2022 Pennsylvania
Aviation Economic Impact Study

TECHNICAL REPORT

pennsylvania
DEPARTMENT OF TRANSPORTATION

Kimley»Horn
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Introduction

Airports serve a unique role in their local communities and surrounding regions, providing an integral link to a larger transportation system to move people and goods all around the world. In addition to supporting a means of travel, airports also facilitate necessary and sometimes critical services such as air cargo and freight, police and law enforcement, emergency medical services, firefighting, and disaster and emergency response, among others. They contribute significant economic and social benefits to their local, regional, and state economies as centers of economic activity. Airports generate economic impact in a variety of ways, from employing people on-airport, to welcoming visitors from out-of-state who go on to spend money in the local economy. The 2022 Pennsylvania Aviation Economic Impact Study (PA AEIS or Study) documents the economic contribution of 122 public-use airports to the state's economy on an annual basis[1]. This report documents the various sources of economic activity, how that activity is quantified, and the results of that activity statewide across the various sources as well as on an individual airport level. The report also provides supplementary information to help readers better understand the context in which airports generate economic impact.

Due to the worldwide COVID-19 pandemic that started in March 2020 and the significant impact of the pandemic to aviation activity in the Commonwealth and around the world, the Pennsylvania Department of Transportation (PennDOT) Bureau of Aviation (BOA) elected to include two separate base years in the Study: 2019 (representing a "normal" if high watermark year of aviation activity) and 2020 (representing the initial pandemic year). This report documents the findings of both years of economic impact assessment of aviation activity.

The report is organized in the following chapters and appendices:

- **Introduction.** This chapter provides an overview of and context for the 2022 PA AEIS Technical Report.
- **Chapter 1. Airport Activity Background.** This chapter details enplanements, air carrier and air taxi operations, and general aviation (GA) operations at Pennsylvania's airports and how they were impacted by the COVID-19 pandemic. Changes to enplanements and operations are directly correlated with the difference in base year 2019 and base year 2020 economic impacts discussed in later chapters.
- **Chapter 2. Socioeconomic Background.** This chapter details the socioeconomic trends occurring in Pennsylvania to better understand current and potential future demands on the aviation system.
- **Chapter 3. Sources of Economic Activity and Levels of Impact.** This chapter presents an overview of where aviation-related economic impacts originate, both on- and off-airport. This chapter also details the different levels at which economic activity is generated (direct, multiplier, and total impacts) as well as the categories of economic impact (employment, payroll, and output).
- **Chapter 4. Study Approach.** This chapter provides an overview of the AEIS study process, including the data collection process and data assumptions and methodologies. Differences

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[1] Note that during the project, two airports were removed from the study including Blue Knob Valley Airport (7G4), and Lakehill Airport (P09). As of July 2022, Pennsylvania has 121 public-use facilities.

between the 2019 base year study approach and the 2020 base year study approach are highlighted.

- **Chapter 5. Total Airport Impacts.** This chapter includes the results of the AEIS study for both base years (2019 and 2020) in terms of employment, payroll, and output. Where applicable, data are separated for commercial service and GA airports.
- **Chapter 6. Additional Areas of Impact.** This chapter includes the results of additional areas of impact beyond the airport-specific impacts identified in Chapter 6, which include off-airport aerospace manufacturing, off-airport air cargo, and off-airport private hospital heliports.
- **Chapter 7. Tax Impacts.** This chapter presents the tax impacts associated with aviation economic activity as detailed in Chapters 6 and 7.
- **Appendix A. Socioeconomic Trend Data.** This appendix includes supplemental data associated with Chapter 3.
- **Appendix B. Airports Needing Estimations.** This appendix includes supplemental data associated with Chapter 5.
- **Appendix C. Detailed Airport Impact Tables.** This appendix includes supplemental data associated with Chapter 6.
- **Appendix D. Real-Life Stories.** This appendix includes several real-life stories highlighting the qualitative impacts of airports in the Commonwealth.
- **Appendix E. Uncrewed Aircraft Systems (UAS) Case Studies.** This appendix includes a series of case studies highlighting the ways UAS are being used by various industries within Pennsylvania.

Most appendices provide supplemental data that are referenced in the appropriate Chapter. **Appendix D** and **Appendix E** are different in that they provide two qualitative analyses that were completed as part of this study. These analyses help highlight the many ways in which aviation positively impacts the lives of Pennsylvanians.

Chapter 1. Airport Activity Background

In early March 2020, the COVID-19 pandemic began to take hold in the United States. Stay-at-home measures were enacted, and non-essential travel rapidly declined. The impact that COVID-19 had on the aviation industry was unprecedented, specifically in the aviation and aerospace sectors that depend on commercial passenger travel. As demand for air travel plummeted in March 2020 and remained low throughout the remainder of the year, even as travel restrictions eased or ceased, effects cascaded across all aviation sectors, including U.S. passenger airlines, airports, aviation manufacturers, and repair station operators.[2] Several measures were enacted at the federal level to combat the devastating financial impact COVID-19 had on the industry. Over $100 billion in payroll support payments, loans, and other financial assistance was provided through COVID-19 relief legislation to the aviation industry. The Federal Aviation Administration (FAA) reported several measures to combat COVID-19 impacts, including providing temporary relief from regulatory requirements and issuing guidance to airlines and airports on mitigating COVID-19 risks.[3]

Even with these mitigating factors, the impact of COVID-19 on the industry continues to be felt well into 2022. Thousands of employees in the aviation and aerospace industry lost their jobs and potentially left the industry permanently, leaving job shortages when the industry rebounded. This had a particularly devastating impact on an industry that was already facing employee shortages before the pandemic began. While travel remained consistently low throughout 2020, in early 2021 it rebounded swiftly, leaving airports and airlines still grappling with employee shortages, overwhelmed. Finally, the impact on airport operations and enplanements has potential funding implications that may not come to fruition until several years from now.

This chapter explores the pandemic's impact on enplanements and operations more closely, as these directly relate to the impact on air travel, and ultimately on economic impact. Typically, a large portion of the economic impacts attributable to aviation are directly related to visitor spending. The sudden and dramatic decrease in aviation activity as a result of the COVID-19 pandemic resulted in a subsequent large decrease in economic impact from visitor spending, as documented in **Chapter 5**. Therefore, discussing this impact in the context of historical enplanement and operations is important for understanding the overall trends in economic impact from 2019 to 2020.

Enplanements, or passenger boardings, remained relatively stable at all Pennsylvania commercial service airports from Calendar Year (CY) 2015 through CY 2019, as shown in **Table 1.1**. For many airports, including Lehigh Valley International Airport (ABE), Erie International Airport/Tom Ridge Field (ERI), and Philadelphia International Airport (PHL), enplanements increased from CY 2017 to CY 2019. However, for all airports, enplanements dropped significantly from CY 2019 to CY 2020. At every airport, enplanements decreased by at least 50%. The most significant decreases were realized at Wilkes-Barre/Scranton International Airport (AVP), where enplanements decreased by 63%; Pittsburgh International Airport (PIT), where enplanements also decreased by 63%; Philadelphia International Airport (PHL), where enplanements decreased by 64%; and Williamsport Regional Airport (IPT), where enplanements decreased by 67%. Similarly, enplanements at all airports except for Williamsport Regional

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[2] "COVID-19 Pandemic: Observations on the Ongoing Recovery of the Aviation Industry." United States Government Accountability Office. https://www.gao.gov/products/gao-22-104429.
[3] Ibid.

Airport (IPT) whose schedule service was suspended by American Airlines' regional affiliate increased by at least 46% from CY 2020 to CY 2021, with two exceeding 100% recovery. The most significant increases were at Arnold Palmer Regional Airport (LBE), where enplanements increased by 97%; John Murtha Johnstown-Cambria County (JST), where enplanements increased by 171%; and Altoona-Blair County Airport (AOO), where enplanements increased by 190%. These trends are illustrated in **Figure 1-1** and **Figure 1-2**.

Table 1.1. Enplanements at Pennsylvania Commercial Service Airports (2015-2021)

Associated City	Airport Name	FAA ID	Hub Size	Annual Enplanements 2015-2021						
				CY 15	CY 16	CY 17	CY 18	CY 19	CY 20	CY 21
Allentown	Lehigh Valley Int'l	ABE	N	320,544	324,511	328,914	376,468	434,007	187,530	355,000
Altoona	Altoona- Blair County	AOO	N/A	2,481	1,865	3,806	4,103	3,656	1,473	4,278
Avoca	Wilkes-Barre/ Scranton Int'l	AVP	N	219,796	232,855	261,572	258,628	288,973	107,622	157,000
Bradford	Bradford Regional	BFD	N/A	3,491	2,623	3,897	4,191	4,293	2,145	3,286
Brookville	Dubois Regional	DUJ	N/A	3,215	2,934	3,888	5,448	5,835	2,451	4,557
Erie	Erie Int'l	ERI	N	88,953	87,647	85,631	95,342	106,720	42,790	69,000
Harrisburg	Harrisburg Int'l	MDT	S	587,049	589,511	582,291	636,756	746,369	312,258	513,000
Johnstown	John Murtha Johnstown – Cambria County	JST	N/A	4,338	4,193	3,594	4,381	6,309	3,149	8,519
Lancaster	Lancaster	LNS	N/A	1,523	4,230	4,577	6,012	5,758	2,418	4,028
Latrobe	Arnold Palmer Regional	LBE	N	181,105	146,127	151,207	151,410	158,253	62,470	123,000
Philadelphia	Philadelphia Int'l	PHL	L	15,101,349	14,564,419	14,271,243	15,292,670	16,006,389	5,753,239	9,579,000
Pittsburgh	Pittsburg Int'l	PIT	M	3,890,681	3,986,114	4,327,434	4,670,033	4,715,947	1,742,406	3,068,000
State College	University Park	UNV	N	139,124	134,312	138,423	153,571	193,534	74,731	120,000
Williamsport	Williamsport Regional	IPT	N	21,923	19,320	18,323	22,547	20,442	6,847	4,063

Sources: Passenger Boarding and All-Cargo Data for U.S. Airports (CY 2015-2020), FAA; Bureau of Transportation Statistics (CY 2021)

Figure 1-1. Enplanements at Pennsylvania Commercial Service Airports, excluding PHL and PIT (2015-2021)
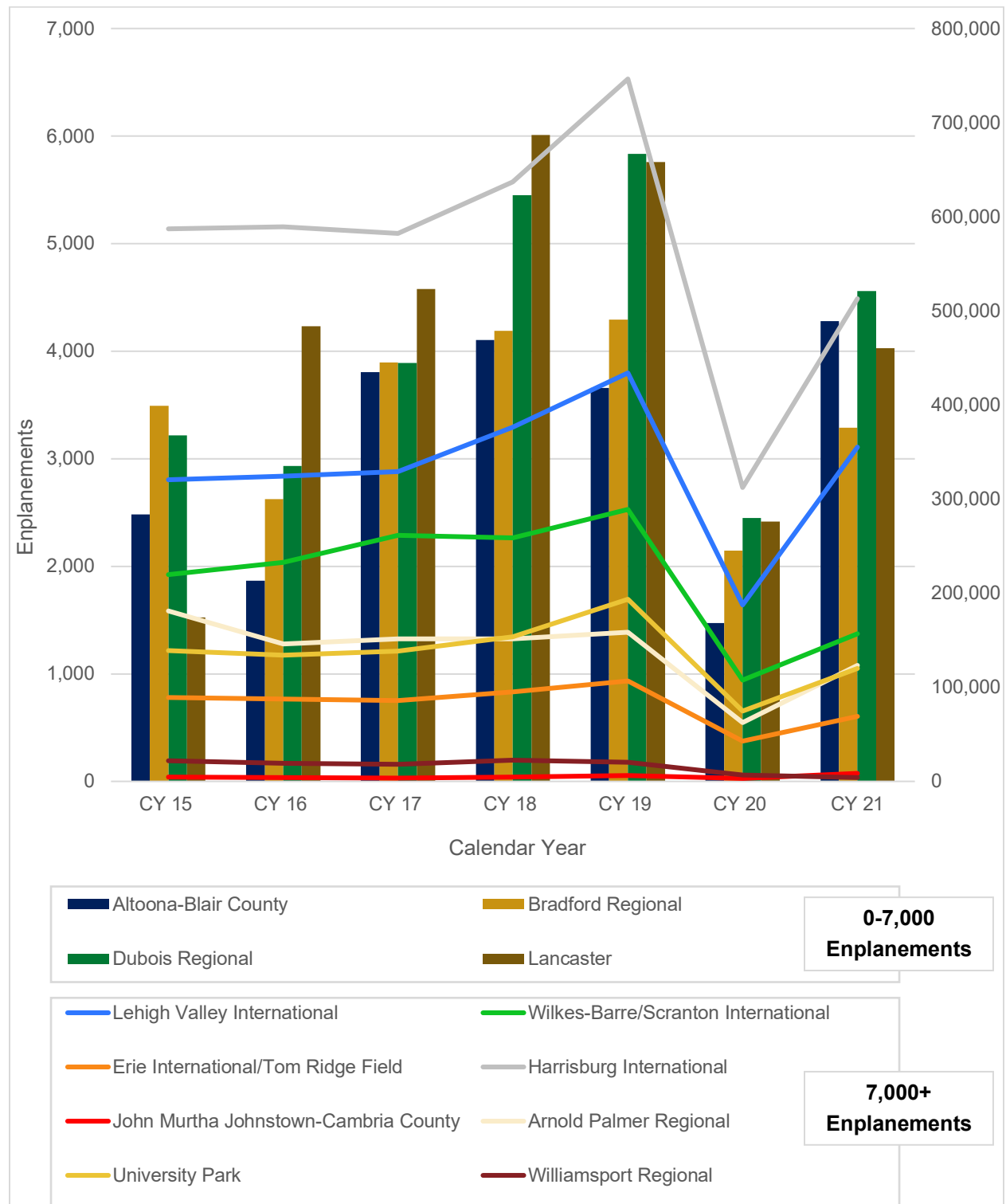
Sources: Passenger Boarding and All-Cargo Data for U.S. Airports (CY 2015-2020), FAA; Bureau of Transportation Statistics (CY 2021)

