The Economic Impact of U.S. Civil Aviation: 2020

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Federal Aviation Administration

Contents

Foreword

Civil air transportation continues to play a major and growing role in economies around the world. In the United States, more than 5,000 public-use airports support over 7,000 air transport and 200,000 General Aviation aircraft performing more than 42 million airport operations. However in calendar year 2020, the economic impact of civil aviation, like so many other areas of the national economy, was adversely impacted by the COVID-19 pandemic. For instance, in 2020 due to COVID-19, the number of passengers at U.S. airports fell to 403.8 million from 1,065.4 million in 2019. Countries around the world implemented entry restrictions due to COVID-19, which depressed the availability of travel options for passengers throughout 2020.

In 2020, the direct sectors of aviation (which include airline and airport operations, aircraft manufacturing and others) amounted to 1.3 percent of gross domestic product (GDP), $534.7 billion in economic activity, and over 2.5 million jobs. When looking at both direct and catalytic sectors (catalytic sectors are comprised of travel arranging services and visitor spending), civil aviation contributed 2.3 percent of our GDP, $0.9 trillion in total economic activity, and supported almost 5 million jobs. While these values are significant, they reflect about a 50 percent decrease when compared to 2019.

Throughout the pandemic, the Federal Aviation Administration (FAA) has continued its efforts to support this economic activity, by ensuring the safest, most efficient aerospace system in the world. As part of our continual modernization efforts, we are introducing new airspace innovations every day. These innovations include publishing more than 9,000 performance-based (or satellite-based) navigation routes. These routes enable more point-to-point, flying; reducing fuel usage and emissions. The FAA continues to put in place data communications, which enable air traffic controllers and pilots to communicate using text, in addition to voice. Changes like these are making flying more efficient and environmentally friendly, while ensuring we meet our exacting safety requirements.

The FAA is integrating new users, such as drones and commercial space operations into the national airspace system. These new vehicles are poised to change how we live, in a way not seen since the dawn of the jet age. All these efforts are bringing positive commercial benefits to our citizens and helping to sustain America's leadership in civil aviation. Additional information on the projected growth and positive impact of drones, commercial space operation, and other areas can be found in the FAA's National Aerospace Forecast available here – https://www.faa.gov/data_research/aviation.

The FAA's Economic Impact Report is ideal for policymakers, industry officials, and universities. It offers data from the pandemic year of 2020 on the economic importance of passenger and cargo transportation, from activities by commercial airlines, air couriers, airports, aircraft manufacturing, and of aviation research and development. As the aviation sector has continued to rebound in 2021 and 2022, this data is useful in order to understand the critical role that aviation plays in supporting tourism and other travel-related activities and notes the impact COVID-19 had on the aviation industry.

Like all of us at the FAA, I am passionate about civil aviation and recognize that now, more than ever, it is a vital component of the nation's transportation network, and one that generates an outsized impact on the economy.

Laurence Wildgoose
Assistant Administrator
Policy, International Affairs, and Environment
Federal Aviation Administration

Overview

Furthering economic growth and development, civil aviation provides the means of transporting millions of passengers and tons of freight to all corners of the globe every day. Consumers rely on this physical connectivity to improve their quality of life and businesses depend on it to facilitate transactions, both of which are key to increasing a nation's economic productivity and prosperity.

The COVID-19 public health emergency led to the U.S. economy shrinking in 2020 for the first time since 2009.[1] COVID-19 impacted civil aviation, as well as the consumers and other U.S. industries dependent on civil aviation.

Some observations of civil aviation in 2020 include:[2]

- **Air carriers operating in U.S. airspace transported 403.8 million passengers over 495.7 billion revenue passenger miles (RPM).**
- **More than 75.5 billion revenue ton-miles (RTM) of freight passed through U.S. airports reflecting a slight increase when compared to 2019.**
- **Civil aircraft manufacturing total output was $38.2 billion.**
- **Commercial airline operations supported $136.2 billion of visitor expenditures on goods and services.**

This report's estimates reveal that only two sectors experienced growth of real primary output during the 2018-2020 period: airport operations and air couriers. Both experienced an average annual growth of 8.0 percent during this time. Airport Operations added $4.6 billion and Air Couriers added $4.3 billion. Both surpassed the U.S. economy which shrank by 1.2 percent during this time frame[3].

Real growth in primary output for airline operations, civilian commercial aircraft manufacturing, and airline visitor expenditure all declined by an average of 30 percent per year between 2018 and 2020. Within the general aviation categories, the decline was smaller with operations decreasing by almost 13 percent per year; 3.0 percent per year for manufacturing; and nearly 2.0 percent per year for visitor expenditure.

