra	149	85	155	143	76	124	90	190
Iraq	150	121	156	143	76	90	97	129
Sao Tome and Principe	151	112	153	143	76	200	114	135

Country/region	Overall Rank	Cost	Labor	Infra-structure	Industry	Geo-political Risk	Economy	Tax Policy
Belize	152	121	150	143	76	201	167	52
Solomon Islands	153	121	156	143	76	168	190	38
Myanmar (Burma)	154	121	156	143	76	85	118	126
South Sudan	155	121	156	143	76	174	143	66
Barbados	156	121	152	143	76	132	174	93
San Marino	157	121	156	143	76	148	207	42
St. Lucia	158	121	156	143	76	146	181	73
Vanuatu	159	121	156	143	76	176	195	58
US Virgin Islands	160	83	154	143	76	156	128	190
Papua New Guinea	161	121	156	143	76	153	145	111
Syria	162	121	156	143	76	197	162	85
Libya	163	121	156	143	76	199	109	128
Fiji	164	121	156	143	76	144	177	98
Samoa	165	121	156	143	76	170	198	74
Marshall Islands	166	121	156	143	76	162	207	70
Dominica	167	121	156	143	76	187	201	75
Sudan	168	121	156	143	76	133	111	163
Kiribati	169	121	156	143	76	118	203	96
Suriname	170	121	151	143	76	203	166	105
Djibouti	171	121	156	143	76	173	164	108
Niger	172	121	144	143	76	120	158	161
Micronesia, Federated States of	173	121	156	143	76	111	205	110
St. Vincent and the Grenadines	174	121	156	143	76	160	194	103
Macau	175	121	156	143	76	92	96	190
Palestinian Authority	176	121	156	143	76	205	163	107
Tonga	177	121	156	143	76	169	204	100
Guyana	178	121	156	143	76	198	170	119
Grenada	179	121	156	143	76	167	157	142
St. Kitts and Nevis	180	121	156	143	76	185	185	124
Maldives	181	121	156	143	76	202	171	117
Palau	182	121	156	143	76	183	207	106
Togo	183	121	156	143	76	117	152	172
Antigua and Barbuda	184	121	156	143	76	192	160	144
East Timor	185	121	156	143	76	136	202	140

Country/region	Overall Rank	Cost	Labor	Infra-structure	Industry	Geo-political Risk	Economy	Tax Policy
Eritrea	186	121	156	143	76	196	155	152
Afghanistan	187	121	156	143	76	142	147	177
Gabon	188	121	156	143	76	161	137	183
North Korea	189	121	142	143	76	189	136	190
Reunion	190	121	156	143	76	105	139	190
Cuba	191	121	156	143	76	140	131	190
Liechtenstein	192	121	156	143	76	128	140	190
Congo	193	121	156	143	76	175	161	185
Guinea-Bissau	194	121	156	143	76	207	183	154
Bermuda	195	121	156	143	76	145	153	190
French Guiana	196	121	156	143	76	121	178	190
Comoros	197	121	156	143	76	204	186	168
Cayman Islands	198	121	156	143	76	138	173	190
Curacao	199	121	156	143	76	129	184	190
Aruba	200	121	156	143	76	135	182	190
Equatorial Guinea	201	121	156	143	76	208	165	179
Martinique	202	121	156	143	76	137	180	190
Central African Republic	203	121	156	143	76	206	169	187
Guam	204	121	156	143	76	158	187	190
Anguilla	205	121	156	143	76	184	179	190
American Samoa	206	121	156	143	76	130	206	190
Tuvalu	207	121	156	143	76	188	197	190
Somalia	208	121	156	143	76	190	200	190
Sint Maarten (SXM)	209	121	156	143	76	209	192	190