Figure 1-2. Enplanements at PHL and PIT (2015-2021)
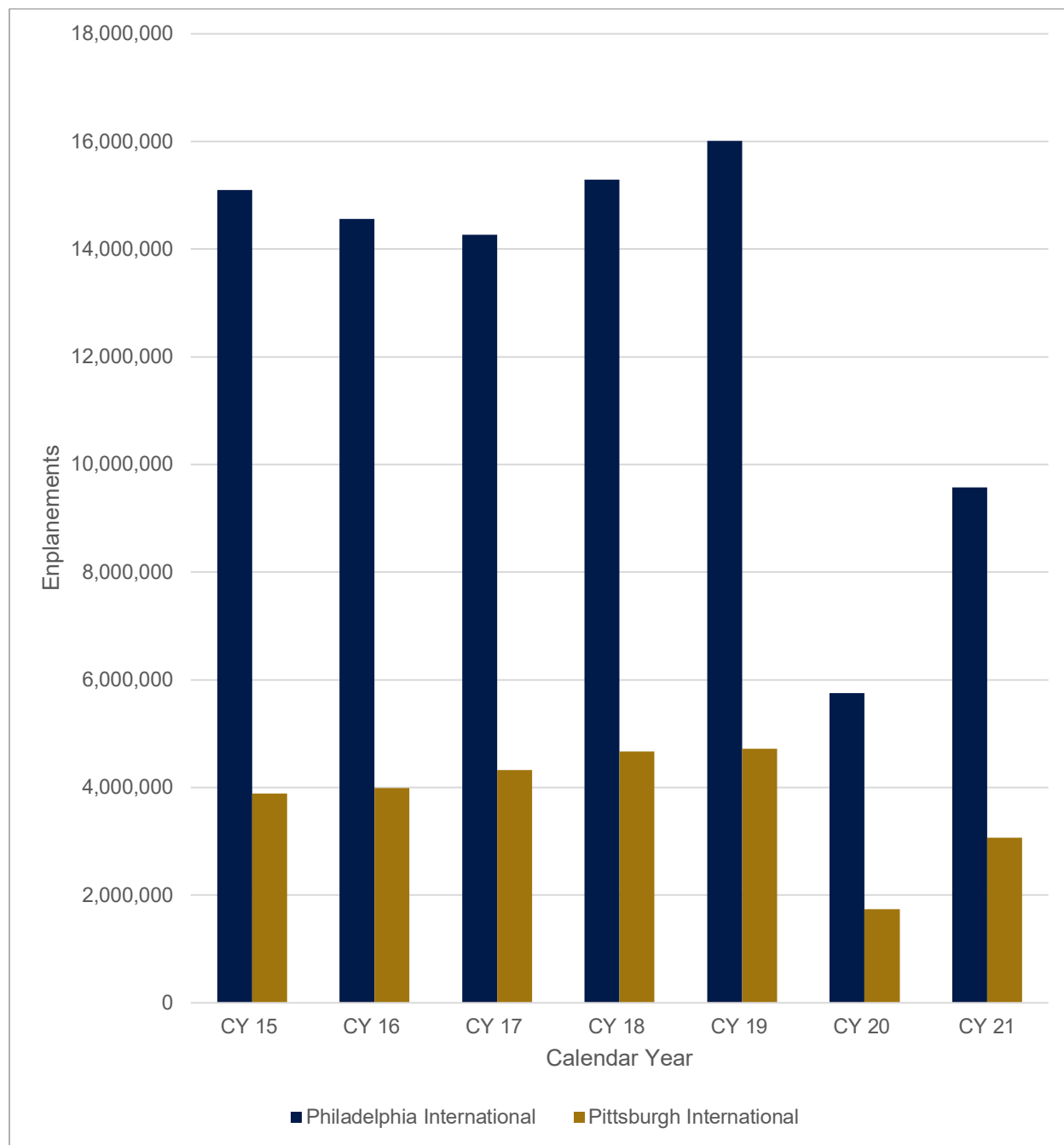
Air carrier and air taxi operations at Pennsylvania's commercial service airports followed a similar trend to enplanements from CY 2015 through CY 2021, according to the FAA Air Traffic Activity System (ATADS) and as shown in **Table 1.2**. For many airports, including Lehigh Valley International Airport (ABE), Harrisburg International Airport (MDT), and Pittsburgh International Airport (PIT), air carrier and air taxi

operations increased from CY 2017 to CY 2019.[4] However, air carrier and air taxi operations dropped significantly for all airports from CY 2019 to CY 2020. The most significant decreases were at Erie International/Tom Ridge Field (ERI), where air carrier and air taxi operations decreased by 40%; Pittsburgh International Airport (PIT), where air carrier and air taxi operations also decreased by 40%; Wilkes-Barre/Scranton International Airport (AVP), where air carrier and air taxi operations decreased by 41%; and Philadelphia International Airport, where air carrier and air taxi operations decreased by 44%. Similarly, air carrier and air taxi operations at all airports increased by at least 13% from CY 2020 to CY 2021. The most significant increases were at Harrisburg International Airport (MDT), where air carrier and air taxi operations increased by 21%; Philadelphia International Airport (PHL), where air carrier and air taxi operations also increased by 21%; Lehigh Valley International Airport (ABE), where air carrier and air taxi operations increased by 36%; and Arnold Palmer Regional Airport (LBE), where air carrier and air taxi operations increased by 51%. Changes in air carrier and air taxi operations from CY 2019 to CY 2020 and from CY 2020 to CY 2021 include impacts due to COVID-19 and travel restrictions but may also be inclusive of other factors not included in this report. These trends are illustrated in **Figure 1-3** and **Figure 1-4**.

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[4] According to the FAA, an air carrier is defined as "Aircraft with seating capacity of more than 60 seats or a maximum payload capacity of more than 18,000 pounds, carrying passengers or cargo for hire or compensation. This includes US and foreign-flagged carriers." An air taxi is defined as "Aircraft designed to have a maximum seating capacity of 60 seats or less or a maximum payload capacity of 18,000 pounds or less, carrying passengers or cargo for hire or compensation."

Table 1.2. Combined Air Carrier and Air Taxi Operations at Pennsylvania Commercial Service Airports (2015-2021)

Associated City	Airport Name	FAA ID	Hub	Annual Operations 2015-2021						
				CY 15	CY 16	CY 17	CY 18	CY 19	CY 20	CY 21
Allentown	Lehigh Valley Int'l	ABE	N	15,787	16,583	19,481	19,563	21,238	14,462	19,627
Altoona	Altoona- Blair County	AOO	N/A	*	*	*	*	*	*	*
Avoca	Wilkes-Barre/Scranton Int'l	AVP	N	15,007	15,106	16,414	15,685	16,777	9,935	11,249
Bradford	Bradford Regional	BFD	N/A	*	*	*	*	*	*	*
Brookville	Dubois Regional	DUJ	N/A	*	*	*	*	*	*	*
Erie	Erie Int'l	ERI	N	6,190	6,232	6,257	6,560	7,149	4,258	4,857
Harrisburg	Harrisburg Int'l	MDT	S	29,405	29,788	29,323	30,696	30,691	21,619	26,133
Johnstown	John Murtha Johnstown – Cambria County	JST	N/A	*	*	*	*	*	*	*
Lancaster	Lancaster	LNS	N/A	4,245	4,613	5,135	4,880	4,779	4,632	5,511
Latrobe	Arnold Palmer Regional	LBE	N	6,814	6,221	6,489	6,731	6,704	4,401	6,650
Philadelphia	Philadelphia Int'l	PHL	L	396,452	379,646	354,996	364,714	375,317	210,562	254,462
Pittsburgh	Pittsburg Int'l	PIT	M	124,723	126,311	134,569	138,698	135,752	80,996	95,969
State College	University Park	UNV	N	10,739	11,142	11,129	11,317	13,321	8,696	9,883
Williamsport	Williamsport Regional	IPT	N	3,614	3,300	3,098	2,992	2,837	2,024	2,306

Source: FAA Air Traffic Activity System (ATADS). Note: Data were not available for these airports.*

Figure 1-3. Combined Air Carrier and Air Taxi Operations at Pennsylvania Commercial Service Airports, excluding PHL and PIT (2015-2021)
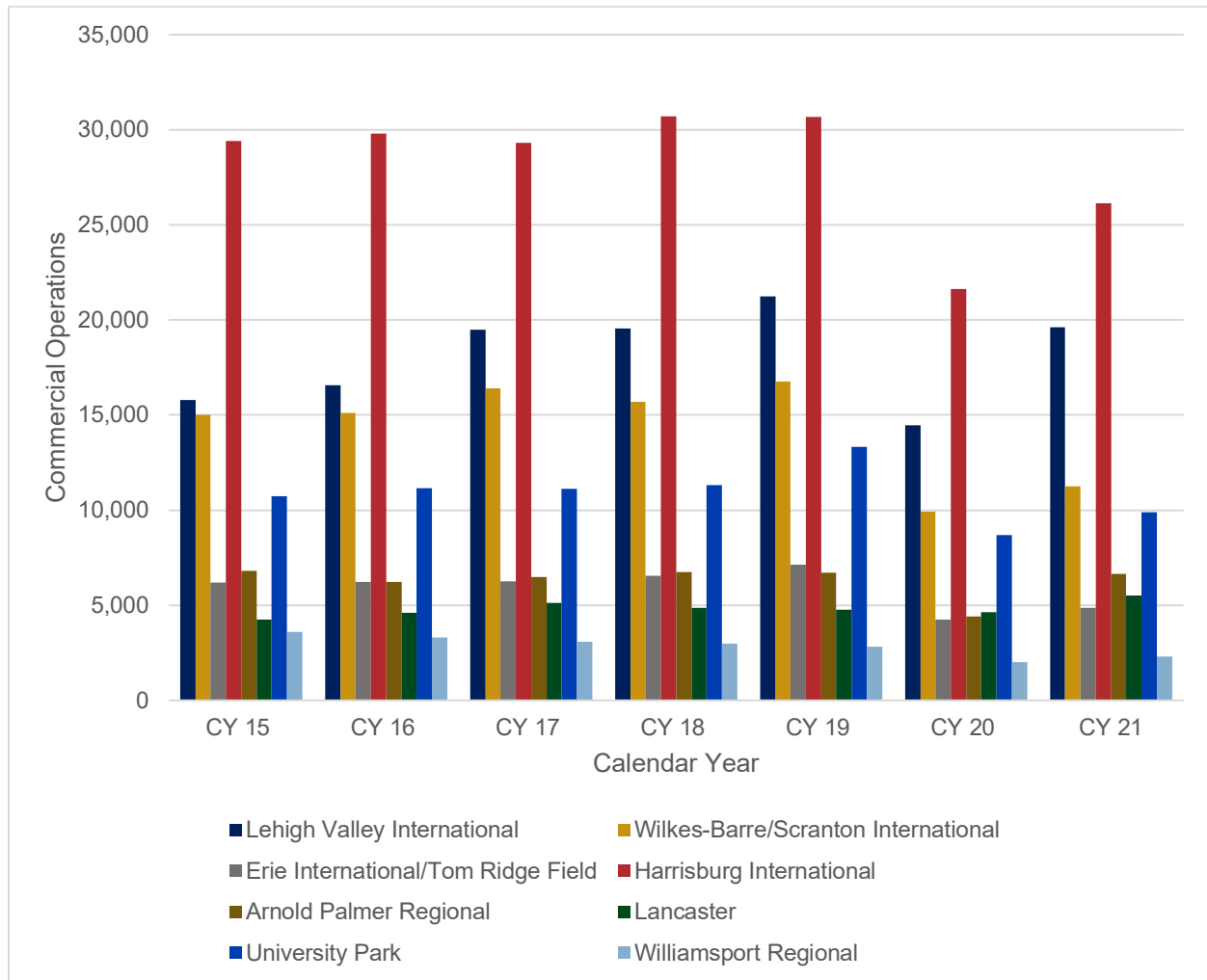
Source: FAA Air Traffic Activity System (ATADS). Note: Data were not available for Altoona-Blair County Airport (AOO), Bradford Regional Airport (BFD), Dubois Regional Airport (DUJ), and John Murtha Johnstown – Cambria County Airport (JST). They are not included in the graph.

Figure 1-4. Combined Air Carrier and Air Taxi Operations at PHL and PIT (2015-2021)
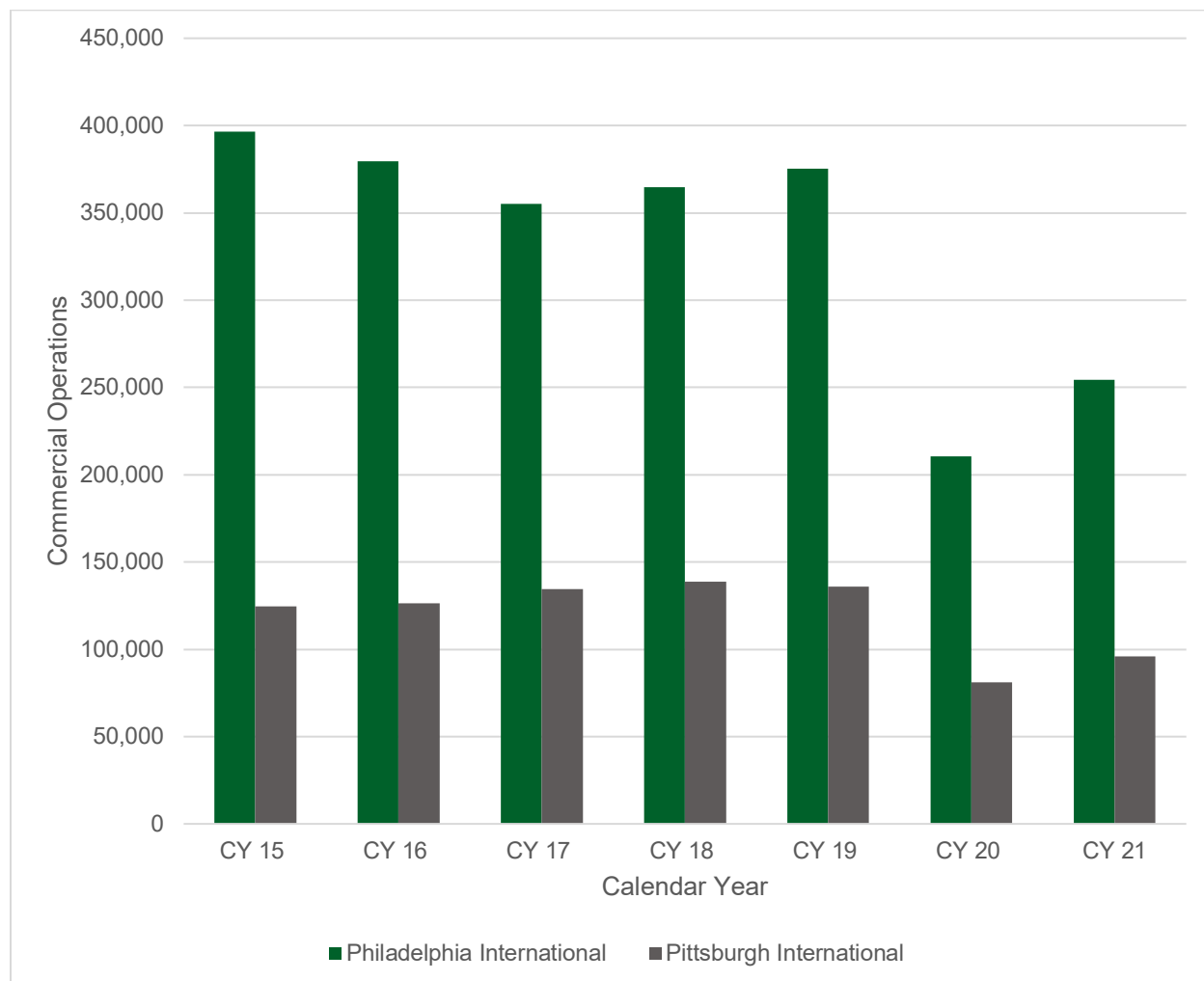
Source: FAA Air Traffic Activity System (ATADS)

GA operations were also impacted by the COVID-19 pandemic but to varying extents. To better understand the changes in operations due to the pandemic, airports were asked to provide both CY 2019 and 2020 operations as a part of the initial data collection effort for the study. GA operations for towered commercial service airports were obtained from the FAA's Air Traffic Activity System (ATADS) and are shown first in the table. Nine commercial towered airports, or 90%, experienced a decline in GA operations from 2019 to 2020. This ranged from a decline of 50% at Erie International/Tom Ridge Field (ERI) to a decline of 4% at Wilkes-Barre/Scranton International Airport (AVP). University Park Airport (UNV) is the only towered commercial service airport that experienced an increase in operations from 2019 to 2020 (16%). All towered commercial service airports experienced an increase in GA operations from 2020 to 2021. This ranged from an increase of 93% at Erie International/Tom Ridge Field (ERI) to an increase of 3% at Williamsport Regional Airport (IPT).

