

# **CHAPTER 1. INTRODUCTION AND METHODOLOGY**

# 1.1 Introduction

The West Virginia Aeronautics Commission (WVAC) initiated the 2020 West Virginia Aviation Economic Impact Study (WV AEIS) to quantify the contributions of West Virginia's airport system to the Mountain State's economy. The results of the WV AEIS showcase the tremendous impact aviation has on each airport's regional economy, along with the system's combined impacts at the state level.

The primary function of West Virginia's public-use airports is to support the safe transport of people and goods into and out of the state. System airports provide commercial airline and general aviation (GA) service connecting residents to thousands of destinations domestically and internationally and allowing out-of-state visitors access to the "Almost Heaven" offerings found across West Virginia. Airports are important economic anchors serving as job centers and support a wide range of industries in the state including aerospace, tourism, mining, agriculture, manufacturing, health, and more. Collectively, the operation of airports and spending by visitors arriving to West Virginia via these airports generate significant economic activity.

It is important to recognize that the value of West Virginia's airports extends far beyond their monetary impact, as they support an enhanced quality of life for residents and visitors alike. The WV AEIS highlights some of the critical qualitative operations airports support, such as emergency medical evacuation, package delivery, law enforcement, aerial firefighting, and much more.

# 1.2 Study Airports

West Virginia's airport system comprises 24 publicly owned, public-use airports that serve numerous communities throughout West Virginia and in bordering states. All 24 airports are included in the Federal Aviation Administration's (FAA's) National Plan of Integrated Airport Systems (NPIAS), signaling their importance to the national aviation network. **Figure 1** illustrates the location of system airports and identifies them as either Commercial Service airports (providing airline service) or GA airports (serving all other operations except airline service). **Table 1** presents all 24 airports included in the WV AEIS, alphabetically by associated city, separating those offering commercial service.







Source: Kimley-Horn, 2020

Table	1:	West	Virginia	System	Airports
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Associated City	Airport Name	FAA ID	NPIAS Inclusion	Ownership	Use
Beckley	Raleigh County Memorial	BKW	$\checkmark$	Public	Public
Charleston	Yeager Airport	CRW	✓	Public	Public
Clarksburg	North Central West Virginia	СКВ	✓	Public	Public
Huntington	Tri-State/Milton J Ferguson Field	HTS	✓	Public	Public
Lewisburg	Greenbrier Valley	LWB	$\checkmark$	Public	Public
Morgantown	Morgantown Municipal - Walter L Bill Hart Field	MGW	$\checkmark$	Public	Public
Parkersburg	Mid-Ohio Valley Regional	PKB	✓	Public	Public



Associated City	Airport Name	FAA ID	NPIAS Inclusion	Ownership	Use	
General Aviation						
Bluefield	Mercer County	BLF	$\checkmark$	Public	Public	
Buckhannon	Upshur County Regional	W22	✓	Public	Public	
Cumberland	Greater Cumberland Regional	CBE	$\checkmark$	Public	Public	
Elkins	Elkins-Randolph County - Jennings Randolph Field	EKN	$\checkmark$	Public	Public	
Fairmont	Fairmont Municipal - Frankman Field	4G7	$\checkmark$	Public	Public	
Logan	Logan County	6L4	✓	Public	Public	
Martinsburg	Eastern West Virginia Regional/ Shepherd Field	MRB	$\checkmark$	Public	Public	
Moundsville	Marshall County	MPG	$\checkmark$	Public	Public	
Petersburg	Grant County	W99	✓	Public	Public	
Philippi	Philippi/Barbour County Regional	79D	$\checkmark$	Public	Public	
Pineville	Kee Field	l16	✓	Public	Public	
Point Pleasant	Mason County	312	✓	Public	Public	
Ravenswood	Jackson County	l18	✓	Public	Public	
Summersville	Summersville	SXL	$\checkmark$	Public	Public	
Sutton	Braxton County	481	✓	Public	Public	
Wheeling	Wheeling Ohio County	HLG	✓	Public	Public	
Williamson	Appalachian Regional	EBD	$\checkmark$	Public	Public	

Sources: Airport Master Record 5010-1 Form, 2020; FAA's NPIAS 2021-2025, 2020

# 1.3 Methodology

The WV AEIS utilized an industry-accepted methodology for measuring and documenting the economic impact of aviation in the state. The study relied on collecting information about airport administration, airport tenants, airport construction, and out-of-state visitor spending from commercial service and GA visitors to quantify the economic contribution of West Virginia's airports. The following sections outline the terminology, geographies, data calculation, and economic modeling approaches used in the study.