Overall, during 2020 the total U.S. economy generated $20.9 trillion in value-added economic activity[4] and supported 142.2 million jobs[5]. At the same time, civil aviation directly or indirectly supported:

- **$0.9 trillion in total economic activity,**
- **4.9 million jobs, and;**
- **contributed 2.3 percent of U.S. gross domestic product (GDP).**

Introduction

What's New

This report incorporates data from the U.S. Department of Commerce, U.S. Department of Transportation, U.S. Department of Labor, and the National Science Foundation from the years 2018–2020.

In September 2021, the U.S. Department of Commerce completed the release of the 2017 Economic Census. Due to incorporating this updated data source, FAA was no longer able to produce reliable estimates for Civilian Avionics Manufacturing. As a result, this report does not report estimates for Civilian Avionics Manufacturing.

For this report, the FAA used the most recent Regional Input-Output Modeling System (RIMS II) multipliers from the Bureau of Economic Analysis (BEA). These multipliers reflect the 2012 input-output benchmark table (I-O table) and the 2020 regional economic accounts. Compared to those used in the 2018 report[6], all of the new multipliers imply a slightly higher impact to output, earnings, and value added whereas the multipliers impacts for jobs are lower.

This report continues to group industry sectors by their primacy in relation to the function of providing air transport. The first category is Direct, which includes airline and airport operations, aircraft manufacturing and others. The second category is Catalytic, which comprises only travel arranging services and visitor spending. This change brings the report more closely into alignment with common usage of the terminology that appears in other economic impact studies. This affects only the presentation of the results.

Finally, while the data source for domestic airline visitor expenditure was kept the same, the methodology was changed. The Consumer Expenditure Survey from the Bureau of Labor Statistics provides the underlining data for domestic airline visitor expenditure. This report continues to use the Consumer Expenditure Survey but will now use the public use microdata. The microdata will help better reflect the economic impact of domestic visitor expenditure on civil aviation.

Emerging Topics in Aviation

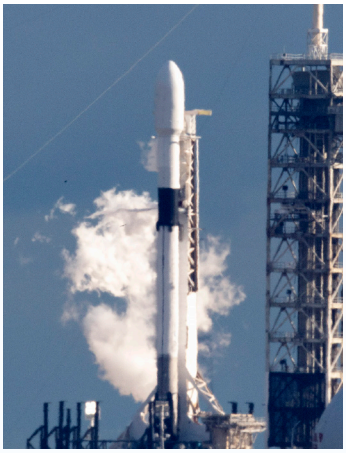
Brief sections on unmanned aircraft systems (also known as drones)[7], and commercial space are included in this report. The rise in popularity of drones is well known. Future editions of this report may include estimates of the economic impacts of the drone segment, as it matures and more economic data become available. Additionally, the commercial space estimates represent the economic impact of commercial launches of vehicles into orbital or suborbital space carrying payloads for private or government purposes.

Drones

Drones continue to experience growth in the United States and around the world. A drone is an aircraft without a human pilot onboard, a ground-based control station, and a communications link connecting all the components. While introduction of drones in the national airspace system have opened numerous possibilities, it has also brought operational challenges. Integration of drones into the national airspace must be done in a manner that ensures the safety of people and property both in the air and on the ground. Despite these challenges, the drone sector continues to move forward.

As the industry evolves and economic gains of drone integration become increasingly apparent; efficiency, safety, security, and the true economic impact will become transparent. As of this publication, economic data on drones is available from trade data. In January 2022, the harmonized tariff schedule began publishing tariff numbers explicitly for drones[8]. As a result, the U.S. Census Bureau now collects and publishes import and export data on drones. These economic values are useful in understanding and tracking the growth of drones. However, the FAA is unable to use them currently in estimating the economic impact of drones in civil aviation. The continued growth of drones will hopefully allow the FAA to provide these estimates in the future.

Commercial Space



Commercial space is becoming a greater presence in the national airspace system. In 2020, there were 39 licensed launches reflecting an increase from the 33 licensed launches in 2018[9]. Additionally, BEA continues to release updated values on the U.S. space economy. In January 2022, BEA released these economic values covering the time period from 2012-2019[10]. However after assessing the data, the FAA is unable to use the new data to help understand the economic impact of commercial space on civil aviation. This is due to BEA reporting values combining civil and defense industries, as well as public and private. These differences in concepts prevent the FAA from publishing reliable estimates on commercial space's impact for civil aviation. The FAA will continue to look for other data sources to help describe the impact of commercial space on civil aviation.

National Impact of U.S. Civil Aviation

This report estimates the economic contribution of the U.S. civil aviation industry. Civil aviation has numerous and far-reaching economic impacts. This report uses the best data available from government and private sources to capture economic activity generated by the air transport of passengers and cargo.

The FAA has produced numerous economic impact reports since 2003 at both the national and state levels. Recently, the FAA has chosen to follow an alternate-year schedule, with the national and state versions staggered and each produced every other year. Due to the lag in data releases, publication of this report puts the FAA on schedule where the report will contain a two-year lag in data since this report references 2020 data.