Similarly, GA operations for the four towered GA airports were obtained from FAA ATADS and are presented first in the table. When looking at activity at the towered GA airports, three airports, or 75%, experienced a decline in operations from 2019 to 2020. This ranged from a decline of 24% at Northeast

Philadelphia Airport (PNE) to a decline of 9% at Allegheny County Airport (AGC). Capital City Airport (CXY) was the only towered GA airport that experienced an increase in operations from 2019 to 2020 (1% increase). All towered GA airports experienced an increase in operations from 2020 to 2021. This ranged from an increase of 46% at Northeast Philadelphia Airport (PNE) to an increase of 15% at Allegheny County Airport (AGC).

When looking at activity as reported by airport staff for non-towered airports between 2019 and 2020, 39% experienced a decline in operations, 13% experienced an increase, and 48% experienced no change. Among airports that experienced a decrease, this decrease ranged from 100% at Philadelphia Seaplane Base (9N2) and 93% at Kampel Airport (2N5) to a decrease of only 1% at Chester County/ G.O. Carlson Airport (MQS), Jake Arner Memorial Airport (22N), Reigle Airport (58N), and Smoketown Airport (S37). Among airports that experienced an increase, this increase ranged from 128% at Zelienople Municipal Airport (PJC) and 100% at Greater Breezewood Regional Airport (P17) to 2% at New Castle Municipal Airport (UCP). Operations data for 2021 for non-towered airports were obtained from FAA 5010 records. Only data from 2021 were used; if 2021 data were not available, the airport is marked as "NP" (for "not provided") in **Table 1.3**. Most non-towered airports experienced an increase in operations from 2020 from 2021, with only four (Bloomsburg Municipal Airport [N13], Bradford Regional Airport [BFD], Keller Brothers Airport [08N] and New Castle Municipal Airport [UCP]) experiencing a decline.

Changes in GA operations from CY 2019 to CY 2020 and from CY 2020 to CY 2021 include impacts due to COVID-19 and travel restrictions but may also be inclusive of other factors not assessed or included in this study.

Table 1.3. GA Operations at All Pennsylvania Airports (2019-2021)

Associated City	Airport Name	FAA ID	Annual GA Operations 2015-2021		
			CY 19	CY 20	CY 21
Towered Commercial Service Airports					
Allentown	Lehigh Valley International Airport	ABE	65,460	49,544	57,329
Erie	Erie International/Tom Ridge Field	ERI	21,131	10,590	20,399
Harrisburg	Harrisburg International Airport	MDT	10,492	9,453	13,955
Lancaster	Lancaster Airport	LNS	73,569	64,534	89,533
Latrobe	Arnold Palmer Regional Airport	LBE	22,266	19,181	26,989
Philadelphia	Philadelphia International Airport	PHL	14,560	9,096	13,965
Pittsburgh	Pittsburgh International Airport	PIT	7,118	4,784	7,067
State College	University Park Airport	UNV	19,672	22,768	28,694
Wilkes-Barre/Scranton	Wilkes-Barre/Scranton International Airport	AVP	31,709	30,461	37,295
Williamsport	Williamsport Regional Airport	IPT	13,427	12,590	13,007
Towered General Aviation Airports					
Harrisburg	Capital City Airport	CXY	22,895	23,067	29,789
Philadelphia	Northeast Philadelphia Airport	PNE	71,226	54,283	79,394

Associated City	Airport Name	FAA ID	Annual GA Operations 2015-2021		
			CY 19	CY 20	CY 21
Pittsburgh	Allegheny County Airport	AGC	39,162	35,474	40,765
Reading	Reading Regional/Carl A Spaatz Field	RDG	40,918	23,632	29,072
Non-Towered Airports					
Allentown	Queen City Municipal Airport/Allentown	XLL	22,960	17,840	NP
Altoona	Altoona-Blair County Airport	AOO	18,500	18,500	NP
Bally	Butter Valley Golfport	7N8	600	400	NP
Beaver Falls	Beaver County Airport	BVI	54,582	65,734	NP
Bedford	Bedford County Airport	HMZ	16,700	16,000	NP
Bellefonte	Bellefonte Airport	N96	8,200	8,200	NP
Bensalem	Total Rf Heliport	00A	100	100	100
Bethel	Grimes Airport	8N1	1,550	1,550	1,550
Bloomsburg	Bloomsburg Municipal Airport	N13	10,600	14,100	10,600
Bradford	Bradford Regional Airport	BFD	971	1,262	803
Breezewood	Greater Breezewood Regional Airport	P17	150	300	7,300
Brogue	Baublitz Airport	9W8	8,550	8,550	8,550
Butler	Butler Farm Show Airport	3G9	6,110	5,338	NP
Butler	Pittsburgh - Butler Regional Airport	BTP	74,386	39,286	NP
Canadensis	Flying Dollar Airport	8N4	250	250	250
Carlisle	Carlisle Airport	N94	23,437	19,000	24,500
Centre Hall	Centre Airpark	N16	1,600	1,200	1,600
Centre Hall	Penn's Cave Airport	N74	350	263	350
Chambersburg	Franklin County Regional Airport	N68	11,910	11,910	NP
Clarion	Clarion County Airport	AXQ	2,776	2,660	NP
Clearfield	Clearfield-Lawrence Airport	FIG	9,600	5,000	NP
Coatesville	Chester County/G.O. Carlson Airport	MQS	41,774	41,242	41,774
Connellsville	Joseph A. Hardy Connellsville Airport	VVS	30,660	21,462	NP
Corry	Corry-Lawrence Airport	8G2	4,920	586	NP
Cresco	Rocky Hill Ultralight Airport	48P	150	150	150
Danville	Danville Airport	8N8	9,200	8,410	9,200
Dover	Lazy B Ranch Airport	0P8	900	900	NP
Doylestown	Doylestown Airport	DYL	43,595	43,595	NP
Dubois	Dubois Regional Airport	DUJ	2,122	2,123	NP
East Stroudsburg	Stroudsburg-Pocono Airport	N53	6,020	6,020	6,020
Easton	Braden Airpark	N43	11,384	10,078	NP
Ebensburg	Ebensburg Airport	9G8	800	725	NP
Eighty Four	Bandel Airport	22D	5,500	5,500	NP

Associated City	Airport Name	FAA ID	Annual GA Operations 2015-2021		
			CY 19	CY 20	CY 21
Erie	Thermal-G Gliderport	03G	550	490	NP
Erwinna	Van Sant Airport	9N1	3,000	3,000	NP
Essington	Philadelphia Seaplane Base	9N2	12	0	NP
Factoryville	Seamans Airport	9N3	25,382	21,076	22,102
Fairfield	Mid-Atlantic Soaring Center	W73	4,130	4,537	NP
Finleyville	Finleyville Airpark	G05	9,506	10,331	NP
Franklin	Venango Regional Airport	FKL	18,936	5,659	18,936
Fredericksburg	Farmers Pride Airport	9N7	7,325	7,325	7,325
Freeport	McVille Airport	6P7	2,300	2,300	NP
Germansville	Flying M Aerodrome	P91	8,864	8,864	8,864
Gettysburg	Gettysburg Regional Airport	W05	9,650	9,650	NP
Greenville	Greenville Municipal Airport	4G1	18,324	18,324	18,324
Grove City	Grove City Airport	29D	7,005	7,305	NP
Hazleton	Hazleton Regional Airport	HZL	550	650	27,075
Honesdale	Cherry Ridge Airport	N30	23,010	23,010	23,010
Horsham	Horsham Valley Airways Heliport	N48	120	120	NP
Indiana	Indiana County/Jimmy Stewart Field	IDI	22,127	23,400	NP
Irwin	Inter County Airport	31D	78	78	78
Jeannette	Greensburg-Jeannette Regional Airport	5G8	1,005	1,075	NP
Jersey Shore	Jersey Shore Airport	P96	1,500	1,500	1,500
Johnstown	John Murtha Johnstown-Cambria County Airport	JST	10,713	8,801	14,269
Kralltown	Bermudian Valley Airpark	07N	6,750	6,750	6,750
Lebanon	Keller Brothers Airport	08N	4,990	5,000	4,990
Lehighton	Beltzville Airport	14N	1,530	1,100	NP
Lehighton	Jake Arner Memorial Airport	22N	13,013	12,850	13,876
Lock Haven	William T. Piper Memorial Airport	LHV	17,400	16,400	17,400
Meadville	Port Meadville Airport	GKJ	3,044	2,943	NP
Mifflintown	Mifflintown Airport	P34	3,850	3,575	NP
Monongahela	Rostraver Airport	FWQ	43,920	43,920	43,920
Morgantown	Morgantown Airport	O03	10,250	10,250	10,250
Mount Joy/Marietta	Donegal Springs Airpark	N71	3,510	3,510	NP
Mount Pleasant	Mount Pleasant/Scottdale Airport	P45	1,170	1,170	NP
Mount Pleasant	W.P.H.S. Heliport	P99	1,288	1,288	NP
Mount Pocono	Pocono Mountains Municipal Airport	MPO	21,800	21,800	22,300
Myerstown	Deck Airport	9D4	13,050	13,050	NP
New Castle	New Castle Municipal Airport	UCP	31,252	31,950	31,252

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Associated City	Airport Name	FAA ID	Annual GA Operations 2015-2021		
			CY 19	CY 20	CY 21
Palmyra	Reigle Airport	58N	983	976	30,000
Perkasie	Pennridge Airport	CKZ	22,050	19,845	22,050
Philadelphia	Wings Field Airport	LOM	30,331	23,351	NP
Philadelphia	Penn's Landing Heliport	P72	11,970	6,025	NP
Philipsburg	Albert Airport	1N3	170	170	170
Philipsburg	Mid-State Airport	PSB	1,500	1,500	NP
Pittsburgh	Pittsburgh Northeast Airport	9G1	1,000	1,000	1,000
Pittsfield	Brokenstraw Airport	P15	1,486	1,560	NP
Pottstown	Pottstown Municipal Airport	N47	14,775	17,968	NP
Pottstown	Heritage Field	PTW	23,400	23,400	NP
Pottsville	Schuylkill County/Joe Zerbey Airport	ZER	28,100	21,000	NP
Punxsutawney	Punxsutawney Municipal Airport	N35	5,200	5,200	NP
Quakertown	Quakertown Airport	UKT	29,667	29,667	29,667
Reedsville	Mifflin County Airport	RVL	14,400	13,700	14,400
Selinsgrove	Penn Valley Airport	SEG	22,000	22,000	22,000
Shamokin	Northumberland County Airport	N79	23,150	23,150	23,150
Slatington	Slatington Airport	69N	7,000	7,000	7,000
Smoketown	Smoketown Airport	S37	26,512	26,500	NP
Somerset	Somerset County Airport	2G9	15,970	14,870	NP
St Marys	St. Mary's Municipal Airport	OYM	6,245	5,770	6,245
Sterling	Spring Hill Airport	70N	2,010	2,010	NP
Stewartstown	Shoestring Aviation Airfield	0P2	1,302	1,302	1,302
Sunbury	Sunbury Airport	71N	1,600	1,600	1,600
Sunbury	Sunbury Seaplane Base	H11	20	20	20
Titusville	Titusville Airport	6G1	9,006	9,006	NP
Toughkenamon	New Garden Flying Field Airport	N57	27,332	27,332	NP
Towanda	Bradford County Airport	N27	23,100	23,100	NP
Tower City	Bendigo Airport	74N	3,080	3,080	3,080
Tunkhannock	Sky Haven Airport	76N	22,090	14,005	22,090
Unionville	Ridge Soaring Gliderport	79N	12,500	12,500	12,500
Washington	Washington County Airport	AFJ	48,900	44,013	NP
Waynesburg	Greene County Airport	WAY	10,012	10,012	NP
Wellsboro	Wellsboro-Johnston Airport	N38	5,700	5,370	5,700
Wellsville	Kampel Airport	2N5	706	50	706
West Chester	Brandywine Airport	OQN	43,373	30,360	43,373
Wilkes-Barre	Wilkes-Barre Wyoming Valley Airport	WBW	33,125	21,863	33,125

Associated City	Airport Name	FAA ID	Annual GA Operations 2015-2021		
			CY 19	CY 20	CY 21
Williamsburg	Cove Valley Airport	6G6	180	100	180
York	York Airport	THV	50,800	32,750	52,750
Zelienople	Zelienople Municipal Airport	PJC	18,449	41,975	NP

Sources: 2022 PA AEIS Airport Manager Survey; Air Traffic Activity System (ATADS); FAA 5010 Records; Kimley-Horn, 2022. Note: If airports didn't respond to the Airport Manager Survey or were identified as "do not contact" airports by the BOA for purposes of this study, their FAA 5010 Record operation counts for 2019 and 2020 were used. In all instances, these numbers were the same for 2019 and 2020, except for Corry Lawrence who did have updated 5010 operations counts. Operation counts for non-towered airports for CY 2021 came from FAA 5010 Records.

Chapter 2. Socioeconomic Background

2.1. Introduction

This chapter examines the socioeconomic trends occurring in Pennsylvania to better understand the demands made upon the Commonwealth's aviation system and potential future opportunities for growth. It is helpful to have this understanding before delving into the economic impact of that system, as it provides context regarding the importance that aviation has in the everyday lives of Pennsylvanians. Aviation demand is closely and positively associated with socioeconomic trends, especially population, employment, and income growth trends. When population, employment, and income trend upward, so too does the demand for aviation as the traveling population grows, disposable incomes rise, and the need for aviation services to support medical, business, recreation, and other operations increases. Likewise, trends downward tend to lower the demand for aviation. This chapter provides an overview of historical and projected socioeconomic trends for both Pennsylvania and the nation as a way of understanding potential short-term and long-term impacts on aviation demand in the state.