## 1.3.1 Terminology

Before the methodology can be presented, an understanding of the terminology and concepts used is required. The following three sections define the terms used in the WV AEIS and their relationship to one another in the calculation of the economic impact of West Virginia's 24 study airports.



# 1.3.1.1 Economic Impact Categories

Three terms are used in the WV AEIS to describe the scope of economic impacts and calculate the total impacts for each study airport and the state as a whole. **Figure 2** provides a definition of each term, along with its associated economic term. Economic terms such as "indirect" and "induced" are commonly used in economic analyses, but it can be difficult to discern what those terms mean. To minimize confusion, the WV AEIS utilizes straightforward terminology that better describes what is represented by each category.

### Figure 2: Economic Impact Categories

## **Economic Impact Categories**

#### DIRECT



Initial effects that occur on- and off-airport, including airport operations, construction, airport tenants, spending from visitors, and companies using air transportation services to ship goods to market.

### SUPPLIER SALES (Indirect)

Portions of direct revenues used to purchase goods and services from West Virginia businesses.



#### **INCOME RE-SPENDING** (Induced)

Income earned by workers from direct and supplier sales transactions that are then spent in West Virginia (household spending).

Sources: EBP US, 2020; Kimley-Horn, 2020

### 1.3.1.2 Economic Impact Indicators

Indicators are used to convey direct impacts, along with multiplier impacts (supplier sales and income re-spending). **Figure 3** defines each economic impact indicator. Measurements of these impact indicators in dollars, specifically business revenues, value added, and payroll, cannot be added together. This is due to value added comprising a component of business revenues and payroll comprising a component of value added (see **Figure 4**). Throughout the WV AEIS, dollar values are reported in 2019 dollars and rounded to the nearest thousand.



### Figure 3: Economic Impact Indicators

### **Economic Impact Indicators**

### JOBS

Jobs are the total number of persons employed that are associated with business revenues and payroll, regardless of whether they are full-time or part-time.

#### PAYROLL

Payroll is defined as total employment compensation, including wages and other benefits (e.g. health care insurance payments, retirement contributions, etc.) Payroll is a subset of value added. This is also known as "labor income" or "total compensation."

### VALUE ADDED

Value added measures the economic productivity of each aviation-related business in West Virginia, calculated as business revenues earned minus the costs of purchasing goods and services from other businesses. Value added is a company or industry contribution to Gross State Product (GSP), which is a local concept synonymous with Gross Domestic Product (GDP). It includes all labor compensation, profits, and business taxes paid.



#### **BUSINESS REVENUES**

Business revenues incorporate expenditures needed to administer airports, sales of goods and services by airport tenants, budget expenditures by public sector agencies located on airports, cost of capital expenditures, visitor spending in West Virginia's hospitality-related sectors, and sales enabled by air cargo services. This is commonly referred to as business "output" or sales.

Sources: EBP US, 2020; Kimley-Horn, 2020

### Figure 4: Relationship of Value Added



Sources: EBP US, 2020; Kimley-Horn, 2020



# **1.3.1.3 Calculation of Total Economic Impacts**

**Figure 5** illustrates the relationship of the economic impact categories (direct, multiplier [supplier sales and income re-spending], and total) to the economic impact indicators (jobs, payroll, value added, and business revenues). The WV AEIS presents findings at all levels, meaning results are separated between direct impacts, impacts from supplier sales and income re-spending, and total impacts. These impacts are reported as jobs, payroll, value added, and business revenues.