Methodology

The total economic impact of an industry is a summation of primary and secondary spending related to that particular industry. This definition is standard for economic-impact studies. It also helps to estimate aviation's unique economic contribution to the national economy. The data used to measure the primary economic impacts of civil aviation comes from reliable government and private sources. This study estimated those impacts by looking at industry output, earnings, and jobs. Application of the multipliers from the RIMS II Input-Output Model, a model developed by the U.S. Department of Commerce's Bureau of Economic Analysis, help derive the amounts of secondary spending[11]. The summation of primary and secondary amounts produce a measure of civil aviation's total impact on the U.S. economy.

Types of Economic Impacts

PRIMARY IMPACTS: The primary impacts of aviation are a summation of the revenue earned from the sale of goods and services by each of the sectors, whether categorized as direct or catalytic, relevant to the civil aviation industry. For example, these sources of revenue include:

- Air carrier ticket sales
- Value of aircraft manufacturer shipments
- General Aviation operating costs
- Visitor spending (excluding airfare) on trips taken by air

SECONDARY IMPACTS: Secondary impacts result from expenditures made by sectors identified in the measurement of primary impacts to supporting businesses and entities, as well as the spending of employees. In other words, secondary impacts capture, through multiplier effects, the spending down the supply chain, and payroll impacts that circulate. As noted above, the RIMS II model derives the secondary impacts from their corresponding primary impacts.

Measures of Economic Impacts

Primary expenditure estimates are inputs into the RIMS II model to estimate the secondary effects of those expenditures on the U.S. economy, in terms of economic output, earnings, and jobs.

OUTPUT: The total economic value of goods and services produced[12].

EARNINGS: Wages and salaries, other labor income, benefits, and proprietors' income paid to all employed persons who deliver final demand output and services.

JOBS: The number of people employed full-time in industries that provide civil-aviation services, manufacture aircraft and aircraft engines, or work in other industries (such as hospitality) that are indirectly affected by activity in the civil aviation sector.

The Coronavirus Aid, Relief, and Economic Security Act of 2020 (CARES) established the Payroll Support Program (PSP) to provide support to air carriers and certain contractors. The PSP made $25 billion available to passenger air carriers; $4 billion for cargo air carriers; and $3 billion for certain contractors. Air carriers and contractors must use the funds for the continuation of payment to employee wages, salaries, and benefits.

This report assesses the role that civil air transportation plays within the U.S. economy from a demand perspective. The Federal assistance payments received via PSP changed the supply of aviation for air carriers and contractors. These differences in concept does not allow a direct assessment of the role of the Federal assistance payments. Therefore, PSP funds were not assessed in this report.

Results

Table 1 summarizes the total impact of U.S. civil aviation on output, earnings, and jobs, in addition to providing the breakdown between direct and catalytic sectors for each measure. The direct category includes airline and airport operations, aircraft manufacturing and others, while the catalytic category comprises only travel arranging services and visitor spending.

In 2020, economic activity attributed to civil aviation-related goods and services totaled $0.9 trillion, generating 4.9 million jobs with $259.1 billion in earnings. Aviation contributed 2.3 percent of GDP, the value-added measure of overall U.S. economic activity. Considering only the direct sectors, aviation contributed 1.3 percent of GDP, $534.7 billion in economic activity, and 2.6 million jobs. As a comparison point, in 2019 the direct sectors for civil aviation contributed 2.0 percent of GDP, $852.3 billion in economic activity, and 3.7 million jobs..

Table 1. Summary – Economic Impact of U.S. Civil Aviation 2018-2020 (Current Dollars)

Year	Sector Category	Output ($Billions)	Earnings ($Billions)	Jobs (Thousands)	Percent of GDP
2020	Direct	534.7	147.2	2,579	1.3
	Catalytic	377.1	111.9	2,352	1.0
	Total	**911.7**	**259.1**	**4,931**	**2.3**
2019	Direct	852.3	224.7	3,730	2.0
	Catalytic	1,066.1	316.4	6,663	2.9
	Total	**1,918.4**	**541.1**	**10,393**	**4.9**
2018	Direct	875.0	228.4	4,093	2.1
	Catalytic	1,003.1	297.7	6,896	2.8
	Total	**1,878.0**	**526.1**	**10,989**	**4.9**

Note: Details may not sum to totals due to rounding.

Table 2. Primary Output (Current Dollars)

Description	2020 ($Billions)
Airline Operations	56.1
Airport Operations	34.6
Civilian Aircraft Manufacturing	16.2
Civilian Aircraft Engine and Engine Parts Manufacturing	5.9
Civilian Other Aircraft Parts and Equipment Manufacturing	21.3
Civilian Research and Development	7.7
GA Operations	19.0
GA Aircraft Manufacturing	11.1
Air Couriers	32.3
Subtotal - Direct	**204.2**
Airline Visitor Expenditures	136.2
GA Visitor Expenditures	5.0
Travel Arrangements	5.1
Subtotal - Catalytic	**146.4**
Total Primary Output	**350.6**

Note: Details may not sum to totals due to rounding.