Recognizing that socioeconomic indicators and trends will vary within the borders of the Commonwealth, data are presented at the nationwide, statewide, and individual Pennsylvania county levels. Data were primarily sourced from the most recent edition of Woods & Poole Economics, Inc. (Woods & Poole). All other data sources are referenced where utilized. Note that all monetary amounts have been standardized to 2009 dollars to account for inflation and thereby more accurately compare the value of money across a longer timeframe. The historical period of reference is 1999 through 2019. The base year for all data comparisons is 2019 and projected years are 2024, 2029, and 2039. The three forecasting periods are thus 2019 to 2024 (5-year), 2019 to 2029 (10-year), and 2019 to 2039 (20-year). Detailed national, state, and county-level data are provided in **Table A-1** through **Table A-5** in **Appendix A**.

2.2. Population Trends

Figure 2-1 shows the historic and projected population of Pennsylvania and the U.S. between 1999 and 2039. Over the last 20 years, Pennsylvania's population increased from 12,263,805 (1999) to 13,016,933 (2019), a compound annual growth rate (CAGR) of 0.3%. From 2019 to 2039, Pennsylvania's population is expected to grow at the same CAGR to approximately 13,831,500, a total increase of approximately 814,560 persons by 2039.

Figure 2-1. Pennsylvania and U.S. Historic and Projected Population in Thousands
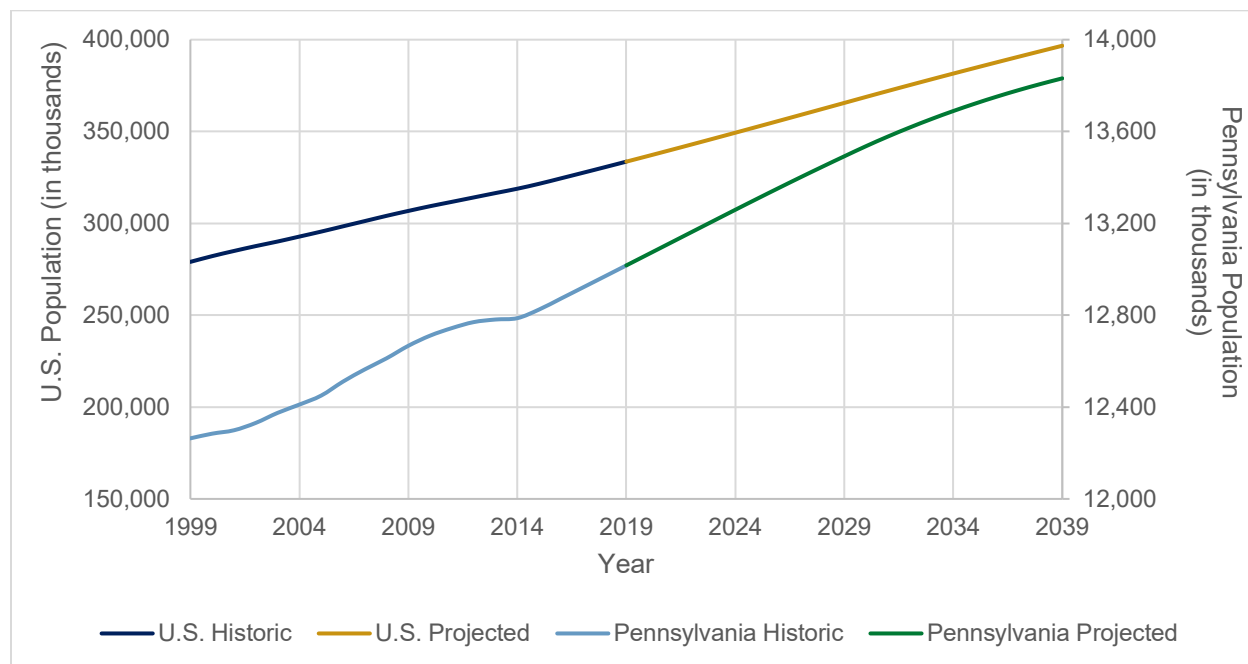
Source: Woods & Poole, Inc.

Table A-1 shows historic and projected population trend for each of Pennsylvania's 67 counties. Population trends on a county-by-county level are illustrated further in **Figure 2-2**. In general, counties in the eastern part of the Commonwealth are projected to experience population growth, while counties in the western part of the Commonwealth are projected to remain stagnant or experience population decline. Philadelphia County, the largest populated county within Pennsylvania, has over 1.5 million people as of 2019. Between 2019 and 2039, the Philadelphia County population is expected to decline by approximately 0.2%. However, the surrounding counties, including Bucks, Montgomery, Chester, and Delaware, are expected to grow by up to 0.8%, likely indicating a shift in population migrating outside of the central city.

Figure 2-2. Projected Population CAGR by County, 2019-2039

LEGEND

- -0.8% to -0.6%
- -0.6% to 0%
- 0% to 0.3%
- 0.3% to 0.8%
- 0.8% to 1.7%

0   25   50   75   100 Miles

Source: Woods & Poole, Inc.
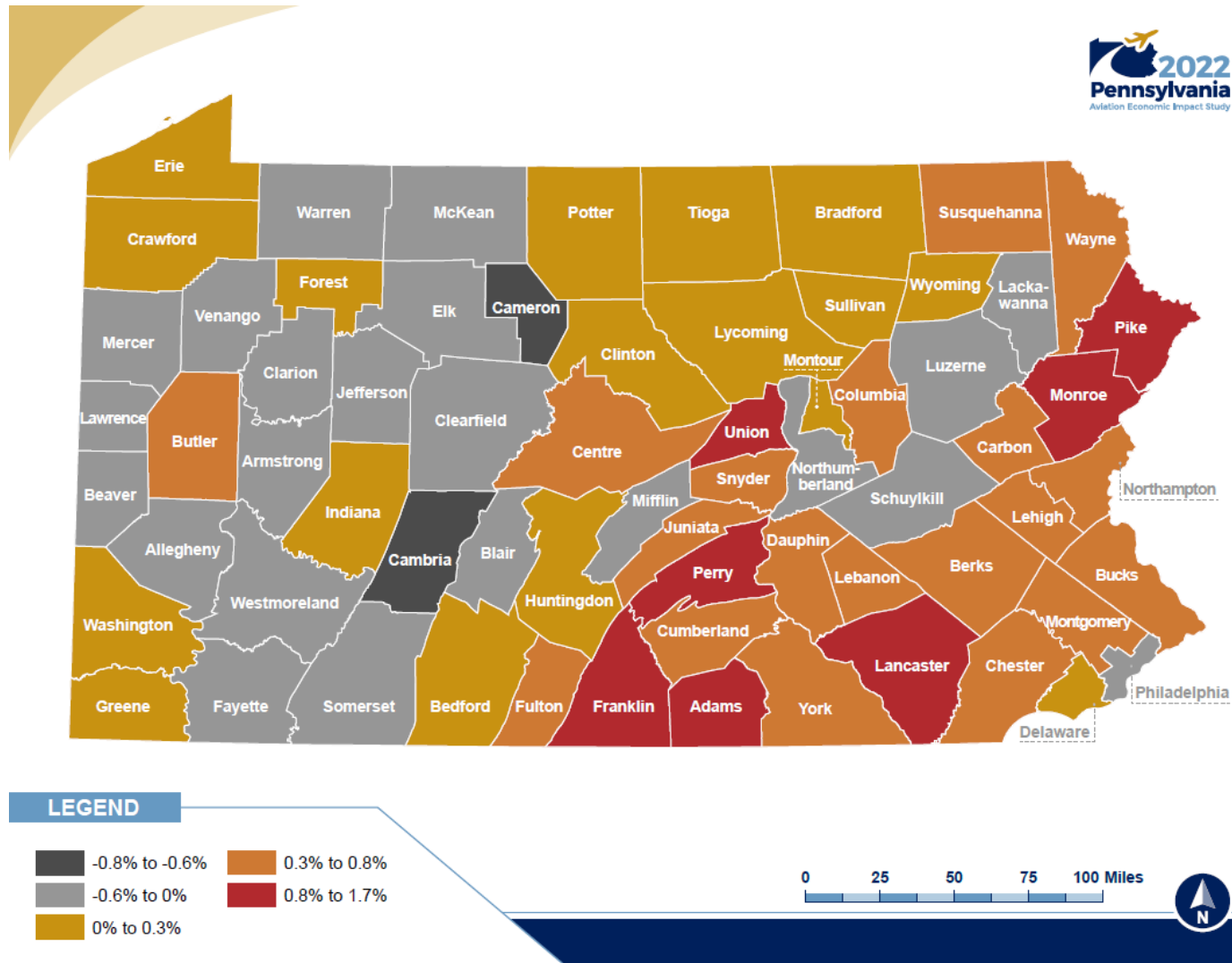
2.3. Age Trends

Figure 2-3 shows Pennsylvania and the U.S. historic and projected median ages between 1999 and 2039. As of 2019, Pennsylvania's median age (40.69) is roughly 2.5 years older than the U.S. median age of 38.17. Pennsylvania's median age is projected to continue to rise at the same CAGR as the nation throughout projected periods of 2019 to 2024 (0.2%), 2019 to 2029 (0.2%), and 2019 to 2039 (0.2%).

Figure 2-3. Pennsylvania and U.S. Historic and Projected Median Age
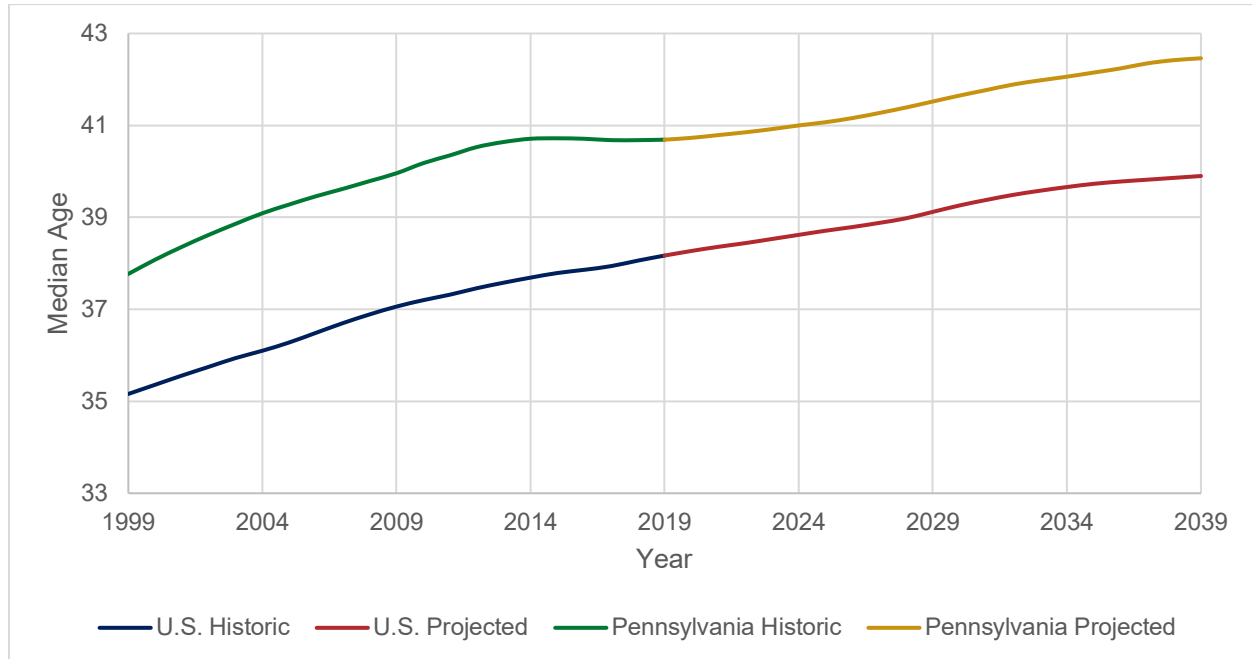
Source: Woods & Poole, Inc.

Table A-2 shows historic and projected age trends for each of Pennsylvania's 67 counties. As shown, 53 counties have median ages greater than or equal to Pennsylvania's median age of 40.69 as of 2019. The remaining 14 counties have median ages below Pennsylvania's median age. Age trends on a county-by-county level are illustrated further in **Figure 2-4**. The majority of Pennsylvania's counties are projected to have an increased median age by 2039. Only a few counties, including Cameron and Sullivan counties, are projected to have a decreased median age. While most counties are expected to experience an increase in median age, the rate at which the age is changing is not equal across the state. Counties near Pittsburgh and Philadelphia are increasing at a lower rate than counties in the center of the Commonwealth, indicating a larger share of younger population in the metro areas.

Figure 2-4. Projected Age CAGR by County, 2019-2039

LEGEND

- -0.5% to -0.3%
- -0.3% to 0%
- 0% to 0.1%
- 0.1% to 0.3%
- 0.3% to 0.5%
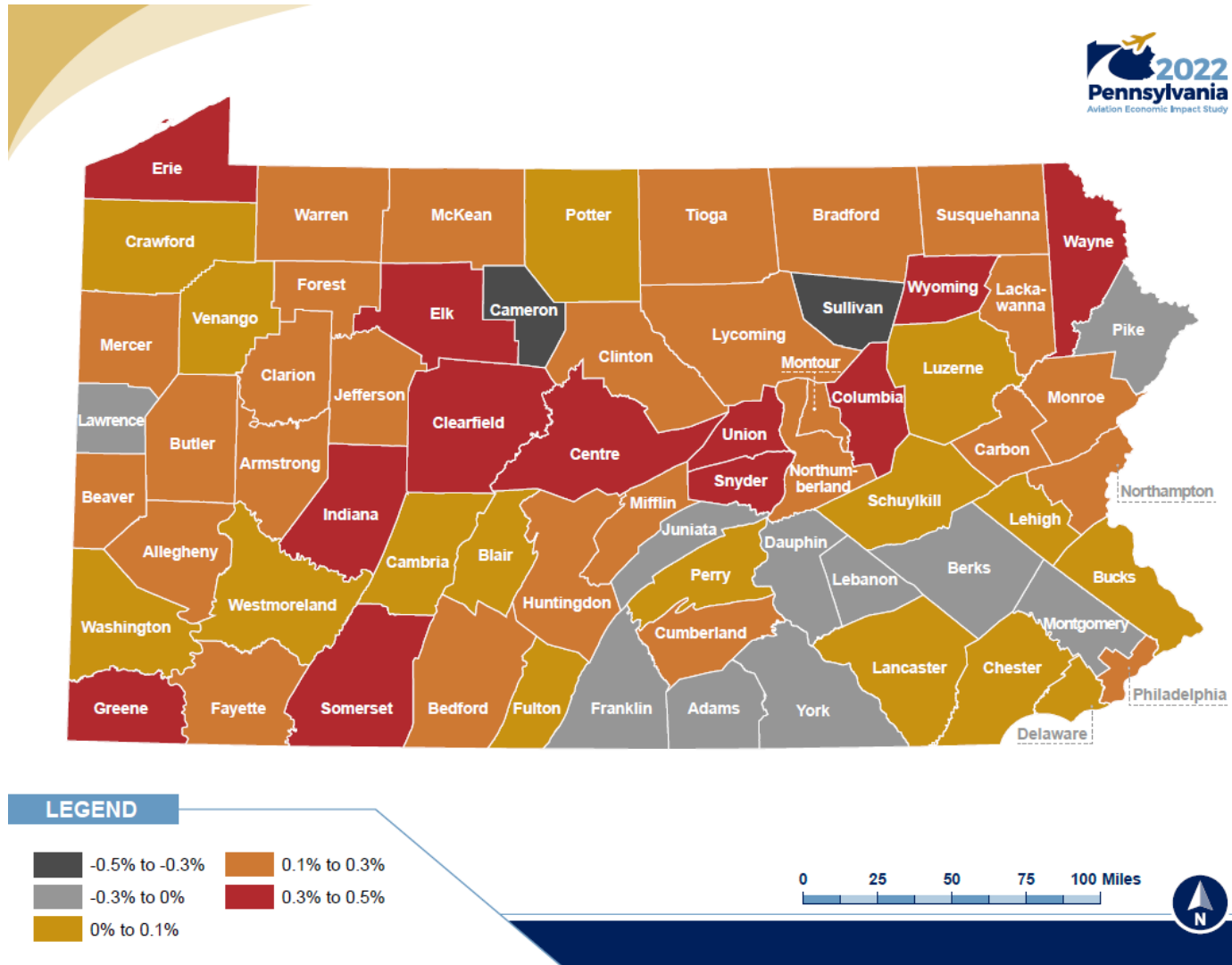
Source: Woods & Poole, Inc.