### **Figure 5: Calculation of Total Economic Impacts**



Sources: EBP US, 2020; Kimley-Horn, 2020

To further explain the relationship of economic categories and economic indicators, consider this hypothetical scenario: an airport generates revenue (business revenues) from users paying rent for an aircraft hangar, buying fuel, or for other services the airport provides. The airport uses that revenue to operate the airport, pay taxes, and provide wages and benefits (payroll) to their employees (jobs). The direct economic impact of the airport includes the number of on-airport employees, their total payroll, and airport revenues. As a result of these revenues, the airport can also purchase goods and services from West Virginia businesses (supplier sales) for groundskeeping, IT management, security, etc. Those employed by the airport, either directly through payroll or through purchased services, will spend their wages in the community (income re-spending).

# 1.4 Geographies for Economic Modeling

The WV AEIS study was conducted at regional and statewide levels to recognize the unique composition of economies found across West Virginia. Factors such as cost of living, salaries, productivity, and industries differ between urban, rural, and recreational areas of the state from the western part of the state to the eastern panhandle, and southern parts of West Virginia to the northern panhandle. The use of regional multipliers presents a more accurate profile of economic factors that are indicative of the regional economy such as mix of industries, wage rates, business



revenues, and sales per employee. These regional multipliers are used to estimate the supplier sales and income re-spending associated with each airport. Regional economic data were also used to calculate the relationship between economic indicators.

Direct impact data were obtained from surveys distributed to airport managers and on-airport tenants (see **Chapter 2. The Data Collection Process** for details on the data collection effort). Surveys asked for information on three measures: jobs, payroll, and business revenues. It should be noted that value added is always calculated. A majority of respondents provided one measure, whereas some respondents provided two, and very few provided all three. In cases where data were not provided for all three measures, regional economic data were used to "fill-in" these missing values.

Information on visitor spending was collected from surveys of travelers and from studies commissioned by the West Virginia Tourism Office. Spending by visitors from outside the state represents business revenue for tourism businesses in the state, which is then translated into other economic indicators (jobs, payroll, value added) using regional economic data.

Additionally, information on reliance of off-airport industries in West Virginia on cargo that is transported through West Virginia airports was generated using a combination of air cargo data sources and economic data to relate the movement of goods by air to its role in the West Virginia economy.

Multiplier effects (supplier purchases and income re-spending) are modeled at both regional and statewide scales to offer a more accurate representation of regional and statewide impacts for each airport and then collectively for West Virginia as a whole. An airport's regional impacts are calculated using a summation of direct regional impacts plus regional multiplier effects. Statewide impacts utilize the same regional direct impacts but use statewide multiplier effects. A more robust explanation of differences between regional and statewide impacts is presented in a subsequent section of this chapter.

For the purposes of the WV AEIS, the state was organized into nine regions based upon the West Virginia Tourism Office's tourism regions as shown in **Figure 6.** The counties located within each region are listed in **Table 2**.







Sources: West Virginia Tourism Office, 2020; Kimley-Horn, 2020

### Table 2: Counties within each Tourism Region

Region	Name	Counties
1	Northern Panhandle	Brooke, Hancock, Marshall, Ohio, Tyler, Wetzel
2	Mountaineer Country	Barbour, Doddridge, Harrison, Marion, Monongalia, Preston, Taylor
3	Mid-Ohio Valley	Calhoun, Jackson, Pleasants, Ritchie, Roane, Wirt, Wood
4	Mountain Lakes	Braxton, Clay, Gilmer, Lewis, Nicholas, Upshur, Webster
5	Potomac Highlands	Grant, Hampshire, Hardy, Mineral, Pendleton, Pocahontas, Randolph, Tucker
6	Eastern Panhandle	Berkeley, Jefferson, Morgan
7	Metro Valley	Cabell, Kanawha, Mason, Putnam
8	New River- Greenbrier Valley	Fayette, Greenbrier, McDowell, Mercer, Monroe, Raleigh, Summers, Wyoming
9	Hatfield McCoy Mountains	Boone, Lincoln, Logan, Mingo, Wayne