Table 2 reports primary output for 2020 and is the basis for calculating the total economic impact of civil aviation for the year. As described above, to get these secondary and total impacts, multiplication of the primary output with the BEA's RIMS II multipliers takes place.

Airline Operations is the largest single sector in the Direct category with primary output of $56.1 billion. Among all sectors, however, Airline Visitor Expenditures is clearly in the lead with primary output of $136.2 billion, reflecting the scope and importance of air travel as a means of transport. In 2020 total primary output for the civil aviation industry as a whole was $350.6 billion.

These primary output amounts, in conjunction with the RIMS II multipliers, calculate the secondary amounts. Total output, or the sum of primary and secondary impacts, reported in Table 3, shows the following:

- In 2020, Airline Operations generated $140.0 billion in total output, representing the largest single sector of civil aviation's direct contribution.
- General Aviation Operations accounted for $47.4 billion of total output in 2020. While the impact is less than Airline Operations, the GA contribution continues to reflect the sector's unique role in the nation's transportation system.
- As domestic and foreign airline passengers reach their destinations in the United States, their total expenditures on hotels, rental cars, and entertainment contributed $349.9 billion in total output, more than double the output supported by Airlines' Operations.

Table 3. Total Output, Earnings and Jobs Estimates, 2020 (Current Dollars)

Description	Output ($Billions)	Earnings ($Billions)	Jobs (Thousands)
Airline Operations	140.0	34.5	532
Airport Operations	107.3	35.8	597
Civilian Aircraft Manufacturing	38.2	8.9	129
Civilian Aircraft Engine and Engine Parts Manufacturing	12.4	2.9	43
Civilian Other Aircraft Parts and Equipment Manufacturing	52.5	13.8	220
Civilian Research and Development	22.2	7.3	105
GA Operations	47.4	11.7	180
GA Aircraft Manufacturing	26.3	6.1	89
Air Couriers	88.4	26.3	685
Subtotal - Direct	**534.7**	**147.2**	**2,579**
Airline Visitor Expenditures	349.9	103.9	2,196
GA Visitor Expenditures	12.9	3.8	81
Travel Arrangements	14.2	4.1	74
Subtotal - Catalytic	**377.1**	**111.9**	**2,352**
Total Impact	**911.7**	**259.1**	**4,931**

Note: Details may not sum to totals due to rounding.

Aviation's Contribution to Gross Domestic Product

U.S. GDP was $20,893.7 billion in 2020[13]. GDP represents the sum of all value-added activities in an economy, so intermediate goods and services used in the production of other goods and services are not included. This contrasts with the previous section where the total output calculation included intermediate goods and services that were purchased as part of the production process. In order to assess aviation's contribution to GDP, these intermediate goods and services must be subtracted from total output.

In order to estimate civil aviation's contribution to GDP, each expenditure category is calculated separately using the RIMS II value added coefficients. Table 4 shows the results. In 2020, value added economic activity from aviation and other related sectors totaled $488.0 billion, or 2.3 percent of U.S. GDP.

In 2020, the direct sectors contributed $272.2 billion or 1.3 percent of GDP, while the catalytic sectors contributed $215.8 billion or 1.0 percent of GDP. Among all sectors, the largest component is Airline Visitor Expenditures totaling $200.7 billion, or 1.0 percent of GDP, followed by Airline Operations at $68.5 billion, or 0.3 percent of GDP. General Aviation, including operations, manufacturing and visitor spending, while small in comparison to commercial aviation, still contributed 0.2 percent to GDP, or $43.6 billion.

See the Appendix for civil aviation's contribution to GDP for the years 2018 through 2020.

Table 4. Civil Aviation's Contribution to GDP, 2020 (Current Dollars)

Description	Value Added ($Billions)	Percent of GDP
Airline Operations	68.5	0.3
Airport Operations	56.2	0.3
Civilian Aircraft Manufacturing	19.0	0.1
Civilian Aircraft Engine and Engine Parts Manufacturing	6.3	0.0
Civilian Other Aircraft Parts and Equipment Manufacturing	26.7	0.1
Civilian Research and Development	12.3	0.1
GA Operations	23.2	0.1
GA Aircraft Manufacturing	13.0	0.1
Air Couriers	47.0	0.2
Subtotal - Direct	**272.2**	**1.3**
Airline Visitor Expenditures	200.7	1.0
GA Visitor Expenditures	7.4	0.0
Travel Arrangements	7.7	0.0
Subtotal - Catalytic	**215.8**	**1.0**
Total Impact	**488.0**	**2.3**

Note: Details may not sum to totals due to rounding.

Revision to Previous Years

Table 5 reports the change from previously published FAA economic impact estimates for civil aviation. For 2018, the total difference between the current and previously published estimates were about $64.5 billion lower in total output, or, approximately 0.1 percentage point lower in contribution to GDP.