Complete state rankings

State	Overall Rank	Cost	Labor	Infrastructure	Industry	Economy	Tax Policy
Washington	1	35	11	1	1	5	26
Georgia	2	8	20	15	7	10	5
California	3	49	13	3	2	2	22
Michigan	4	23	28	23	14	3	1
Illinois	5	40	12	4	11	4	31
Indiana	6	18	41	11	10	7	2
North Carolina	7	19	24	38	6	9	4
Ohio	8	32	35	8	4	8	8
Arizona	9	14	25	17	5	21	9
Oregon	10	24	17	14	19	18	13
Pennsylvania	11	36	21	10	13	13	23
Texas	12	37	32	18	3	1	33
Virginia	13	30	6	28	20	19	19
Colorado	14	42	5	6	23	27	15
Connecticut	15	48	2	25	15	30	6
Massachusetts	16	51	1	18	21	15	14
Missouri	17	38	27	16	17	24	3
Utah	18	9	16	36	33	26	7
New York	19	41	8	8	12	11	51
Tennessee	20	6	39	41	24	12	11
Wisconsin	21	33	34	7	25	14	21
Florida	22	38	30	36	8	6	33
Kansas	23	28	14	20	18	36	23
New Jersey	24	43	10	2	31	16	41
Alabama	25	14	44	34	9	22	18
Maryland	26	50	4	20	30	29	17
New Hampshire	27	29	9	24	36	33	11
Minnesota	28	45	15	12	28	23	30
South Carolina	29	7	36	50	16	20	29
Oklahoma	30	11	45	13	29	35	10
Louisiana	31	25	47	28	21	17	32
Delaware	32	13	19	30	41	44	20
Arkansas	33	4	48	32	27	31	28
Kentucky	34	5	46	49	26	25	37
Idaho	35	3	42	27	44	37	25
Iowa	36	20	37	25	32	31	36
Nebraska	37	16	26	34	38	38	35
Nevada	38	2	49	51	34	28	38
Rhode Island	39	22	18	42	40	45	39

State	Overall Rank	Cost	Labor	Infrastructure	Industry	Economy	Tax Policy
District of Columbia	40	27	3	33	49	47	42
New Mexico	41	12	33	39	35	43	46
Montana	42	1	29	42	48	41	47
Alaska	43	47	31	5	51	51	16
Mississippi	44	10	50	30	37	34	45
South Dakota	45	17	40	46	47	46	26
Vermont	46	46	7	48	45	48	50
Hawaii	47	34	23	22	50	50	42
North Dakota	48	31	38	45	39	42	44
Wyoming	49	21	43	40	42	49	40
Maine	50	44	22	47	46	40	48
West Virginia	51	26	51	44	43	39	49
Puerto Rico	52	52	52	52	52	52	52



Contacts

To have a deeper conversation about the aerospace manufacturing industry and the issues discussed in this paper, please contact one of the following:

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SB 0574 Sen. Corderman.pdf

Uploaded by: Jaime Giandomenico

Position: FAV



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**MD 2024 SB 0574 - HB 0557 Sales Tax Exemption - Aircraft Parts and Equipment -
Repeal of Reporting Requirement and Sunset**

Senate Bill

**MD 2024 SB 0574 Sales and Use Tax Exemption - Aircraft Parts and Equipment -
Repeal of Reporting Requirement and Sunset**

Date of Hearing: 02/07/24 2:00 PM Senate Budget & Taxation Committee

Chairman / Senator Guy Guzzone & Vice Chair / Senator Jim Rosapepe

&

House Bill

**MD 2024 HB 0557 Sales and Use Tax Exemption - Aircraft Parts and Equipment -
Repeal of Reporting Requirement and Sunset**

Date of Hearing: 02/08/24 1:00 PM House Ways & Means Committee

**Chairwoman / Delegate Vanessa E Atterbeary & Vice Chair / Delegate Jheanelle K.
Wilkins**

Dear Senator Corderman,

I respectfully write to the Committee today and its members for a favorable report for MD 2024 SB 0574 - HB 0557 Sales Tax Exemption - Aircraft Parts and Equipment - Repeal of Reporting Requirement and Sunset

The aviation industry in America is a staple to our country's economy; as of 2020 there are over 20,000 airports in the US. The industry supports over 6.5 million jobs in the US and generates over \$700 billion dollars in revenue towards the GDP. Right now, there are forecasts for 2024 that Air travel is expected to jump from 4.5 billion travelers in 2019 to 4.7 billion travelers this year worldwide.