2.4. Employment Trends

Figure 2-5 shows the historic and projected employment of Pennsylvania and the U.S. between 1999-2039. Overall, employment steadily increased from 1999 to 2019 for both the U.S. and Pennsylvania, with two exceptions. The 2001 Recession caused employment trends to drop from 2001 to 2003, and the Great Recession of 2007-2009 caused employment trends to drop from 2008 to 2010. By 2004, Pennsylvania's workforce rebounded from the 2001 Recession, surpassing 2001 totals until impacts from the Great Recession began. By 2013, Pennsylvania had regained employment numbers and surpassed pre-Great Recession totals. As shown in **Figure 2-5,** employment trends in Pennsylvania have largely mirrored those of the greater U.S. during the review period.

Employment has steadily grown from 2010 and is expected to continue to increase at a steady rate through 2039. Projections indicate that Pennsylvania's employment will increase and reach just under 9.29 million people by 2039, an increase of approximately 1.44 million from 2019.

Figure 2-5. Pennsylvania and U.S. Historic and Projected Employment in Thousands
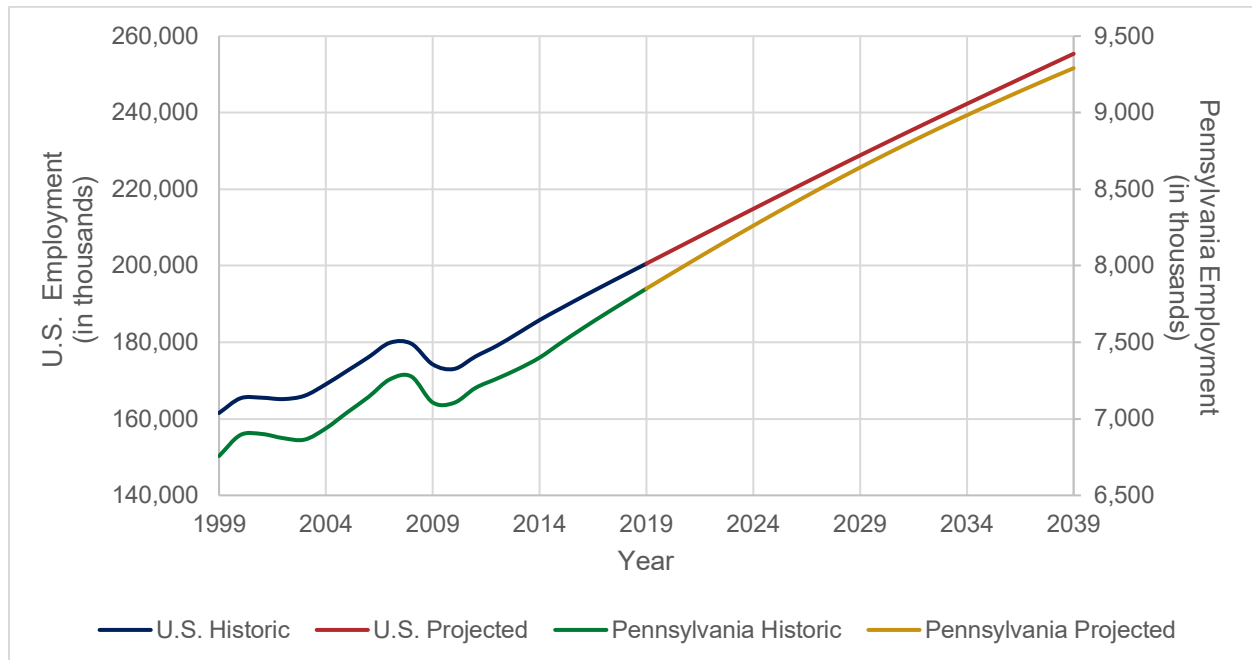
Source: Woods & Poole, Inc.

Table A-3 shows historic and projected employment trends for each of Pennsylvania's 67 counties. Allegheny County has the highest employment for any county in Pennsylvania not only for the base year 2019, but also through projected years 2019 to 2024, 2019 to 2029 and 2019 to 2039. Employment trends on a county-by-county level are illustrated further in **Figure 2-6**. The majority of Pennsylvania's counties are projected to have increased employment by 2039, with the exception of Cameron County. Employment in Centre, Montour, and Pike counties are projected to grow the most. Centre County's employment growth is likely due to the projected growth of Penn State University, the county's largest employer, and the Mount Nittany health system. Montour County also has a regional health system, Geisinger, whose medical center, clinic, system services, and health plan are currently the County's top

four employers, and which are similarly anticipated to grow. Pike County's employment growth is projected to increase along with its projected population growth (the highest CAGR in the Commonwealth) and its projected increase in the number of private-sector employers.

Figure 2-6. Projected Employment CAGR by County, 2019-2039
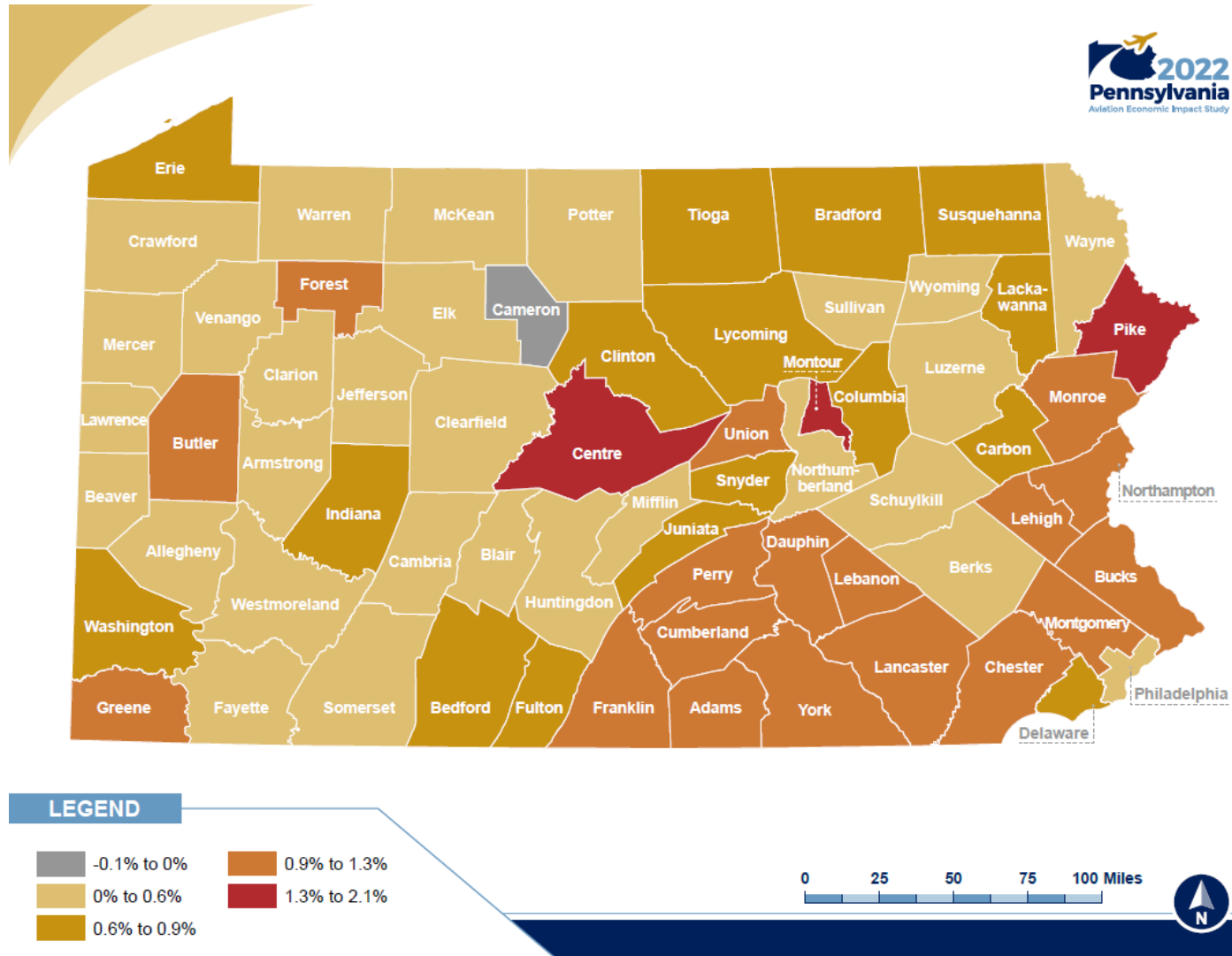
Source: Woods & Poole, Inc.

Table 2.1 shows historic and projected Pennsylvania employment by industry sector (22 total industry sectors). Currently, the "health care and social assistance" sector has the greatest share of employment, at 1.1 million employees in Pennsylvania. Sectors including healthcare and social assistance, educational services, real estate and rental and lease, arts, entertainment, and recreation, and management of companies and enterprises are anticipated to experience the fastest growth rates throughout projected years 2019 to 2024, 2019 to 2029, and 2019 to 2039. The management of companies and enterprises sector shows the highest annual growth rates for the projected years, averaging 2.4% for 2019 to 2024; 2.3% for 2019 to 2029; and 2.1% for 2019 to 2039.

Table 2.1. Employment in Thousands by Sector

Industry Sector	Historic	Base	Projected			CAGR			
	1999	2019	2024	2029	2039	1999 to 2019	2019 to 2024	2019 to 2029	2019 to 2039
Farm	82.5	76.4	77.4	78.0	78.0	0.4%	0.3%	0.2%	0.1%
Forestry, Fishing, Related Activities and Other	17.0	20.6	22.0	23.4	26.2	1.0%	1.3%	1.3%	1.2%
Mining	27.2	64.8	68.2	71.7	79.2	4.4%	1.0%	1.0%	1.0%
Utilities	31.9	23.2	23.1	23.0	22.3	1.6%	0.0%	0.1%	0.2%
Construction	357.4	408.9	435.8	449.9	459.4	0.7%	1.3%	1.0%	0.6%
Manufacturing	877.4	604.6	592.5	573.8	530.5	1.8%	0.4%	0.5%	0.7%
Wholesale Trade	241.5	261.7	269.0	274.9	282.0	0.4%	0.5%	0.5%	0.4%
Retail Trade	804.5	823.1	849.3	874.2	923.5	0.1%	0.6%	0.6%	0.6%
Transportation and Warehousing	225.1	285.7	298.8	313.0	338.1	1.2%	0.9%	0.9%	0.8%
Information	140.8	104.2	105.5	106.7	108.7	1.5%	0.3%	0.2%	0.2%
Finance and Insurance	347.9	443.7	478.1	504.3	533.9	1.2%	1.5%	1.3%	0.9%
Real Estate and Rental and Lease	157.6	263.8	284.1	305.1	348.3	2.6%	1.5%	1.5%	1.4%
Professional and Technical Services	383.5	517.7	545.1	574.6	639.6	1.5%	1.0%	1.0%	1.1%
Management of Companies and Enterprises	60.4	156.3	175.6	195.7	238.5	4.9%	2.4%	2.3%	2.1%
Administrative and Waste Services	331.9	408.8	433.2	457.2	495.2	1.0%	1.2%	1.1%	1.0%
Educational Services	207.3	311.0	337.1	363.1	408.4	2.0%	1.6%	1.6%	1.4%
Health Care and Social Assistance	796.9	1,130.9	1,223.1	1,319.9	1,503.9	1.8%	1.6%	1.6%	1.4%
Arts, Entertainment, and Recreation	113.9	174.1	188.3	203.1	230.5	2.1%	1.6%	1.6%	1.4%
Accommodation and Food Services	394.6	509.7	539.7	566.2	602.8	1.3%	1.2%	1.1%	0.8%
Other Services, Except Public Administration	391.2	441.9	464.4	488.0	537.0	0.6%	1.0%	1.0%	1.0%

Industry Sector	Historic	Base	Projected			CAGR			
	1999	2019	2024	2029	2039	1999 to 2019	2019 to 2024	2019 to 2029	2019 to 2039
Federal Civilian Government	108.8	95.3	94.8	94.4	93.4	0.7%	0.1%	0.1%	0.1%
Federal Military	44.7	36.4	36.5	36.6	36.8	-1.0%	0.1%	0.1%	0.1%
State and Local Government	613.0	687.4	719.7	744.7	774.5	0.6%	0.9%	0.8%	0.6%

Source: Woods & Poole, Inc.

2.5. Per Capita Income Trend

Figure 2-7 shows Pennsylvania and the U.S. historic and projected incomes per capita. Pennsylvania matched the nation's income per capita in 1999 but has outpaced the nation starting in 2008 and is projected to continue to outpace the U.S. projection throughout the 20-year forecast period. By 2039, the national per capita income is expected to reach $58,548, while the Pennsylvania per capita income is expected to reach $62,580, roughly $4,000 above the nation's expected total. Pennsylvania's CAGRs are 1.65% for projected years 2019 to 2024, 1.57% for projected years 2019 to 2029, and 1.38% for projected years 2019 to 2039, whereas the nation's CAGRs for the same periods are 1.50%, 1.43%, and 1.25%, respectively.