Source: West Virginia Tourism Office, 2020



# 1.5 Data Calculation Approach

Primary and secondary sources of data were used to calculate the economic impact of aviation in West Virginia. Five different surveys were distributed to different groups to collect key information related to economic activities occurring on- and off- airports. **Chapter 2. The Data Collection Process** documents the data collection methods used for the WV AEIS as well as the surveys used to collect primary data from the following groups:

- Airport managers
- On-airport tenants
- Businesses that rely on airports included in the WV AEIS
- Out-of-state visitors who used commercial service
- Out-of-state visitors who used GA

The WV AEIS relied on secondary sources to fill in any gaps in information pertaining to on- and off- airport business activity and visitor spending gathered from data collection efforts. Secondary sources included:

- Data Axle Reference Solutions (formerly ReferenceUSA)
- Environmental Systems Research Institute (ESRI) Community Analyst
- Longwoods International (provided by the West Virginia Tourism Office)
- IMPLAN, LLC (using data from the Bureau of Economic Analysis [BEA], Bureau of the Census, and other federal agencies)
- Federal Aviation Administration (FAA)
- WISERTrade (using data from the U.S. Foreign Trade Division)
- The Freight Analysis Framework (FAF)
- The Air Carrier Statistics Database, also known as T-100

Through these efforts, primary and secondary data sources created the foundation needed to quantify the direct on-airport and off-airport visitor spending impacts of each airport. These data were then input into IMPLAN, an industry-accepted economic model to calculate the influence of multiplier effects from supplier purchases and income re-spending. Additional information about the IMPLAN modeling process is described in **Section 1.6 Economic Modeling Process**. An overview of data collection and how it relates to the economic modeling process used in the WV AEIS is shown in **Figure 7**.





### Figure 7: Overview of Data Collection and Economic Modeling Process

\*Revenue generation information collected but not utilized in the economic modeling process

Sources: EBP US, 2020; Kimley-Horn, 2020

## 1.5.1 On-Airport Data

On-airport economic activity is captured in three categories: airport administration, capital improvement expenditures, and airport tenants. These data sources are described below:

### **Airport Administration**

Airport administration includes airport managers and staff necessary to an airport's operation including business operations, grounds/building maintenance, contracted individuals or firms, and other employees. Data received related to airport administration included employment, payroll, and annual airport budgets. In cases where airport administration provided only employment information, county-level data derived primarily from BEA and modeled in IMPLAN were used to estimate payroll and business revenues.

### **Capital Improvements**

Capital improvement expenditures were reported by airport managers for the past four years (2016 - 2019) to calculate an average annual expenditure. Obtaining an average for capital improvements accounts for years in which expenditures are very high at an airport and very low during other years. This allows for any anomalies due to available funding, weather, project schedules, etc. to be removed. Common capital expenditures include pavement maintenance, lighting, fencing, terminal and hangar construction, among many others. Airport tenants also provided information about any capital improvement expenditures they paid for such as hangar construction, building out office space, etc. Capital improvement expenditures were treated as direct business revenues as these would equate to revenues received by the companies that



perform the construction work. To develop a complete profile of direct impacts, economic data in IMPLAN were used to link the construction revenues to associated jobs, payroll, and value added, based on regional average relationships.

# **Airport Tenants**

As a component of the Airport Manager Survey distributed to all 24 West Virginia system airports (see **Chapter 2. Data Collection Process**), managers were asked to provide information about their tenants, including the business/organization name, main product or service provided, contact information, and estimates of employment, if known. These lists were compiled into a tenant tracking database used to lead the Airport Tenant Survey distribution and outreach. The surveys requested information on employment, business type, and expenditures (including payroll and capital improvement expenditures).

Nearly 150 on-airport tenants were identified across all 24 system airports in West Virginia. Numerous rounds of outreach were conducted in an effort to capture data from each airport tenant. Data were collected from 142 of the of the 148 tenants surveyed. Of the 142 respondents, 135 reported at least one job.