Of the 34 public-use aviation facilities in the State of Maryland, there are 3 Air Carrier Airports, 6 Reliever Airports, 15 General Airports, 8 Local Airports, and 2 Special Facilities. In addition to the 34 public-use aviation facilities in the Maryland Aviation System Plan, there are 182 private-use aviation facilities in the State, including airports,

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heliports, and a seaplane base. Civil aviation supports the Maryland state economy through economic output by attracting business and tourism, supporting local economic development, and helping retain jobs that otherwise might be located elsewhere. The Maryland Aviation Administration (MAA) published the Economic Impact of Public Use Airports in Maryland in December 2018, which identified the following total combined annual impacts for 34 Maryland airports, excluding Baltimore/Washington International Thurgood Marshall Airport (BWI):

- Total Jobs: 9,929
- Personal Income: \$582.8 million
- Business Revenue: \$867.1 million
- Local Purchases: \$271.7 million
- State and Local Taxes: \$131.4 million

Separately, a 2015 estimate of economic impact from BWI alone produced the following impacts:

- Total Jobs: 97,737
- Personal Income: \$3.8 billion
- Business Revenue: \$7 billion
- Local Purchases: \$1.6 billion
- State and Local Taxes: \$536 million

In 2020, the State passed a bill to help boost this important industry to exempt sales tax on aircraft parts, making our State the 10th in the eastern region to pass this legislation. This legislation has helped drive competition, increase jobs, and aviation volume across the State. However, this legislation had a sunset provision; thus, this legislation would keep the momentum that we helped create in 2020 intact by simply reversing the sunset provision.

Furthermore, in 2023, the University of Maryland Eastern Shore (UMES), Piedmont Airlines, and Salisbury Wicomico Economic Development (SWED) partnered to create a workforce development program to innovate the next generation of workers in our State to become certified aircraft maintenance technicians. To strengthen our workforce in this important industry, this legislation will help make this program and similar programs in the State be more successful.

In closing, I respectfully ask the Committee for a favorable report for MD 2024 SB 0574 - HB 0557 Sales Tax Exemption - Aircraft Parts and Equipment - Repeal of Reporting Requirement and Sunset.

Sincerely,



Jaime Giandomenico, Airport Manager
Ocean City Municipal Airport
Maryland Aviation Council, Board of Directors, Ex-officio

WCCC SB574 Support Letter - Aircraft Parts Tax Exe

Uploaded by: Jim Kercheval

Position: FAV



- Washington County Government
- City of Hagerstown
- Hagerstown Community College
- Washington Co. Free Library
- Town of Williamsport
- Washington County Chamber of Commerce
- The Greater Hagerstown Committee, Inc.
- Visit Hagerstown (Local Convention & Visitor's Bureau)
- CHIEF (Hagerstown-Washington Co. Industrial Foundation)

Washington County Community Coalition

Lobbyist: John Favazza, Esquire Mannis Canning & Associates 410.263.7882 jfavazza@maniscanning.com

February 4, 2024

The Honorable Guy Guzzone
Chair, Budget and Taxation Committee
Miller Senate Office Building, 3 West Wing
11 Bladen Street
Annapolis, MD 21401-1991

RE: Senate Bill 574 - Sales and Use Tax Exemption - Aircraft Parts and Equipment - Repeal of Reporting Requirement and Sunset

Dear Chair Guzzone and Distinguished Committee Members,

The Washington County Community Coalition, representing 9 community partner groups, would like to express our strong support for HB557 – Sales and Use Tax Exemption - Aircraft Parts and Equipment.

There are a variety of views in regard to tax policy, however there's a universal understanding that Maryland must remain competitive with surrounding states in order to have a strong and growing economy. Over the last 15 years, all of the states in the mid-atlantic region have exempted or capped sales tax on aircraft parts. The legislators in these states shared many of the same concerns in regard to impacts from lost sales tax revenue. However, one state after another implemented a tax exemption on aircraft parts recognizing the importance of growing this industry in their home state and supporting the many small businesses at their local airports. Since that time, several states recently extended their sunset clauses or made the exemption permanent, and no state has reverted back to taxing aircraft parts.