The downward revisions to output, earnings, jobs, and percent of GDP are primarily attributable to changes in the underlying data for two categories: Avionics Manufacturing and Airline Visitor Expenditures. The decrease in Avionics Manufacturing is attributable to incorporating the 2017 Economic Census. Incorporating the new economic census resulted in the inability to calculate a reliable estimate for Avionics Manufacturing. For Airline Visitor Expenditure, the decrease is due to using the Consumer Expenditure Survey's microdata instead of extrapolating historical values.

Table 5. Revisions to Previously Published Estimates (Current Dollars)

	Year	Output ($Billions)	Earnings ($Billions)	Jobs (Thousands)	Percent of GDP
Current Total:	2018	1,878.0	526.1	10,989	4.9
Previous Total:	2018	1,942.6	543.9	11,351	5.1
Difference (Revision):		-64.5	-17.8	-362	-0.1

Revision by Sector	Output ($Billions)	Earnings ($Billions)	Jobs (Thousands)	Value Added ($Billions)
Airline Operations	0.0	0.0	0	0.0
Airport Operations	0.0	0.0	0	0.0
Civilian Aircraft Manufacturing	-7.6	-1.8	-27	-3.8
Civilian Aircraft Engine and Engine Parts Manufacturing	0.1	0.0	0	0.0
Civilian Other Aircraft Parts and Equipment Manufacturing	3.3	0.9	15	1.7
Civilian Avionics Manufacturing	-29.6	-7.8	-133	-15.0
Civilian Research and Development	0.0	0.0	0	0.0
GA Operations	0.0	0.0	0	0.0
GA Aircraft Manufacturing	0.0	0.0	0	0.0
Air Couriers	-2.6	-0.8	-20	-1.4
Subtotal - Direct	**-36.4**	**-9.4**	**-166**	**-18.5**
Airline Visitor Expenditures	-29.8	-8.8	-206	-17.1
GA Visitor Expenditures	0.6	0.2	4	0.3
Travel Arrangements	1.0	0.3	6	0.6
Subtotal - Catalytic	**-28.1**	**-8.4**	**-196**	**-16.2**

Note: Details may not sum to totals due to rounding.

Real Change from Previous Years

Three measures highlight the economic contribution of the civil aviation sector: the value of total output, earnings paid to employees, and the number of jobs supported by civil aviation. Table 6 shows these measures in 2018 dollars. This removes inflation leading to a better comparison to 2020 estimates.

Comparing the 2020 estimates to the 2018 revised values in Table 5, real total output of civil aviation decreased 53.6 percent between 2018 and 2020, while real earnings decreased 52.9 percent and total jobs decreased 55.7 percent during the same time. Airport Operations and Air Couriers were the only two sectors to not experience a decrease in real total output, real earnings, and total jobs.

Table 6. U.S. Civil Aviation: Growth of Total Output, Earnings, and Jobs (2018 Dollars)

Description	Output (2018 $Billions)		%	Earnings (2018 $Billions)		%	Jobs (Thousands)		%
	2018	2020	Change	2018	2020	Change	2018	2020	Change
Airline Operations	367.4	135.8	-63.0	90.3	33.4	-63.0	1,543	532	-65.5
Airport Operations	89.3	104.1	16.5	29.8	34.7	16.5	564	597	5.8
Civilian Aircraft Manufacturing	135.6	37.1	-72.7	31.5	8.6	-72.6	491	129	-73.7
Civilian Aircraft Engine and Engine Parts Manufacturing	16.5	12.0	-27.4	3.9	2.8	-27.4	62	43	-31.4
Civilian Other Aircraft Parts and Equipment Manufacturing	70.7	50.9	-28.0	18.6	13.4	-28.0	318	220	-30.8
Civilian Research and Development	32.5	21.5	-33.9	10.7	7.1	-33.9	170	105	-38.5
GA Operations	61.8	46.2	-25.3	15.2	11.4	-25.2	260	180	-30.6
GA Aircraft Manufacturing	27.4	25.6	-6.4	6.4	6.0	-6.4	99	89	-10.4
Air Couriers	73.7	85.8	16.4	21.9	25.5	16.4	585	685	17.0
Subtotal - Direct	**875.0**	**518.9**	**-40.7**	**228.4**	**142.9**	**-37.4**	**4,093**	**2,579**	**-37.0**
Airline Visitor Expenditures	964.9	339.4	-64.8	286.6	100.8	-64.8	6,664	2,196	-67.0
GA Visitor Expenditures	13.1	12.6	-3.4	3.9	3.7	-3.4	90	81	-9.9
Travel Arrangements	25.2	13.8	-45.1	7.3	4.0	-45.1	142	74	-47.8
Subtotal - Catalytic	**1,003.1**	**365.8**	**-63.5**	**297.7**	**108.5**	**-63.5**	**6,896**	**2,352**	**-65.9**
Total Impact	**1,878.0**	**884.7**	**-52.9**	**526.1**	**251.4**	**-52.2**	**10,989**	**4,931**	**-55.1**

Note: Details may not sum to totals due to rounding.