Through the combination of primary and secondary tenant data, each tenant was assigned an industry classification based upon its business type. Classifying each tenant by industry established an accurate representation of direct economic impacts (jobs, payroll, value added, and business revenues) and estimate of multiplier effects (supplier sales and income respending) associated with each business.

Two levels of information were obtained from each tenant:

- Employment (number of full-time and/or part-time employees) only; or
- Employment and payroll

Data from IMPLAN were utilized to calculate missing information about tenants' payroll and business revenues if these were not reported on a survey. For tenants that did provide both employment and payroll information, IMPLAN modeling was adjusted to maintain the same business revenue to payroll ratios as shown by default regional values in IMPLAN per region and industry.

### 1.5.2 Off-Airport Visitor Spending

One of the most commonly known functions of airports is the facilitation of passenger travel. Out-of-state visitors utilizing scheduled commercial airline service and GA aircraft generate important economic contributions to the state and regional economies. Out-of-state visitors traveling to West Virginia bring new money into the state's economy. Visitor spending supports jobs and payroll primarily in hospitality-related industries including lodging, restaurants, retail, entertainment, and local transportation services.

The analysis of GA visitor spending data were limited to transient (out-of-state) activity which makes up a small percentage of overall GA operations at airports in the state. Similarly, the analysis of commercial visitor spending was limited to only those out-of-state visitors with final destinations in West Virginia. The assessment of visitor spending impacts did not include local passenger activity or passengers that used a West Virginia airport to connect to final destinations outside of the state.



# 1.5.2.1 Commercial Visitors

The primary source of commercial visitor spending data for 2019 was Longwoods International, an industry-accepted database which collects tourism spending data for each state. These data was provided by the West Virginia Tourism Office. Calendar year 2018 was the latest year of available data from the Tourism Office at the time of this study. Data from 2015-2018 were adjusted to 2019 dollars for this study and averaged across the four-year period.

In addition to this source, a Commercial Air Passenger Survey was deployed at participating airports on airport Wi-Fi access pages and airport websites. Visitors traveling through Yeager Airport (CRW), Huntington Tri-State/Milton J. Ferguson Field (HTS), and Morgantown Municipal - Walter L. Bill Hart Field (MGW) airports between July 2020 and November 2020 were invited to complete the online survey documenting their length of stay and expenditures made in West Virginia.

Through survey efforts at these three commercial service airports, valid visitor spending data were collected from over 449 visitors who arrived in West Virginia from out of state at CRW and 10 visitors who arrived at MGW.

Limited responses were gathered from HTS as the airport lost some commercial airline service at the time visitor surveys were conducted due to reductions in airline service prompted by reduced passenger travel resulting from COVID-19. Most of the responses from MGW were from local residents flying out of the airport, not out-of-state visitors inbound.

A combination of spending information from Longwoods International and valid passenger surveys at CRW were used to develop spending profiles for visitors arriving to each of the state's commercial service airports. Visitors at CRW reported an average spending of \$386.00 per visitor per trip. The Longwoods International data reported an average spending of \$240.00 per visitor per trip by West Virginia visitors arriving by air (after adjusting to 2019 dollars). Information about variation in strength of each commercial airports' regional economy on a per capita basis was used to estimate individual airport visitor spending levels from the Longwoods International data. From there, the estimated Longwoods International visitor spending level for CRW was compared to the actual observed visitor spending level at CRW from the survey, and an adjustment factor was calculated as the ratio between the survey level and Longwoods level. This adjustment factor was then applied to all other airport-specific estimated visitor spending values derived from Longwoods International. In addition, visitor spending levels for Greenbrier Valley Regional (LWB) were further adjusted based on input from WVAC to be in better alignment with the levels expected for the region's specialized tourist economy.

The number of out-of-state visitors to West Virginia was obtained by a third-party source, Airline Data, Inc. **Table 3** presents the visitor spending profiles of travelers arriving to West Virginia via the state's commercial service airports.