Maryland was at a significant competitive disadvantage with all of the states in our region until our state finally passed its own aircraft parts tax exemption legislation in 2020. Prior to the 2020 legislation, our repair and maintenance businesses saw the negative impacts of our state's non-competitive aviation tax policy. Local maintenance and repair shops at our airport had been forced to reduce jobs as much as 40% due to lost sales to surrounding states, like Pennsylvania, that exempted sales tax for aircraft parts for years. In addition, there were no new repair businesses being created at our local airport.

Today, thanks to the support of the General Assembly in 2020, plane owners and insurance companies needing aircraft maintenance can get their repair work done in Maryland at competitive prices without having to take a short flight to adjacent states to receive significant savings on their maintenance work.

It took a couple years for the positive effects of the 2020 legislation to kick in, but this economic incentive is working. Hagerstown Regional Airport (HGR) has over a dozen small businesses that are successfully competing with neighboring states to provide aviation repair and maintenance work. These businesses create jobs and produce income taxes, corporate taxes, and other secondary revenue benefitting our county and state. This has helped our airport to be a major economic development engine for this community contributing over \$300M in economic impact each year, and ranking in the top 3 public use airports in Maryland for total economic impact.



- Washington County Government
- City of Hagerstown
- Hagerstown Community College
- Washington Co. Free Library
- Town of Williamsport
- Washington County Chamber of Commerce
- The Greater Hagerstown Committee, Inc.
- Visit Hagerstown (Local Convention & Visitor's Bureau)
- CHIEF (Hagerstown-Washington Co. Industrial Foundation)

Washington County Community Coalition

Lobbyist: John Favazza, Esquire Mannis Canning & Associates 410.263.7882 jfavazza@maniscanning.com

Our Pittsburgh Institute of Aeronautics (PIA), which trains aviation mechanics and service technicians, continues to grow and provide workers for regional airports like BWI, Dulles, Reagan, as well as some of the smaller airports in Maryland. PIA has been recognized by FORBES magazine as the nation's #1 two-year trade school, with a 90% placement rate and median salaries over \$70,000. The school will be adding 35% more space in the coming year in order to take on more students. It is important to pass this bill and keep Maryland competitive with other states in the aviation repair business so that we can keep the workers we are training in our state.

In closing, we respectfully ask for your support of HB557 – Aircraft Parts and Equipment – Exemption. We are seeing first-hand the benefits of the original legislation. Passage of this bill will keep the exemption in place and maintain Maryland's competitiveness with our neighbors - allowing us to continue to grow and retain the aviation repair and maintenance industry at Maryland's airports.

Sincerely,

Paul Frey, Managing Partner for The Washington County Community Coalition

Aircraft Parts Tax Exemption SB574 Letter of Suppo

Uploaded by: Jonathan Horowitz

Position: FAV



February 6, 2024

The Honorable Guy Guzzone
Chair, Budget and Taxation Committee
Miller Senate Office Building, 3 West Wing
11 Bladen Street
Annapolis, MD 21401-1991

RE: Senate Bill 574 - Sales and Use Tax Exemption - Aircraft Parts and Equipment - Repeal of Reporting Requirement and Sunset

Dear Chair Guzzone and Distinguished Committee Members,

The Washington County Department of Business and Economic Development, supporting the private business industries of our community, would like to express our strong support for HB557 – Sales and Use Tax Exemption - Aircraft Parts and Equipment.

Maryland's unique geographic location can sometimes be a hinderance to our economic development opportunities being situated between neighboring strong economic policy states. Acutely, Washington County itself experiences and even greater degree of competition from our neighbors literally being only 12 miles wide North to South in our community.

Unfortunately, in the aviation industry, this is compounded to the tenth degree. It takes only moments and pennies of fuel to fly over Washington County to a neighboring state in order to address aviation repair or maintenance needs. This puts our aviation industry at a competitive disadvantage which cannot be outweighed by any incentive or local offset. Luckily, with the support of your Legislature in 2020 we were able to level that playing field.