Conclusion

Civil aviation connects the entire globe, providing much needed economic benefits both seen and unseen for U.S. consumers and businesses. Civil aviation has been a major force connecting America to the global economy and the U.S. civil aviation industry truly remains a unique engine for innovation and technological progress.

Due to COVID-19 from 2018 to 2020, real GDP averaged -1.2 percent growth per year, and employment shrank by 6.7 million persons, from 148.9 million to 142.2 million. In 2020, civil aviation direct sectors produced 1.3 percent of GDP, and generated 2.6 million jobs. Earnings for civil aviation direct sectors registered at $147.2 billion. The catalytic sectors generated 1.0 percent of GDP and supported 2.4 million jobs. Overall, civil aviation and the sectors it supports accounted for 2.3 percent of the U.S. economy. The total output of civil aviation-related (both direct and catalytic) goods and services amounted to $0.9 trillion and generated 4.9 million jobs, with earnings of $259.1 billion. As shown the four primary metrics found in this report all show a decline of over 50 percent from 2018 to 2020 due to the emergence of COVID-19 in early 2020.

Drones and commercial space operations are both emerging sectors within civil aviation, though as yet, neither category has sufficiently reliable data to be included in the computational breakdown of impacts in this report. As with commercial aviation, the economic impact of drones and commercial space operations extends beyond those sectors to other parts of the economy. The FAA will continue to monitor availability of data on drones and commercial space as their impacts expand.

Appendix – Supplemental Tables

Table 7. U.S. Civil Aviation Economic Impact, Total Output: Primary plus Secondary Impacts (Current Dollars)

Total Output ($Billions)			
Description	2018	2019	2020
Airline Operations	367.4	385.5	140.0
Airport Operations	89.3	105.2	107.3
Civilian Aircraft Manufacturing	135.6	76.3	38.2
Civilian Aircraft Engine and Engine Parts Manufacturing	16.5	17.8	12.4
Civilian Other Aircraft Parts and Equipment Manufacturing	70.7	75.7	52.5
Civilian Research and Development	32.5	25.7	22.2
GA Operations	61.8	55.7	47.4
GA Aircraft Manufacturing	27.4	33.0	26.3
Air Couriers	73.7	77.3	88.4
Subtotal - Direct	**875.0**	**852.3**	**534.7**
Airline Visitor Expenditures	964.9	1,025.5	349.9
GA Visitor Expenditures	13.1	13.4	12.9
Travel Arrangements	25.2	27.2	14.2
Subtotal - Catalytic	**1,003.1**	**1,066.1**	**377.1**
Total Impact	**1,878.0**	**1,918.4**	**911.7**

Note: Details may not sum to totals due to rounding.

Table 8. U.S. Civil Aviation Economic Impact, Total Earnings: Primary plus Secondary Impacts (Current Dollars)

Total Earnings ($Billions)			
Description	2018	2019	2020
Airline Operations	90.3	94.8	34.5
Airport Operations	29.8	35.1	35.8
Civilian Aircraft Manufacturing	31.5	17.7	8.9
Civilian Aircraft Engine and Engine Parts Manufacturing	3.9	4.2	2.9
Civilian Other Aircraft Parts and Equipment Manufacturing	18.6	20.0	13.8
Civilian Research and Development	10.7	8.5	7.3
GA Operations	15.2	13.7	11.7
GA Aircraft Manufacturing	6.4	7.7	6.1
Air Couriers	21.9	23.0	26.3
Subtotal - Direct	**228.4**	**224.7**	**147.2**
Airline Visitor Expenditures	286.6	304.6	103.9
GA Visitor Expenditures	3.9	4.0	3.8
Travel Arrangements	7.3	7.9	4.1
Subtotal - Catalytic	**297.7**	**316.4**	**111.9**
Total Impact	**526.1**	**541.1**	**259.1**

Note: Details may not sum to totals due to rounding.

Table 9. U.S. Civil Aviation Economic Impact, Total Jobs: Primary plus Secondary Impacts

Total Jobs (Thousands)			
Description	2018	2019	2020
Airline Operations	1,543	1,464	532
Airport Operations	564	585	597
Civilian Aircraft Manufacturing	491	258	129
Civilian Aircraft Engine and Engine Parts Manufacturing	62	62	43
Civilian Other Aircraft Parts and Equipment Manufacturing	318	318	220
Civilian Research and Development	170	121	105
GA Operations	260	211	180
GA Aircraft Manufacturing	99	112	89
Air Couriers	585	599	685
Subtotal - Direct	**4,093**	**3,730**	**2,579**
Airline Visitor Expenditures	6,664	6,437	2,196
GA Visitor Expenditures	90	84	81
Travel Arrangements	142	141	74
Subtotal - Catalytic	**6,896**	**6,663**	**2,352**
Total Impact	**10,989**	**10,393**	**4,931**

Note: Details may not sum to totals due to rounding.