Figure 2-7. Pennsylvania and U.S. Historic and Projected Income per Capita
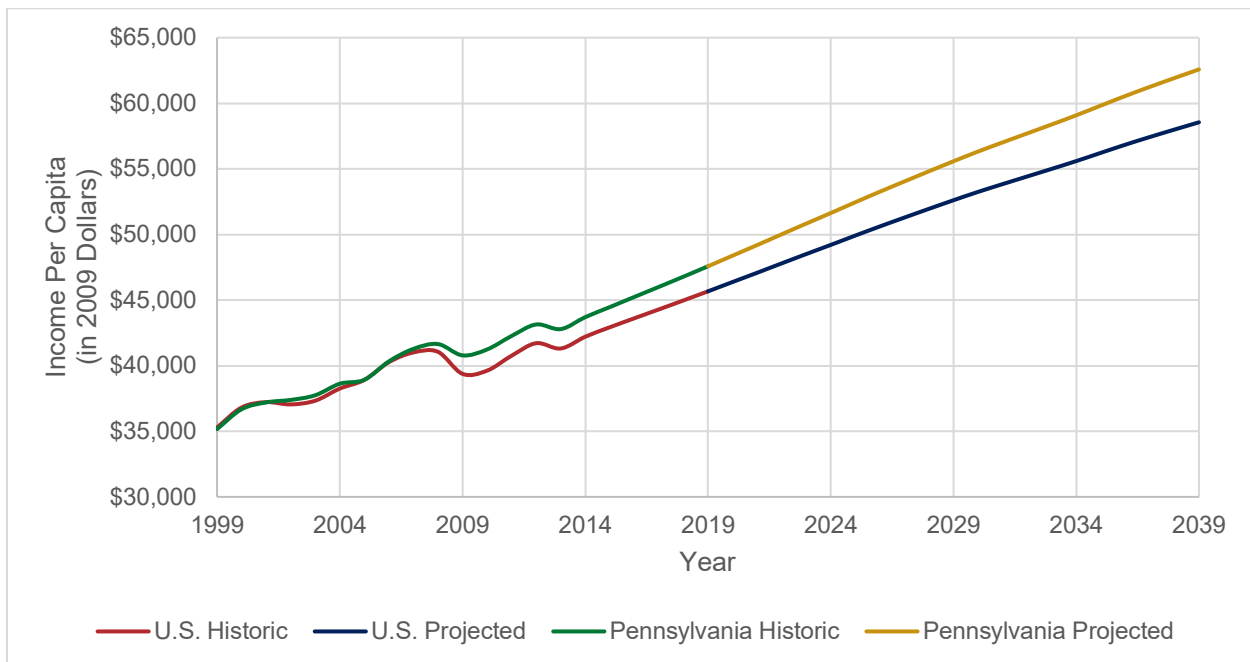
Source: Woods & Poole, Inc.

Table A-4 shows historic and projected per capita income trends for each of Pennsylvania's 67 counties. Montgomery and Chester counties maintain the highest income per capita from historic throughout projected years. Income per capita trends on a county-by-county level are illustrated further in **Figure 2-8**. All counties in Pennsylvania are projected to have an increase in per capita income by 2039. This

increase is most pronounced in the western part of the Commonwealth, with Forest, Butler, and Greene counties projected to have up to a 1.8% increase in per capita income. Forest County has a slightly higher than average (for Pennsylvania) employment in the healthcare industry, which itself is projected to grow. This employment, which has the possibility of higher-than-average per capita income, may be contributing to the County's projected growth in per capita income. Butler County has several major employers that have historically paid high salaries, which may be a contributing factor to projected per capita income increases. These employers include Carnegie Mellon University, University of Pittsburgh, and PNC Financial Services Group. PNC is the largest consumer bank in Pennsylvania. A large percent of Greene County residents (42%) work outside of the county in the professional, scientific, or management professions, which are typically higher paid.[5] If this trend continues, this could account for the higher per capita income in Greene County relative to its current employment opportunities.

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[5] *Greene County Comprehensive Economic Development Plan*. Greene County, PA. https://www.greenegovernment.com/wp-content/uploads/2013/10/ChapterTwo_ResourceAssessmentandStakeholderFeedback.pdf.

Figure 2-8. Projected Income Per Capita CAGR by County, 2019-2039
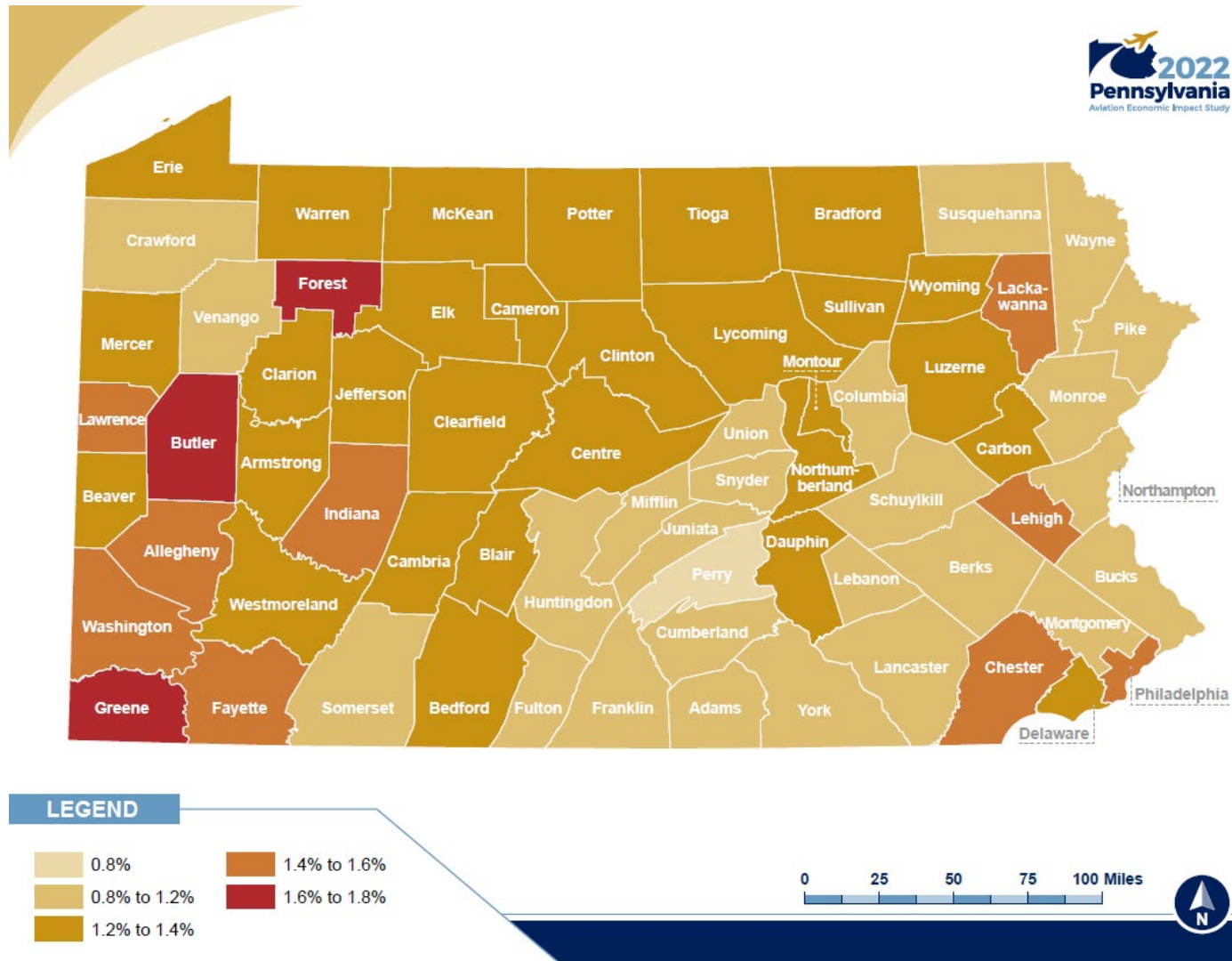
Source: Woods & Poole, Inc.

2.6. Gross Regional Product Trend

Figure 2-9 shows Pennsylvania and the U.S. historic and projected Gross Regional Product (GRP).[6] GRP growth in Pennsylvania has generally mirrored GRP growth for the nation as a whole during the study period. GRP for both Pennsylvania and the U.S. has historically grown steadily, except a slight decline between 2007 and 2009 as a result of the Great Recession. GRP is projected to continue growing at a steady pace throughout all projected years.

Figure 2-9. Pennsylvania and U.S. Historic and Projected Gross Regional Product (GRP) in Millions
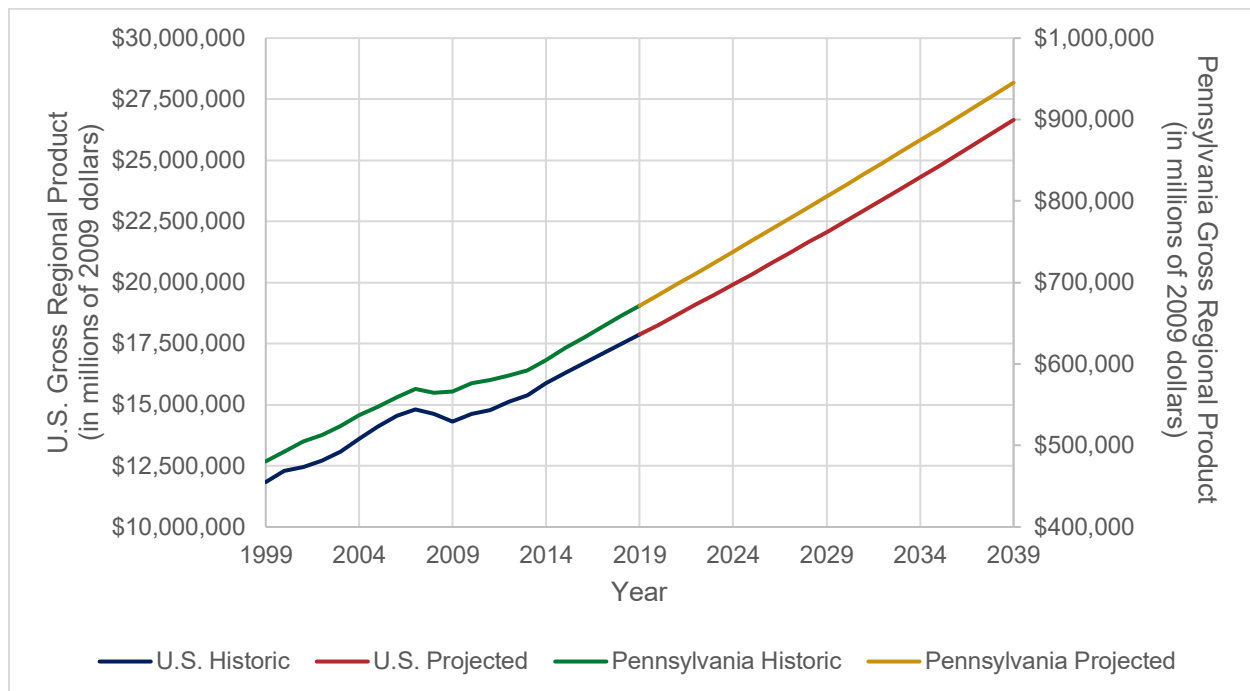
Source: Woods & Poole, Inc.

Table A-5 shows historic and projected GRP trends for each of Pennsylvania's 67 counties. While Allegheny County led the state in GRP in 1999, by 2019 Philadelphia County surpassed and now leads the state in GRP for base year 2019. Philadelphia County is also expected to continue to lead in total GRP throughout the projected years 2019 to 2024, 2019 to 2029, and 2019 to 2039, although it is not anticipated to lead in projected GRP CAGR. Pennsylvania maintains an approximate CAGR between 1.7% and 1.9% throughout projected year periods, while the nation maintains a CAGR of between 2.0% and 2.2%. GRP trends on a county-by-county level are illustrated further in **Figure 2-10.** All counties in Pennsylvania are projected to have an increase in GRP by 2039, with growth evenly distributed throughout the Commonwealth. Forest and Butler counties have the greatest increase in the western part of the Commonwealth. Forest County has several active and growing oil and gas companies; as the price

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[6] Gross Regional Product (GRP) is conceptually the same as Gross Domestic Product (GDP) but for a smaller region, such as a state or metro area. GRP measures the final market value of all goods and services produced in the region of study.

of oil and gas continues to climb, these companies could be contributing to the County's projected GRP growth. Butler County has several types of manufacturing companies, including those for plastics, lumber, and food processing. Manufacturing in the county is anticipated to continue growing, adding to the County's projected GRP growth. Centre and Montour counties have the greatest GRP increase in central Pennsylvania. One of the largest manufacturing employers in the Commonwealth, Restek, is located in Centre County and may be contributing to the County's GRP growth. Montour County also has several large manufacturing employers, including Wise Foods and Autoneum North America. Finally, Pike and Chester counties have the greatest GRP increase in the eastern part of the Commonwealth. Pike County has a robust transportation and warehousing industry. Manufacturing is growing in the County, potentially influenced by the existence of these supporting industries. Manufacturing is the largest industry in Chester County and is anticipated to continue holding this role, potentially accounting for the County's projected GRP growth. Herr Foods Inc. produces snack foods in the County, and the County also remains a big steel producer.