I was surprised to see this exemption sunseting already, time does fly. I strongly urge you to support the repeal of this sunset clause and ensure that Maryland's aviation industry can compete directly with Pennsylvania, West Virginia, and Virginia. We have the Pittsburgh Institute of Aeronautics educating and training some of the nation's finest aircraft maintenance technicians, lets all try to keep them in the State of Maryland and more specifically Washington County when they graduate and seek employment. To do that we must ensure our tax policy does not negatively impact our private business' ability to compete for this lucrative revenue.

With the support of this tax exemption we can ensure that our local regional airport, HGR, continues to attract MRO operations grow their existing business base. **Each year, HGR's tenant businesses contribute some \$300-\$350 million in annual impact to our local and state economies.**

Sincerely,

A handwritten signature in black ink that reads 'Jonathan Horowitz'.

Jonathan Horowitz, Director, Washington County Department of Business and Economic Development

100 West Washington Street, Suite 1401 | Hagerstown, MD 21740 | P: 240.313.2280 | F: 240.313.2281

WWW.WASHCO-MD.NET

SB574_RMC_SupportTestimony.pdf

Uploaded by: Molli Cole

Position: FAV



50 Harry S. Truman Parkway • Annapolis, MD 21401
Office: 410-841-5772 • Voice: 410-841-5761 • TTY: 800-735-2258
Email: rmc.mda@maryland.gov
Website: www.rural.maryland.go

Susan O'Neill, Chair

Charlotte Davis, Executive Director

TESTIMONY IN SUPPORT OF
Senate Bill 574 - Sales and Use Tax - Aircraft Parts and Equipment – Repeal of Reporting
Requirement and Sunset
Senate Budget and Taxation Committee
February 8, 2024

The Rural Maryland Council SUPPORTS Senate Bill 574 - Sales and Use Tax - Aircraft Parts and Equipment – Repeal of Reporting Requirement and Sunset. This bill repeals a certain reporting requirement relating to an exemption from the sales and use tax for certain materials, parts, and equipment used to repair, maintain, or upgrade aircraft or certain aircraft systems; and repealing the termination date of the exemption.

A study published by the Maryland Aviation Administration reports that the Maryland airport system consists of Baltimore/Washington International Thurgood Marshall Airport, Martin State Airport, and 35 general aviation airports. The study estimated that these airports are responsible for over 107,000 direct and indirect jobs, \$7.8 billion in business revenue, and approximately \$590 million in State and local tax revenues.

In addition, the 2012 Economic Census lists 12 businesses in Maryland involved in aerospace products and parts manufacturing. The Maryland Comptroller's Office reports that, according to data from the National Business Aviation Association, there are (1) approximately 11,000 workers employed in the general aviation industry, (2) 24 Federal Aviation Administration certified repair stations, and (3) over 2,500 active general aviation aircraft in Maryland.

Rural Maryland hosts several regional airports. Salisbury-Ocean City Wicomico Regional Airport (Salisbury Regional Airport) spans 1,081 acres and is the second largest airport in Maryland. Salisbury Regional Airport supports 1,300 direct and indirect jobs in the area and generates approximately \$84 million in revenue annually. Hagerstown Regional Airport in Washington County offers passenger service in Western Maryland. The Federal Aviation Administration reports this airport hosted 10,665 passenger boardings in 2010. In the year ending March 31, 2011, the airport had 43,035 aircraft operations, an average of 117 per day: 79% of which were general aviation, 11% military, and 10% air taxi. 129 aircraft were based at Hagerstown: 94% single-engine, 4% jet, and 2% ultralight. Hagerstown Regional Airport also hosts a branch of the Pittsburgh Institute of Aeronautics. Ranked by Forbes as a Top Two-Year Trade School in 2018, PIA has produced aircraft mechanics and avionics technicians to enter the workforce in aviation maintenance, electronics, and other related fields since 1929.

SB 574 will continue to boost Maryland's economic development by encouraging investment in expanded aviation infrastructure and workforce. The Council respectfully requests your favorable support of SB 574.

The Rural Maryland Council (RMC) brings together citizens, community-based organizations, federal, state, county and municipal government officials as well as representatives of the for-profit and nonprofit sectors to collectively address the needs of Rural Maryland communities. We provide a venue for members of agriculture and natural resource-based industries, health care facilities, educational institutions, economic and community development organizations, for-profit and nonprofit corporations, and government agencies to cross traditional boundaries, share information, and address in a more holistic way the special needs and opportunities in Rural Maryland.