Table 10. U.S. Civil Aviation Economic Impact, Value Added (Current Dollars)

Value Added ($Billions)			
Description	2018	2019	2020
Airline Operations	179.6	188.5	68.5
Airport Operations	46.8	55.1	56.2
Civilian Aircraft Manufacturing	67.3	37.9	19.0
Civilian Aircraft Engine and Engine Parts Manufacturing	8.4	9.1	6.3
Civilian Other Aircraft Parts and Equipment Manufacturing	35.9	38.5	26.7
Civilian Research and Development	18.1	14.3	12.3
GA Operations	30.2	27.2	23.2
GA Aircraft Manufacturing	13.6	16.4	13.0
Air Couriers	39.2	41.1	47.0
Subtotal - Direct	**439.1**	**428.1**	**272.2**
Airline Visitor Expenditures	555.3	588.2	200.7
GA Visitor Expenditures	7.5	7.7	7.4
Travel Arrangements	13.7	14.7	7.7
Subtotal - Catalytic	**576.5**	**610.6**	**215.8**
Total Impact	**1,015.6**	**1,038.7**	**488.0**

Note: Details may not sum to totals due to rounding.

Table 11. U.S. Civil Aviation Economic Impact, Percent Contribution to GDP

	Value Added (% of GDP)		
Description	2018	2019	2020
Airline Operations	0.9	0.9	0.3
Airport Operations	0.2	0.3	0.3
Civilian Aircraft Manufacturing	0.3	0.2	0.1
Civilian Aircraft Engine and Engine Parts Manufacturing	0.0	0.0	0.0
Civilian Other Aircraft Parts and Equipment Manufacturing	0.2	0.2	0.1
Civilian Research and Development	0.1	0.1	0.1
GA Operations	0.1	0.1	0.1
GA Aircraft Manufacturing	0.1	0.1	0.1
Air Couriers	0.2	0.2	0.2
Subtotal - Direct	**2.1**	**2.0**	**1.3**
Airline Visitor Expenditures	2.7	2.8	1.0
GA Visitor Expenditures	0.0	0.0	0.0
Travel Arrangements	0.1	0.1	0.0
Subtotal - Catalytic	**2.8**	**2.9**	**1.0**
Total Impact	**4.9**	**4.9**	**2.3**

Note: Details may not sum to totals due to rounding.

Glossary of Economic Terms

Catalytic Sector

This is a term used to categorize the various sectors within the civil aviation industry. In this report, these sectors provide goods and services that are related to, and partially dependent upon, civil aviation, but their main function is not to support aviation. The sectors categorized as catalytic are visitor expenditures and travel arrangers[14].

Direct Sector

This is a term used to categorize the various sectors within the civil aviation industry. In this report, these sectors provide goods and services that are fundamental to, and inseparable from, civil aviation. Airline operations, aircraft manufacturing, air couriers and others all are grouped in this category.

Earnings

Earnings are wages and salaries and other labor income, such as overtime, benefits and proprietors' income, paid to all employed persons by employers for a given unit of work or time. The Bureau of Labor Statistics (BLS) publishes earnings data.

Employment (Jobs)

The BLS is responsible for collecting and publishing data on the number of persons employed within the United States. According to BLS:

Employment data refer to persons on establishment payrolls who received pay for any part of the pay period that includes the 12th day of the month.

Data exclude proprietors, the unincorporated self-employed, unpaid volunteer or family workers, farm workers, and domestic workers. Salaried officers of corporations are included. Government employment covers only civilian employees; military personnel are excluded. Employees of the Central Intelligence Agency, the National Security Agency, the National Imagery and Mapping Agency and the Defense Intelligence Agency also are excluded[15].

Gross Domestic Product

Gross domestic product (GDP) is a measure of overall economic production during a period of time. It represents the current dollar value of all final goods and services produced within a country during a specified time period, such as a year or quarter. These goods and services include consumption, investment, government expenditures and net exports. GDP also can be viewed as the sum or aggregate of value added over each stage of production over the entire economy. The Bureau of Economic Analysis (BEA) publishes annual and quarterly measures of GDP.

Gross Output

For an industry, gross output is the dollar value of goods or services produced by the industry and made available for use outside that industry during a specified time period[16]. It is measured as total sales or receipts, plus other operating income, commodity taxes (sales and excise taxes) and changes in inventories; or, equivalently, as value added, plus goods and services purchased for use in production. For an entire nation, total gross output is equal to total intermediate inputs plus GDP, and thus exceeds GDP. The BEA publishes annual national and industry-level estimates of gross output.

Multipliers

Multipliers measure the impact of a particular category of spending on the rest of the economy, specifically on output, earnings and employment. The BEA publishes industry-level multiplier estimates.