Figure 2-10. GRP CAGR by County, 2019-2039

LEGEND

- 0.1% to 0.7%
- 0.7% to 1.3%
- 1.3% to 1.7%
- 1.7% to 2.2%
- 2.2% to 3.0%

0   25   50   75   100 Miles
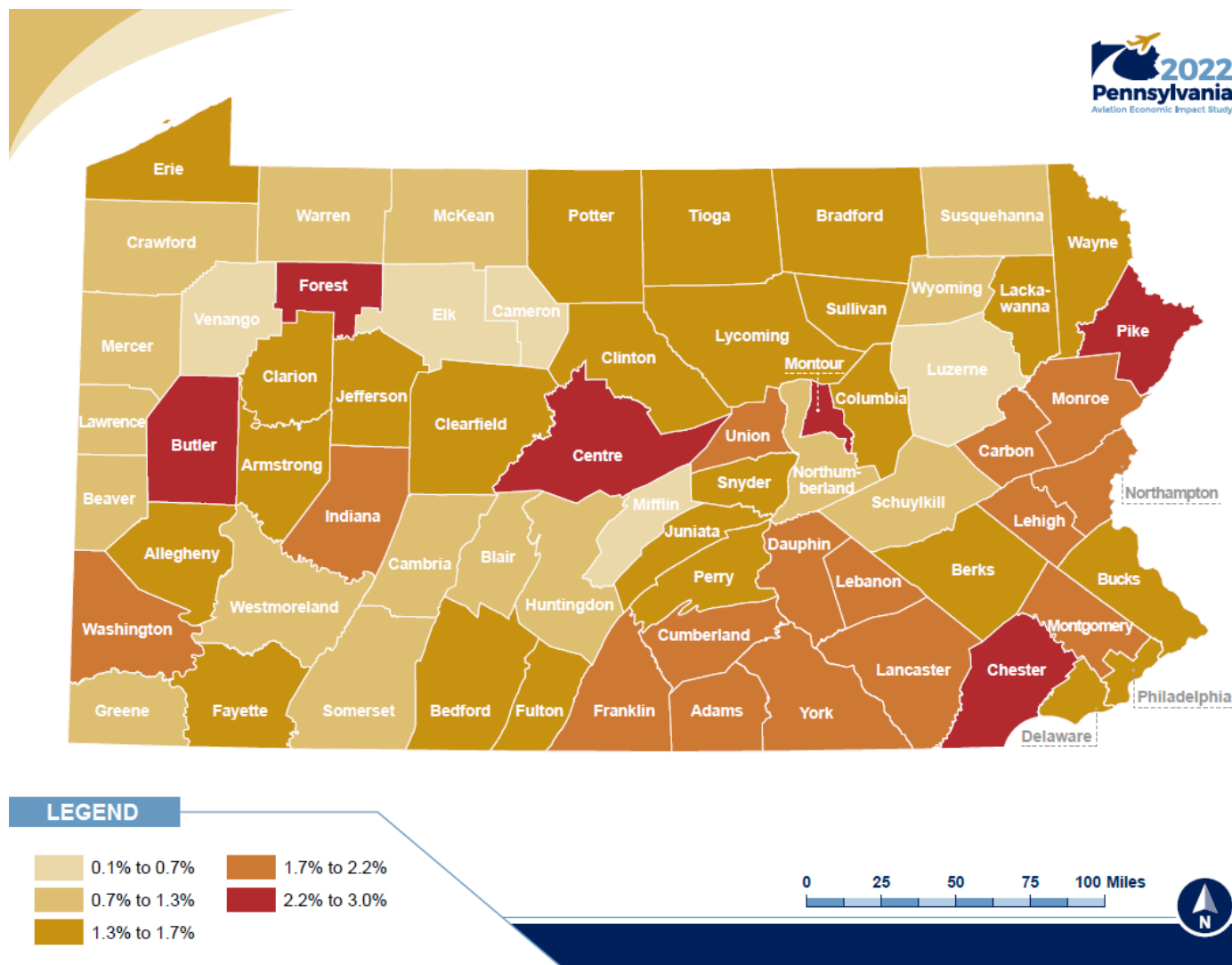
Source: Woods & Poole, Inc.

2.7. Pennsylvania Socioeconomic Trends Summary

Growth is projected across all five of the socioeconomic indicators presented in this study at both the state and national levels. However, as shown in **Figure 2-11**, each is expected to grow at different rates. For some indicators, the national rate of growth is anticipated to be higher than that of the Commonwealth. For others, Pennsylvania is expected to outpace the nation.

Figure 2-11. Comparison of Pennsylvania and U.S. Socioeconomic Indicator CAGRs (2019-2039)
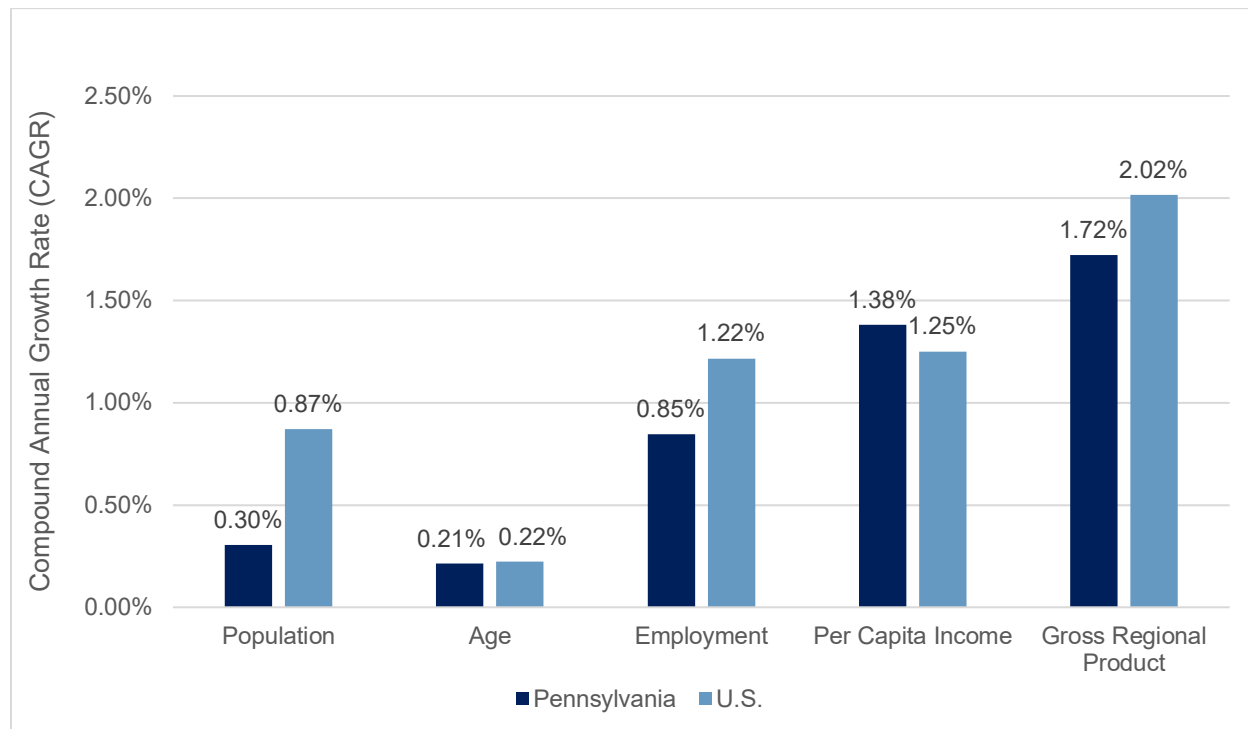
Source: Woods & Poole, Inc.

Pennsylvania's population has steadily increased from 1999 to 2019 and is projected to continue increasing through the projected years 2019 to 2039. However, Pennsylvania still has a lower CAGR percent in comparison to the current and projected national population. Age trends in Pennsylvania are projected to continue to increase as well, nearly matching the CAGR of the nation. Pennsylvania's median age is projected to reach 42.46 by 2039, while nationally the median age is expected to reach 39.9 by 2039.

While Pennsylvania's employment is expected to continue to grow, Pennsylvania's CAGR for the projected years 2019 to 2039 is projected to be approximately 0.4% behind the national average. Pennsylvania's workforce is projected to reach 9.29 million by 2039, an increase of over 1.44 million from 2019. Healthcare and social assistance, educational services, real estate and rental and lease, arts, entertainment, and recreation, and management of companies and enterprises employment sectors are expected to lead Pennsylvania in the fastest growth rate of any other industry throughout 2039.

Pennsylvania's per capita income has outpaced and is expected to continue to outpace the nation throughout projected years. GRP is also expected to increase, although at about a quarter of a percent behind when compared to the national expected growth rate.

Utilizing socioeconomic trends can assist in determining future demands within aviation. Understanding the composition of the population within the Commonwealth can indicate likelihood of increased or decreased aviation use. Not only are changes in the total state population important, but changes in the age of the population, the employment of that population, and the associated income earned all play a role in likelihood of those populations to utilize air transportation. Modest growth in populations, incomes, and employment are expected to generate a modest increase in the demand for aviation services in Pennsylvania, with some regions outpacing others.

Chapter 3. Sources of Economic Activity and Levels of Impact

Airports support a wealth of activity that generates economic impacts both on- and off-airport. Some examples of this activity include airport owners/sponsors and tenants that employ workers to operate the airport and associated businesses (e.g., baggage handlers, maintenance technicians, etc.) and off-airport businesses which cater to the traveling public who arrive by air (e.g., hotel staff, restaurant wait staff, retail employees, etc.). Additional off-airport activities, like aerospace manufacturing corporations, cargo carriers, and private hospital heliport operators also employ staff and generate revenues that are expended in the state. Understanding the source of the impacts and how each is related is vital to understanding the complete economic contribution of the airport system in Pennsylvania. **Figure 3-1** illustrates the sources of economic activity, including impacts that are considered on- and off-airport.

Figure 3-1. Sources of Economic Activity

On-Airport
- Airport Owners/ Operators/ Sponsors
- Aviation Tenants
- Aviation Related Businesses Near PIT and PHL

Off-Airport
- Commercial Service and General Aviation Visitors
- Off-Airport Aerospace Manufacturing
- Off-Airport Air Cargo
- Off-Airport Private Hospital Heliports

Note: Impacts of aviation-related businesses off-airport, but nearby PHL and PIT were included as "on-airport" impacts as this is how they were assessed and documented in the 2011 Economic Impact of Aviation in Pennsylvania Study.
Source: Kimley-Horn, 2022

It is important to recognize that a comprehensive assessment of the economic impact of Pennsylvania's airport system includes direct impacts (the initial effect of employment and spending as a result of aviation-related activities) as well as multiplier impacts (often include both indirect and induced impacts) which represent successive rounds of impact created by the initial event, or existence of the airport. **Figure 3-2** provides additional definition of each level of impact, and the following sections provide further explanation of what is classified as direct impacts and multiplier impacts.

Figure 3-2. Levels of Impact

Direct Impacts	Multiplier Impacts	Total Impacts
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.	*Indirect*: Portions of direct revenues used to purchase goods and services from Pennsylvania businesses. *Induced*: Income earned by workers from direct and suppliers sales transactions that are then spent in Pennsylvania.	The sum of direct impacts and multiplier impacts.

Source: Kimley-Horn, 2022

3.1. Direct Impacts

The first round of impacts, or direct impacts, include economic activity generated directly as a result of the existence of an airport. This includes on-airport businesses and government agencies (tenants), capital improvements (made by the airport or on-airport tenants), nearby aviation-related businesses at Philadelphia and Pittsburgh International airports, spending by visitors arriving via aviation to both commercial service and GA airports, and activities associated with air cargo, aerospace manufacturing, and private hospital heliports[7]. These impacts are reported in terms of employment (or jobs), payroll (the wages and benefits associated with those jobs), and output. Output is also referred to as "business revenues" or sales. **Figure 3-3** provides additional detail on the three main categories of economic activity. Note that these categories remain the same from the *2011 Economic Impact of Aviation in Pennsylvania Study*, herein referred to as the *2011 Study*.

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[7] Note that the impacts of private hospital heliports is a new addition to the 2022 PA AEIS. These impacts were not assessed in the *2011 Study*.

Figure 3-3. Categories of Economic Impact
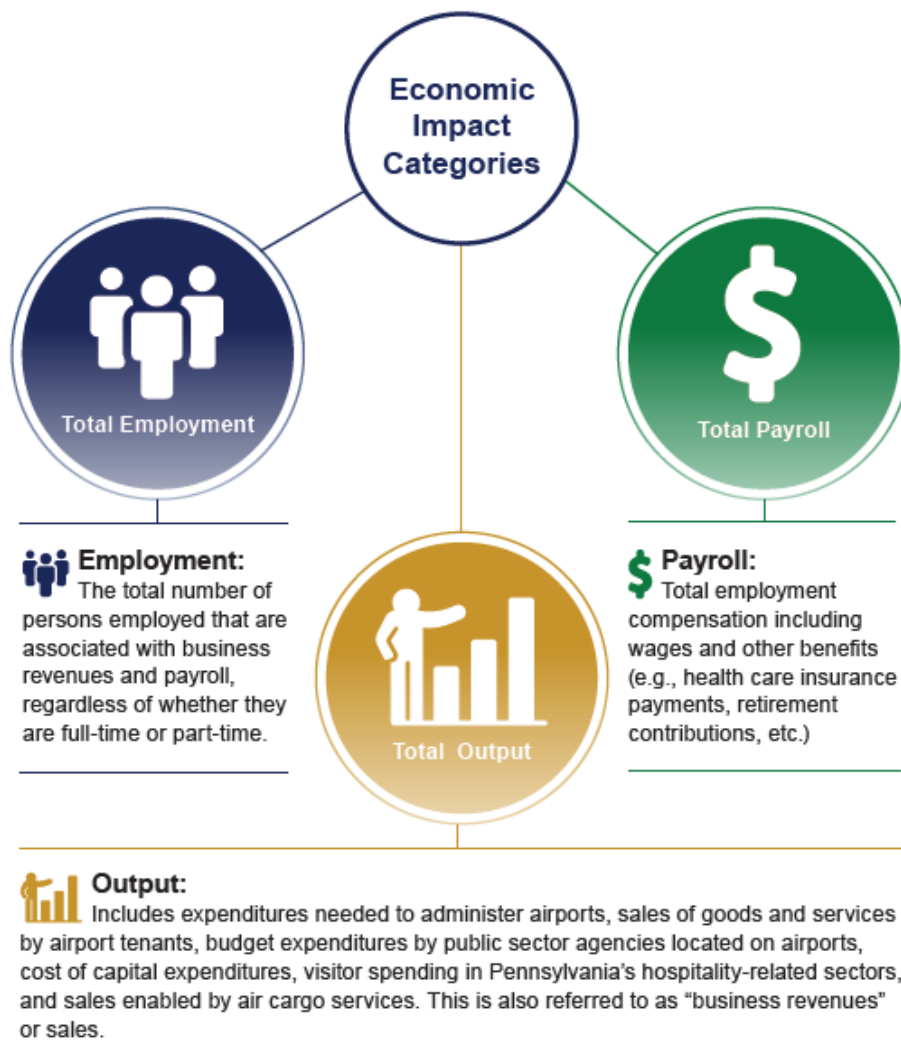
Source: Kimley-Horn, 2022

3.2. Multiplier Impacts

Successive rounds of economic impact, called multiplier impacts, are created when the airport and related businesses purchase goods and services from other businesses within the state (known as indirect impacts) and when employee payroll is spent in the local economy (known as induced impacts). For example, indirect impacts are generated when airport concessionaires purchase food products from suppliers in the state (e.g., hamburger buns) and induced impacts are generated when the concessionaire staff spend their payroll at their neighborhood grocery store. These multiplier impacts are only generated because of the existence of the airport and as a result of the airport concessionaire which is in business to provide services to air travelers. The combination of direct impacts and multiplier impacts reflect the total impact of the activity. The multiplier impacts, which are part of the total impacts, are

calculated using an industry-standard economic model and database, Impact Analysis for Planning, or IMPLAN. The direct impacts are identified by industry sector and gathered through a variety of methods, and the IMPLAN model develops a set of indirect and induced impacts associated with each sector. Since this study includes two base years – 2019 and 2020 – two years of IMPLAN multipliers were also used, 2019 and 2020, respectively.