"A Collective Voice for Rural Maryland"

SB 574 Sen Corderman Testimony.pdf

Uploaded by: Paul Corderman

Position: FAV

PAUL D. CORDERMAN
Legislative District 2
Frederick and Washington Counties

Budget and Taxation Committee

Subcommittees

Capital Budget

Education, Business and Administration



James Senate Office Building
11 Bladen Street, Room 403
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410-841-3903 · 301-858-3903
800-492-7122 Ext. 3903
Paul.Corderman@senate.state.md.us

THE SENATE OF MARYLAND
ANNAPOLIS, MARYLAND 21401

February 7, 2024

Senate Budget & Tax Committee
Chair Guy Guzzone
Vice Chair Jim Rospepe
3 West Miller Senate Office Building
Annapolis, MD 21401

Testimony in Support of Senate Bill SB 574 – Sales and Use Tax Exemption – Aircraft Parts and Equipment – Repeal of Reporting Requirement and Sunset

Chair Guzzone, Vice Chair Rosapepe, & Members of the Budget & Tax Committee,

Thank you for the opportunity to present SB 574 – Sales and Use Tax Exemption – Aircraft Parts and Equipment – Repeal of Reporting Requirement and Sunset. This bill simply repeals the sales and use tax revenue reporting requirement for the Comptroller's Office, as well as the sunset provision. This Committee passed this bill successfully in 2020 and we are approaching the sunset year, which is scheduled for June of 2025. Allowing this exemption to expire will leave Maryland at an economic disadvantage.

Maryland is home to 33 public-use airports, 2 of which are owned by the State of Maryland – The Baltimore/Washington International Airport (BWI) and the Martin State Airport. Due to our proximity to many other neighboring states, Maryland must remain competitive to incentivize airline industry leaders to remain and attract new aviation businesses to our region.

Thank you for your consideration and I respectfully ask for a favorable report on SB 574.

Sincerely,

A handwritten signature in blue ink, appearing to read "Paul D. Corderman".

Paul D. Corderman
District 2 – Washington & Frederick Counties

Gustavus McLeod Executive Director Glenn L Martin

Uploaded by: Paul Ellington

Position: FAV

Attn:

Senate Bill

MD 2024 SB 0574 Sales and Use Tax Exemption - Aircraft Parts and Equipment - Repeal of Reporting Requirement and Sunset

Date of Hearing: 02/07/24 2:00 PM Senate Budget & Taxation Committee

Chairman / Senator Guy Guzzone & Vice Chair / Senator Jim Rosapepe

Hello Chairman / Senator Guzzone & Vice Chair/ Senator Rosapepe,

Maryland's aerospace heritage is the riches in the nation. More aviation first were in Maryland than anywhere in the world. We have been a leader in the industry since the start. An industry that has given so much to the state has had so little recognition. For us to maintain our leadership in this vital field, we must not continue to ignore it. This bill tells the aviation community, "Maryland is with you." If we are not, others will take our place. Maryland must do more for what has given us so much.

Gustavus McLeod

Executive Director Glenn L Martin Maryland Aviation Museum

SB 574 Support.pdf

Uploaded by: Paul Frey

Position: FAV

February 5, 2024

The Honorable Guy Guzzone
Chair Budget and Taxation Committee
Miller Senate Office Building, 3 West Wing
11 Bladen Street
Annapolis, MD 21401

RE: Senate Bill 574 – Sales and Use Tax Exemption – Aircraft Parts and Equipment – Repeal of Reporting Requirement and Sunset

Dear Chair Guzzone and Distinguished Committee Members,

The Washington County Chamber of Commerce, on behalf of our almost 675 members representing over 40,000 employees, supports SB574, **Sales and Use Tax Exemption – Aircraft Parts and Equipment – Repeal of Reporting Requirement and Sunset**, and we respectfully ask you to vote in support of this legislation.