Output

Output is the current dollar production of goods or services by a production unit and is measured by total sales or receipts of that unit, plus other operating income, commodity taxes (sales and excise taxes) and changes in inventories.

Primary Impact

This is a term used to categorize the dollar amounts that flow through the civil aviation industry. Primary impact refers to the first round of expenditures within each sector that are collected from government and private sources. These amounts are applied against the RIMS II multipliers to derive secondary impacts.

Seasonal Adjustment

Many aviation-related time series data display seasonal patterns. For example, travel tends to pick up during the summer and the end-of-year holiday season, and slow down at other times of the year. Seasonal adjustment is a statistical process that removes such patterns to reveal underlying trends. In other words, seasonal adjustment removes the effects of recurring seasonal influences from time series. This process "quantifies seasonal patterns and then factors them out of the series to permit analysis of non-seasonal"[17] trends in the data.

Secondary Impact

This is a term used to categorize the dollar amounts that flow through the civil aviation industry. Secondary impacts result from follow-on spending down the supply chain after the initial round or primary impact. This includes payments- to suppliers, and suppliers of suppliers, as well as spending by employees of those businesses. Secondary impacts therefore capture both interindustry and household spending that derive from activity in the respective sectors.

Total Economic Activity

Total economic activity is a term used interchangeably with gross output.

Total Impact

Total impact is the sum of primary and secondary impacts.

Value Added

Value added refers to the current dollar contribution to production by an individual producer, industry or sector during a specified time period. It is measured as the difference between gross output and goods and services purchased for use in production. (These purchased goods and services are also called input purchases or intermediate inputs.) Measures of value added consist of employee compensation, production-related taxes, imports less subsidies, and gross operating surplus. Value added can be summed or aggregated across individual producers over an entire sector, industry or nation; at the national level, total value added equals GDP. The BEA publishes national- and selected sector-level annual and quarterly measures of value added, as well as selected annual industry measures.

Notes

[1] U.S. Bureau of Economic Analysis, "Table 1.1.1. Percent Change From Preceding Period in Real Gross Domestic Product," (accessed April 26, 2022).

[2] Data sources include: Bureau of Transportation Statistics T-100 Segment data for passengers and freight; FAA impact report estimates for visitor expenditures.

[3] U.S. Bureau of Economic Analysis, "Table 1.1.6. Real Gross Domestic Product, Chained Dollars," (accessed April 26, 2022).

[4] U.S. Bureau of Economic Analysis, "Table 1.1.5 Gross Domestic Product," (accessed April 26, 2022).

[5] Bureau of Labor Statistics, U.S. Department of Labor, Current Employment Statistics, (accessed September 28, 2020) https://www.bls.gov/ces/data/

[6] U.S. Department of Transportation, Federal Aviation Administration, 2022. The Economic Impact of Civil Aviation on the U.S. Economy. March 2021. https://www.faa.gov/sites/faa.gov/files/2022-08/2018_Economic_Impact_Report_SSM07.pdf.

[7] The statutory definition for unmanned aircraft systems comes from 49 USC 44801. For this report unmanned aircraft systems will be referred to as "drones".

[8] U.S. International Trade Commission, Harmonized Tariff Schedule, (accessed April 26, 2022) https://hts.usitc.gov/current

[9] U.S. Department of Transportation, Federal Aviation Administration, Commercial Space Data, (accessed April 26, 2022) https://www.faa.gov/data_research/commercial_space_data/

[10] U.S. Bureau of Economic Analysis, Space Economy, (accessed April 26, 2022) https://www.bea.gov/data/special-topics/space-economy.

[11] The multipliers typically change over time thereby affecting these secondary impacts as compared to earlier years. For example, 2020 jobs multipliers were generally lower than those for 2018, resulting in lower estimates for total jobs.

[12] "Output" includes the sum of all of intermediate goods and services used in production, plus value added by the industry itself. This distinguishes output from gross domestic product, which only counts value added.

[13] U.S. Bureau of Economic Analysis, "Table 1.1.5 Gross Domestic Product," (accessed April 26, 2022).

[14] ACI Europe, The Social and Economic Impact of Airports in Europe, 2004, p. 5.

[15] Bureau of Labor Statistics, U.S. Department of Labor, Chapter 2. Employment, Hours, and Earnings from the Establishment Survey. In Handbook of Methods, (accessed October 1, 2020) https://www.bls.gov/opub/hom/pdf/ces-20110307.pdf

[16]Organization for Economic Co-operation and Development, “Glossary of Statistical Terms,” 2002

[17] Bureau of Labor Statistics, U.S. Department of Labor, Fact Sheet on Seasonal Adjustment in the CPI, (accessed October 1, 2020) https://www.bls.gov/cpi/seasonal-adjustment/questions-and-answers.htm

For more information, please send inquiries to:

Roger Schaufele
Manager
Forecast and Performance Analysis Division, Office of Aviation Policy and Plans
roger.schaufele@faa.gov

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