Associated City	Airport Name	FAA ID	2019 Visitors	Spending per Visitor per Trip
Beckley	Raleigh County Memorial	BKW	4,287	\$210
Charleston	Yeager Airport	CRW	87,543	\$386
Clarksburg	North Central West Virginia	СКВ	10,942	\$401
Huntington	Tri-State/Milton J Ferguson Field	HTS	32,134	\$156
Lewisburg	Greenbrier Valley	LWB	5,916	\$430
Morgantown	Morgantown Municipal - Walter L Bill Hart Field	MGW	3,730	\$400
Parkersburg	Mid-Ohio Valley Regional	PKB	2,541	\$298

### Table 3: Commercial Service Visitors and Spending Per Visitor Per Trip

Sources: WV AEIS Commercial Air Passenger Survey, 2020; Airline Data, Inc., 2020; Longwoods International, 2015-2018; EBP US, 2020

### 1.5.2.2 GA Visitors

Similar to commercial visitors, GA visitors from outside West Virginia generate new economic activity in the state and regional economy of their destination. To determine the number of true visitors arriving to the state using GA, a multi-step process is used:

- This process begins by determining the total number of GA operations that took place in West Virginia in 2019. The number of GA operations was first gathered from official sources, including each airport's FAA Airport Master Record Form 5010, and were validated by airport managers on the Airport Manager Survey. In 2019, a total of 241,000 GA operations were conducted in the state.
- 2. The second step includes dividing the number of operations by two. Since an aircraft operation is defined as a takeoff or a landing, this figure is divided by two to isolate the number of outbound aircraft operations only.
- 3. Operations considered to be "local" were removed from the total number of operations, leaving what is referred to as "itinerant" operations only. The FAA defines itinerant operations as any aircraft arriving or departing from outside the airport area. However, under this definition, this number includes locally-based aircraft that leave the airport area and return back which are not visitors. In 2019, West Virginia's airports supported 122,000 itinerant operations which comprised almost 51 percent of all GA operations in the state.
- 4. To parse out true out-of-state visitors from itinerant operations, airport managers were asked to provide the percentage of itinerant operations that were transient (out-of-state) for their airport. Based on manager responses, an estimated 73,000 transient operations took place in West Virginia in 2019, making up 60 percent of total itinerant GA operations in the state.
- 5. Finally, airport managers were asked to provide the average number of passengers per operation (including the pilot). This varied by airport as some airports support operations by larger aircraft with more passengers than other airports, and each airport experiences a different passenger mix. Generally, responses ranged from two to five passengers per transient operation. From these data, it was estimated that almost 130,000 out-of-state visitors arrived in West Virginia using GA in 2019.



To determine the impacts of GA visitor spending, the final step requires identifying how much the average visitor is spending on their trip to West Virginia. To do this, GA visitor spending data were gathered through responses to a Transient GA Pilot & Passenger Survey (see Chapter 2. The Data Collection Process) between July 2020 and November 2020. Similar to the Commercial Air Passenger Survey, the Transient GA Pilot & Passenger Survey targeted only visitors arriving to West Virginia from out of state. Ninety-one surveys were submitted by 12 study airports, representing 279 GA visitors. One hundred and fifty-three of those visitors traveled through Greenbrier Valley, while the remainder were spread across West Virginia's other GA airports. Given the large number of valid observations at LWB, the visitor spending value of \$645 per visitor per trip was used directly for this airport. Note that the visitor spending associated with LWB is significantly higher due to travelers visiting The Greenbrier, a luxury resort attracting visitors year round. For the other GA airports, a baseline visitor spending level was calculated first from the survey. This was then adjusted up or down to generate airport-specific estimates based on the relative strength of the economy of the county in which airport is located. Finally, these values were further adjusted by WVAC based on local knowledge of the nature of likely travel to each airport, including the likelihood of an overnight stay. Table 4 presents the average visitor spending profiles of travelers arriving to West Virginia via GA at all system airports summarized by NPIAS classification.