General aviation repair and maintenance continues to be one of the many industries at our Washington County airport (HGR) that provides quality jobs and supports our local economy. For years, local aviation businesses enjoyed steady growth in sales and employment until 2013, when neighboring states in the North-Atlantic region began exempting sales tax on aircraft parts and Maryland did not. Washington County, in particular, competes in a regional economy and operates at a competitive disadvantage against regional airports in close proximity.

The sales tax exemption for aircraft parts and components that has been in place for the last several years, if allowed to stay in place permanently, will continue to allow Maryland's repair stations to compete on a level playing field, attract business back into the State, support expansion of existing General Aviation repair and installation businesses, and grow employment in the aviation sector. The minimal decrease in Maryland's sales and use tax revenue from aircraft parts sales during the last several years, has been more than offset by the resulting increases in business tax revenues and personal income tax collections resulting from new aviation related jobs.

Again, the Washington County Chamber of Commerce, on behalf of our almost 675 members representing over 40,000 employees, supports SB574, **Sales and Use Tax Exemption – Aircraft Parts and Equipment – Repeal of Reporting Requirement and Sunset**, and we respectfully ask you to vote in support of this legislation.

Please contact me at 301-739-2015, ext. 102, should you have any questions.

Sincerely,

A handwritten signature in blue ink that reads "Paul Frey". The signature is written in a cursive, flowing style.

Paul Frey, IOM
President & CEO

AOPA Support MD S574_2024.pdf

Uploaded by: Sean Collins

Position: FAV



421 Aviation Way
Frederick, MD 21701

T. 202-737-7950
F. 202-273-7951

www.aopa.org

6 February 2024

Senate Budget & Taxation Committee
3 West
Miller Senate Office Building
Annapolis, Maryland 21401

Re: AOPA Support for Senate Bill 574, Repeal of Reporting Requirements and Sunset.

Chairman Senator Guzzone, Vice Chair Senator Rosapepe, and members of the Budget & Taxation Committee,

I am Sean Collins, the Eastern Regional Manager for the Aircraft Owners & Pilots Association (AOPA). We are the world's largest aviation membership organization representing the general aviation interests of 300,000 aircraft owners and pilots nationwide, including more than 4,500 in Maryland. On behalf of these members, **AOPA supports Senate Bill 574, an act to repeal the reporting requirement and sunset.**

In 2020 the legislature passed a targeted sales tax exemption on aircraft parts and components with a provision to sunset in 2025. This action was urgently needed for Maryland's aviation industry to remove a competitive barrier with neighboring states. Since that time, however, Virginia extended its exemption and West Virginia cemented its own, in line with Pennsylvania which has no sunset. Unfortunately, the inclusion of the sunset provision hinders potential new and long-term investment where business planning strategies traditionally look at 10- and 20-year horizons.

General Aviation is a mobile industry. While convenience is a chief concern, expense is the principal motive—even if it means leaving or skipping over Maryland to save money in neighboring states. For this reason, competition to entice new business at airports across state lines is fierce. The opportunity for a state to increase its competitive edge over its neighbor-states is limited, making the necessity to keep-pace, vital.

The passage of Maryland's exemption has paved the way for industry growth and investment in both existing and new aircraft maintenance facilities. Of the 9 facilities that have responded to an AOPA survey, collective employment at these companies increased from 21 staff in 2019, to 59 staff in 2023—a 280% growth in employment opportunity. At the St. Mary's County Regional Airport (2W6), the number of maintenance facilities increased from two to three while quadrupling the number of staff associated with those services from 4 to 16. Local development also included a new flight school that operates 6 new aircraft. At the Bay Bridge Airport (W29), Chesapeake Sport Pilot—a woman-owned flight school—expanded by opening a maintenance department catering to light general aviation aircraft. Last year, Chesapeake Sport Pilot expanded their maintenance operation to the Tipton Airport (FME) and is now considering additional investment to secure a more permanent future. Royal Aircraft Services at the Hagerstown Regional Airport (HGR) in Washington County, invested in new infrastructure to expand its service offerings to include an aircraft paint shop—the first of its kind in Maryland and these are just a few examples of how this targeted exemption has spurred new development and generated new good-wage paying jobs across the state.