Airport NPIAS Classification	2019 GA Visitors	Average Spending per Visitor Per Trip
Commercial Service	28,166	\$394
GA-Regional	67,797	\$101
GA-Local	19,680	\$83
GA-Basic	10,561	\$55
GA-Unclassified	3,615	\$49

### Table 4: GA Visitors and Average Spending Per Visitor Per Trip by Airport NPIAS Classification

Notes: Although the main type of operation at commercial service airports are those by commercial air carriers, commercial service airports also support GA operations. Greenbrier Valley Airport is not reflected in this table. Sources: WV AEIS Transient GA Pilot & Passenger Survey, 2020, with adjustments based on local knowledge; EBP US, 2020

### 1.5.3 Off-Airport Aviation Business Reliance Data

Beyond the economic contributions in West Virginia of airport operations, both airside and landside, and of airport-enabled visitor spending, West Virginia airports play an additional economic role in supporting business operations. Analysis of such reliance was divided into two categories: 1) general reliance captured in responses to the Aviation-Reliant Business and Business Aircraft Owner Survey, and 2) a separate air cargo economic impact analysis. A summary of the methodology used to determine the economic reliance of West Virginia businesses on aviation is provided in the following sections and the complete findings can be found in **Appendix C - Economic Reliance of West Virginia Businesses on Aviation**.

### 1.5.3.1 Aviation-Reliant Business and Business Aircraft Owner Survey

A total of 33 businesses that use West Virginia airports in some way responded to the survey. Businesses were invited to provide a variety of information including their industry, number of employees, and both quantitative and qualitative data on how they rely on both commercial



service and GA service to support business operations. Findings from this survey were summarized to illustrate the various ways in which West Virginia businesses rely on West Virginia airports. These descriptive findings do not constitute a direct impact, but rather represent a profile of survey respondents that is indicative of the diverse ways in which West Virginia businesses rely on aviation.

### 1.5.3.2 Air Cargo Economic Impacts

The air cargo economic impact analysis assessed the reliance of off-airport industries in West Virginia on cargo that is transported through West Virginia airports and calculated the economic contributions of this air cargo to off-airport businesses. The air cargo analysis relied on three air cargo data sources to conduct the analysis of off-airport air cargo economic impacts:

- **WISERTrade** reports weights and values of each commodity shipped to or from international destinations that are collected by the U.S. Foreign Trade Division of the U.S. Census Bureau.
- The **FAF**, produced by the Bureau of Transportation Statistics and the Federal Highway Administration, integrates data from a variety of sources to create a comprehensive picture of cargo movement between U.S. geographic zones, including major metropolitan areas and the remaining non-metropolitan areas of each state.
- The **Air Carrier Statistics Database, also known as T-100** refers to domestic and international airline market and segment data. These data include reports from certificated U.S. air carriers on monthly air carrier traffic information using Form T-100. These data can be used to determine the total volume of cargo handled at specific airports.

In addition to the above outlined air cargo data sources, the air cargo economic impact analysis also relied on economic data to relate the movement of goods to its role in the West Virginia economy. County-level economic business revenue data by industry sectors were assembled by IMPLAN from federal sources, primarily the BEA. Data assembled by IMPLAN provided detail on the commodities used in the production of goods for each industry by county. These data also allowed for the estimation of commodities produced by West Virginia industries and sold out of state. Freight data and economic impact models were linked to identify the portion of industry activity that is reliant on air cargo by overlaying commodity flows, economic geography, and industries' production processes, which provided an assessment of how air cargo affects the state economy outside of airports.

# **1.6 Economic Modeling Process**

Once direct impacts were defined using the data described above, the IMPLAN model was used to calculate multiplier impacts including supplier purchases and income re-spending. To do so, a multi-regional input-output model was calibrated to the West Virginia economy and each of its nine regions. Direct impacts are allocated to regions based on the associated airport's location. They are also assigned to specific industry sectors in IMPLAN to correctly capture the nature of the economic activity. This allows for tracing of supplier effects based on specific profiles of industries in the West Virginia economy. Following estimation of multiplier impacts, these were added to direct impacts to summarize the total economic impact of West Virginia airports—by region, and statewide. The following sections discuss the sectoring used in the economic modeling process.