For these reasons, **AOPA supports Senate Bill 574**. Thank you for your consideration of our views. For questions, please contact me directly at 301-695-2090 or by email at sean.collins@aopa.org.

Sincerely,

A handwritten signature in black ink, appearing to read "Sean M. Collins", is centered on a light-colored rectangular background.

Sean M. Collins, AOPA
Eastern Regional Manager

Tax exemption bill.pdf

Uploaded by: Shannon Lund

Position: FAV



MD 2024 SB 0574 - HB 0557 Sales Tax Exemption - Aircraft Parts and Equipment - Repeal of Reporting Requirement and Sunset

Senate Bill:

- MD 2024 SB 0574 Sales and Use Tax Exemption - Aircraft Parts and Equipment - Repeal of Reporting Requirement and Sunset
- Date of Hearing: 02/07/24 2:00 PM Senate Budget & Taxation Committee
- Chairman / Senator Guy Guzzone & Vice Chair / Senator Jim Rosapepe

House Bill

- MD 2024 HB 0557 Sales and Use Tax Exemption - Aircraft Parts and Equipment - Repeal of Reporting Requirement and Sunset
- Date of Hearing: 02/08/24 1:00 PM House Ways & Means Committee
- Chairwoman / Delegate Vanessa E Atterbeary & Vice Chair / Delegate Jheanelle K. Wilkins

Hello Senators and Delegates,

I respectfully write to the Committee today and its members for a favorable report for MD 2024 SB 0574 - HB 0557 Sales Tax Exemption - Aircraft Parts and Equipment - Repeal of Reporting Requirement and Sunset

The aviation industry in America is a staple to our country's economy; as of 2020, there are over 20,000 airports in the US. The industry supports over 6.5 million jobs in the US and generates over \$700 billion dollars in revenue towards the GDP. Right now, there are forecasts for 2024 that Air travel is expected to jump from 4.5 billion travelers in 2019 to 4.7 billion travelers this year worldwide.

Of the 34 public-use aviation facilities in the State of Maryland, there are 3 Air Carrier Airports, 6 Reliever Airports, 15 General Airports, 8 Local Airports, and 2 Special Facilities. In addition to the 34 public-use aviation facilities in the Maryland Aviation System Plan, there are 182 private-use aviation facilities in the State, including airports, heliports, and a seaplane base. Civil aviation supports the Maryland state economy through economic output by attracting business and tourism, supporting local economic development, and helping retain jobs that otherwise might be located elsewhere. The Maryland Aviation Administration (MAA) published the Economic Impact of Public Use Airports in Maryland in December 2018, which identified the following total combined annual impacts for 34 Maryland airports, excluding Baltimore/Washington International Thurgood Marshall Airport (BWI):

- Total Jobs: 9,929
- Personal Income: \$582.8 million
- Business Revenue: \$867.1 million
- Local Purchases: \$271.7 million
- State and Local Taxes: \$131.4 million

Separately, a 2015 estimate of economic impact from BWI alone produced the following impacts:

- Total Jobs: 97,737
- Personal Income: \$3.8 billion
- Business Revenue: \$7 billion
- Local Purchases: \$1.6 billion
- State and Local Taxes: \$536 million

In 2020, the State passed a bill to help boost this important industry to exempt sales tax on aircraft parts, making our State the 10th in the eastern region to pass this legislation. This legislation has helped drive competition, increase jobs, and aviation volume across the State. However, this legislation had a sunset provision; thus, this legislation would keep the momentum that we helped create in 2020 intact by simply reversing the sunset provision.

Furthermore, in 2023, the University of Maryland Eastern Shore (UMES), Piedmont Airlines, and Salisbury Wicomico Economic Development (SWED) partnered to create a workforce development program to innovate the next generation of workers in our State to become certified aircraft maintenance technicians. To strengthen our workforce in this important industry, this legislation will help make this program and similar programs in the State be more successful.

In closing, I respectfully ask the Committee for a favorable report for MD 2024 SB 0574 - HB 0557 Sales Tax Exemption - Aircraft Parts and Equipment - Repeal of Reporting Requirement and Sunset.

Thank you for your time and consideration.



Shannon Lund
Maintenance Administration
Atkinson Aeronautics and Tech.