### 1.6.1 Industry Sectoring

Of the 544 industry and profile sectors available in IMPLAN, 29 sectors were used to capture the wide range of industries present on West Virginia's airports, as shown in **Table 5.** Five aggregate sectors were used to define visitor spending characteristics in the WV AEIS, as shown in **Table 6**.

### 1.6.1.1 On-Airport Activity

**Table 5** lists all sectors included in the assessment of on-airport impacts. In some instances, responses to the Airport Manager Survey and Airport Tenant Survey were too generalized in terms of associated industry or product. In these cases, employment was assigned to an aggregated industry (e.g. aerospace, retail, entertainment, etc.). Aggregation allows for the averaging of measures across industries by region, which avoids large inaccuracies when measuring small or large industries in an economic impact study.

### Table 5: Industries and Sectors Modeled for On-Airport Economic Impacts

Industries and Sectors					
Accounting	Couriers and messengers	Real estate			
Agricultural/Forestry Support	Elementary and secondary schools	Retail - building and garden materials/supplies			
Air transportation	Federal government/military	Retail - Non-store			
Amusement and recreation industries	Health care services	Retail - sporting goods/hobby/ book stores			
Architecture and engineering	Individual/family services	Support activities for transportation			
Business and professional association	Life insurance	Travel agents			
Car rentals	Machinery and equipment repair	Warehousing and storage			
Coal mining	Motion picture and video industries	Waste management/remediation			
Colleges/universities	Natural gas distribution	Wholesale - machinery, equipment, supplies			
Conveyor equipment manufacturing	Non-profits				

Source: EBP US using the 2017 IMPLAN Economic Model, 2020

### 1.6.1.2 Off-Airport Visitor Spending

As presented in previous sections, visitor spending data in the WV AEIS came from commercial visitor and GA visitor survey responses and from data collected from Longwoods International. **Table 6** presents the five key visitor spending categories and their associated industries and sectors used in IMPLAN to categorize typical out-of-state visitor spending. Categories of spending are purposefully generalized to present visitors with surveys that they can and are willing to quickly answer.

The distribution of commercial visitor spending across the spending categories was based on the pattern identified at CRW via the Commercial Air Passenger Survey. For GA visitor spending at LWB, the allocation across spending categories was derived from survey responses for that airport. For all other GA airports, the visitor spending profile by category was based on GA visitor



spending survey responses for all other GA airports, excluding LWB. When assigning GA visitor spending to categories, accommodations were excluded from the profile for all airports for which per trip per visitor spending levels were less than \$70, based on the assumption that these trips did not involve overnight stays.

Visitor Spending Categories	Industries and Sectors		
Accommodations	Hotels and motels, including casino hotels	Other accommodations	
	Performing arts companies	Commercial sports except racing	
	Racing and track operation	Independent artists, writers and performers	
Entertainment	Museums, historical sites, zoos and parks	Amusement parks and arcades	
	Gambling industries (except casino hotels)	Other amusement and recreation industries (including skiing)	
	Fitness and recreational sports centers	Bowling centers	
Food 9 Deverage	Full-service restaurants	Limited-service restaurants	
Food & Beverage	All other food and drinking places		
Ground Transportation	Transit and ground passenger transportation	Transportation support activities	
	Automotive equipme	ent rental and leasing	
	Retail - Electronics and appliance stores	Retail - Food and beverage stores	
Retail	Retail - Health and personal care stores	Retail - Clothing and clothing accessories stores	
	Retail - Sporting goods, musical instruments, and books	Retail - General merchandise stores	
	Retail - Miscellaneous store retailers		

Table 6: Industries and Se	ctors Modeled for	Off-Airport Visitor S	nending Classifications
Table 0. Industries and Se		On-Anport visitor 3	penuing classifications

Source: EBP US using 2017 IMPLAN Economic Model, 2020

# 1.7 Summary

The methodology used in the development of the WV AEIS relied on gathering information about on-airport activity and off-airport visitor spending to create a foundation of direct impacts. These direct impacts were then incorporated into the IMPLAN economic model to apply multiplier impacts at regional and statewide levels. The results of this process produced the total economic impacts of aviation in West Virginia, presented in detail in **Chapter 3**.