Chapter 4. Study Approach

4.1. Data Collection

To capture and model the economic contribution of airports to the state's economy, a significant data collection effort was undertaken. Customized surveys were developed and distributed to a number of different aviation system users, requesting information about their operation or activity which is directly related to the Commonwealth's airports. Since the 2022 PA AEIS includes two base years, these surveys requested information for both calendar year (CY) 2019 and 2020. The following paragraphs provide an overview of the audience surveyed and the data collected from each.

As **Table 4.1** depicts, there are three major sources generating economic activity on airports. The first is the owner/operator/sponsor of the airport, the second is airport tenants, and the third is aviation-related businesses near Philadelphia International Airport (PHL) and Pittsburgh International Airport (PIT). The data gathering for each component is described below.

- **On Airport**
  1. Airport Owner/Operator/Sponsor

     Outreach to airport representatives of each study airport began with the development of a customized Airport Manager Survey tailored to their specific facility. Airports were given a reasonable amount of time to complete the survey which asked for information on airport operations, employment, payroll, operating expenses, and capital expenditures for both 2019 and 2020. Airports were also asked to provide a comprehensive listing of their tenants for further outreach.

     Approximately half of the study airports received an in-person site visit to help complete the survey, answer any questions, meet with tenants, and obtain pictures. The airports that did not receive an in-person site visit were contacted via phone/email or had a virtual site visit to capture the same information.

     It is important to note that some lower activity and/or private airports were not sent a survey as participation was expected to be minimal, if any.

  2. Aviation Tenants

     Similar to airport owners/operators/sponsors, a survey was developed for distribution to each on-airport aviation-related tenant identified by the airports to collect information on employment, payroll, operating expenses, capital expenditures, and more. Tenants located at airports that received an in-person site visit were met on site when available to walk through and complete the survey. For those tenants that were not available on the day of the site visit or are located at an airport that did not receive a site visit, a digital copy of the survey was distributed to them for completion. Multiple follow-ups via phone and email were made to each tenant that did not respond within the original specified time window to ensure the highest completion factor possible.

3. Aviation-Related Businesses Near PHL and PIT

Although technically located off airport property, there are a number of aviation-related businesses that are located near the two largest commercial service airports in the state, PHL and PIT. These off-airport, aviation-related businesses include some rental cars, park and ride lots, warehousing, and more. As noted previously, these impacts are categorized as "on-airport" similar to what was done in the *2011 Study* to maintain consistency. Environmental Systems Research Institute's (ESRI) Business Analyst was used to identify the appropriate businesses and collect information on their employment and associated industry. No survey was developed for this audience. More information on these impacts and the methodology used to estimate their economic impact is located in **Section 4.2.2**.

There are four main off-airport sources of economic activity that can be attributed to aviation. These include (1) visitors to the state arriving via aviation to either commercial airports or GA airports from out of state; (2) the aerospace manufacturing industry in the state; (3) the air cargo industry, and (4) private hospital heliports. The data gathering for each component is described below.

- **Off Airport**

  1. Airport Visitors[8]

     To capture the spending amounts and patterns of out-of-state travelers arriving to the Commonwealth via the state's study airports, two visitor surveys were developed. The data are gathered from passengers departing the state after their visit, which was generated through one of the study airports.

     The first survey was tailored to visitors using GA to reach the state. The GA visitor survey was provided to 65 airports identified by BOA which have historically experienced the most GA traffic. Posters with quick response (QR) codes advertising the survey were also provided to airports to help draw attention to the survey and encourage participation. Hard copy surveys, along with the posters, were delivered in person to airports receiving a site visit. GA airports that did not receive site visits were mailed the materials along with instructions on where and how to collect the surveys. Passengers could either fill out hard copy surveys or scan the provided QR code and complete the survey electronically online. Surveys asked passengers for information on their stay while on this trip to Pennsylvania, such as origin and destination (to determine Pennsylvanians returning from an out-of-state trip, who were excluded, length of stay, amount spent during their trip, and categories of spending. Of the 65 airports selected to administer the GA survey, surveys were completed at 41 airports.[9]

     The second visitor survey was for visitors arriving via commercial service airlines. Due to the volume of commercial service visitors, this survey was only provided online and was

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[8] Airport representatives were asked to administer the surveys over several months during the study, during which time responses were extracted and analyzed at two different points in time to assess variations in passenger spending.
[9] Note that only the surveys completed by out-of-state visiting passengers were evaluated for potential use.

advertised via participating airports' WiFi networks. The survey asked similar questions to that of the GA survey. All 14 commercial airports were asked to participate. Responses were received from 10 of the 14 airports.[10]

2. Statewide Aerospace

   The Commonwealth is home to a significant number of aerospace businesses, many in the manufacturing industry. Information on the operation of these businesses was collected using ESRI's Business Analyst; no survey was developed for this audience. More information on these impacts and the methodology used can be found in **Section 4.2.6**.

3. Statewide Air Cargo

   Air cargo is a significant industry sector in Pennsylvania. While the majority of this activity occurs on-airport and is included in airport-generated economic impact activity, some occurs off airport at nearby distribution facilities, for example. Similar to the statewide aerospace industry sector, ESRI's Business Analyst was used, and no survey was developed for this audience. More information on these impacts and the methodology used can be found in **Section 4.2.6**.

4. Statewide Private Hospital Heliports

   A new addition to the 2022 PA AEIS is the inclusion of impacts generated by private hospital heliports. Although this activity is occurring off-airport, it is aviation-related and is providing economic contribution to the state's economy, in addition to its significant contribution to health and safety. A tailored survey was developed for the 10 private hospital heliport owners/operators in the state identified by BOA. These surveys requested information similar to that requested of aviation-related tenants, including employment, payroll, operating expenses, capital improvements, and more. Once the surveys were distributed, phone calls were made to each to answer questions and help complete the survey.

4.2. Data Assumptions and Methodologies

Despite multiple follow-ups to all audiences, some airports and tenants did not or would not respond and did not end up participating in the study. This is not uncommon. When this occurred, secondary or alternate sources of data were used for needed direct data inputs to ensure the study reflects all public-use airports and other off-airport elements previously discussed. The following sections document the alternate sources and assumptions made when no response or incomplete responses were provided. These assumptions and sources were approved by BOA after discussion of the methodology. **Appendix B. Airports Needing Estimations** provides a list of all airports that required estimation.

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[10] Responses had varying degrees of validity; not all airports had sample sizes that were statistically valid and could be used after removing erroneous responses and passengers traveling within the state rather than from outside the state.

4.2.1. Airport Owner/Operator/Sponsor Information

The following sections detail the assumptions made for information not provided or only partially provided by airport representatives.

4.2.1.1. Airport Sponsor Employment

Airport sponsor employment is key for determining the direct impact of an airport, as airport sponsor employment frequently comprises a large proportion of direct jobs. Recognizing that the volume of employment by an airport sponsor or owner is directly related to the volume of activity experienced at an airport, employment counts were averaged by airport classification (as assigned in the *2016 Pennsylvania Statewide Airport System Plan*) and applied to non-responsive airports.[11] The larger and busier the airport, an assumption was made that more employees were needed to operate and maintain it. **Table 4.1** presents the average sponsor employment by airport classification for both base years (2019 and 2020). Average employment was not calculated for Commercial Service or Advanced airports as there was a 100% response rate from these airports and no estimations were required. As shown, the reporting airports indicated no change in direct employment between 2019 and 2020.

Table 4.1. 2019 and 2020 Average Airport Sponsor Employment by Airport Classification

Airport Classification	Average Number of Jobs per Airport Classification					
	2019			2020		
	Full-time Direct	Part-time Direct	Total Direct	Full-time Direct	Part-time Direct	Total Direct
Commercial Service	N/A			N/A		
Advanced	N/A			N/A		
Intermediate	2	2	4	2	2	4
Basic	1	2	3	1	2	3
Limited	0	1	1	0	1	1
Special Use	0	0	0	0	0	0

Sources: 2022 PA AEIS Airport Manager Survey; Kimley-Horn, 2022

4.2.1.2. Operating Expenses

Operating expenses are key for determining the direct impact of an airport, as operating expenses help determine the direct output of the airport. Similar to sponsor employment, the costs associated with operating an airport are directly related to the volume of operations and the type of users accommodated by the facility. The larger and more advanced the airport, the higher the likely operating expenses. As such, operating expenses reported by responsive airports were averaged by airport classification (rounded to the nearest $1,000) and applied to non-responsive airports.[12] When airports reported no operating expenses or extremely low operating expenses, a minimum amount was applied by airport classification. These minimums reflect reasonable operating costs to keep the airport open, the electricity on, the lawn mowed, the snow plowed, etc. **Table 4.2** presents the average operating expenses by airport

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[11] An exception to this rule was made for W.P.H.S. Heliport where one full time employee (the airport manager) was assigned for 2019 and 2020 based on BOA knowledge.
[12] Exceptions to this rule were made for Grove City where the Intermediate average was used for 2019 and 2020 and Pittsburgh Northeast where the minimum was used rather than the average for 2019 and 2020 based on BOA knowledge.

classification for both base years (2019 and 2020). Minimum operating expenses were not calculated for Commercial Service or Intermediate airports as there was a 100% response rate from these airports and no estimations were required. Average operating expenses were not calculated for Commercial Service airports as there was a 100% response rate from these airports and no estimations were required.

Table 4.2. 2019 and 2020 Average Airport Operating Expenses by Airport Classification

| Airport Classification | Average Operating Expenses per Airport Classification | | | |
| | Minimum | | Average | |
	2019	2020	2019	2020
Commercial Service	N/A	N/A	N/A	N/A
Advanced	$15,000	$10,000	$699,000	$644,000
Intermediate	N/A	N/A	$539,000	$479,000
Basic	$15,000	$10,000	$220,000	$230,000
Limited	$15,000	$10,000	$89,000	$86,000
Special Use	$7,500	$5,000	$7,500	$5,000

Sources: 2022 PA AEIS Airport Manager Survey; Kimley-Horn, 2022

4.2.1.3. Capital Expenditures

Capital expenditures reflect spending on major projects and programs at airports that are above traditional operating expenses. Capital expenditures for each study airport were requested for the period 2016 through 2020 (calendar year basis). A range of years is requested to "smooth" out any years with particularly high capital expenditures (such as years where large projects were being constructed) or low capital expenditures (such as years where minimal or no capital projects were undertaken). For base year 2019, capital expenditures were averaged for calendar years 2016 through 2019. For base year 2020, capital expenditures were averaged for calendar years 2017 through 2020. Costs were compared between those provided by airport managers on their survey and records maintained by BOA. For non-responsive airports, grant histories maintained by BOA were used. Costs for land acquisition and Coronavirus Aid, Relief, and Economic Security (CARES) Act funding were excluded from the calculation as land acquisition projects do not generate much economic impact and in most cases, CARES funding was primarily used to cover payroll and debt service rather than construction projects at airports in Pennsylvania.[13]

Unlike other elements, capital expenditures are provided as "spending estimates," and the number of jobs and associated payroll are unknown. Therefore, a different process that is nearly the opposite of estimating impacts for airport administration and tenants, was employed to determine the number of jobs and payroll associated with the capital expenditure spending at each airport.

4.2.2. Aviation Tenants

The Airport Manager Survey asked airports to provide a list of their aviation-related onsite businesses (aviation tenants, or tenants) and to identify each aviation tenant's business type (e.g., aircraft manufacturing and repair, fixed-base operator, flight school, etc.) and to estimate the tenant's number of

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[13] CARES Act funding is not applicable to base year 2019 as it was established in late 2020.

full-time and part-time employees. Each tenant then received an Airport Tenant Survey, which asked them to verify this information as well as provide additional data, such as expenditures. When the airport was unable to provide a tenant employment estimate and a tenant did not respond to survey attempts, a secondary source was used to identify the type of business and the number of employees at that business's airport location. ESRI's Business Analyst software is a demographic mapping tool that combines demographic, business, lifestyle, spending, and U.S. Census data with map-based analytics. One of the tools in the Business Analyst software is called the "Business and Facilities Search," which allows a user to search for and identify businesses and associated business data within a certain geographic area. The Business and Facilities Search allows a user to filter their search by business name, general category, or by North American Industrial Classification System (NAICS) codes, previously referred to as Standard Industrial Classification (SIC) codes. This tool was used to identify businesses by name, their associated NAICS code, and the volume of employment which are the minimum data needed to model economic impacts associated with those tenants.

It is important to note that the *2011 Study* accounted for non-aviation-related tenant employment for PIT and Allegheny County Airport (AGC) as the Airport Authority's study conducted just prior to the *2011 Study* for PIT and AGC was used as the basis for impacts for these two airports. Non-aviation-related tenant employment was not considered for any other airport in the *2011 Study*. For this 2022 Study, non-aviation-related tenant employment was removed for all airports, including PIT and AGC, in an effort to treat all study airports equally. This results in lower impacts for PIT and AGC than reported in their most recent individualized study.[14] The importance of removing non-aviation-related tenant employment is to emphasize the true impacts associated with aviation-dependent and related businesses. Non-aviation-related tenant employment (e.g., farming operations, non-aeronautical businesses, etc.) could and would exist without the presence of the airport and may be utilizing airport property purely from an availability, compatibility, and/or pricing standpoint. Aviation-related tenant employment would not exist at an airport if it was no longer there (it would be forced to relocate to another airport or cease to exist entirely). This conservative approach of focusing on aviation-related employment provides BOA with specific information that is directly related to the airport's function in the system and is easily understood by the general public.

4.2.3. Aviation-Related Businesses Near PIT and PHL

The *2011 Study* accounted for the impact of aviation-related businesses located off airport property at both PIT and PHL. The *2011 Study* looked at employment associated with airline offices, freight forwarding operations, warehousing, and airport parking not located on the airport property; however, it does not document whether this was an exhaustive list of aviation-reliant employment that was assessed or what the geographic scope of "off-airport" for these two airports was. Therefore, several considerations and informed assumptions were necessary to execute the estimation of employment associated with off-airport aviation-related businesses near PIT and PHL to provide an accurate comparison of airport and statewide aviation economic impacts. This analysis included two steps: determining which businesses

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[14] *2017 Pittsburgh International Airport, Allegheny County Airport and the Allegheny County Airport Authority Economic Impact Study.* Allegheny County Airport Authority. https://flypittsburgh.com/wp-content/uploads/2020/01/Economic-Impact-Study-Core-Report_Final.pdf.

were considered "aviation-related," and determining the geographic area around PIT and PHL that was considered "off-airport" but still reliant on the airport.

ESRI's Business Analyst software was used to help identify the aviation support businesses off-airport at PIT and PHL. Aviation-related businesses were identified using NAICS codes associated with the aviation services examples provided in the *2011 Study*, which included: airline offices, freight forwarding, warehousing, and airport parking. NAICS codes were developed under the auspices of the Office of Management and Budget (OMB) for use by Federal statistical agencies to classify business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the United States (U.S.)

> **Where does this employment data come from?**
>
> The data driving the Business and Facilities Search is provided to ESRI by Data Axle (formerly known as Infogroup). Data Axle is a leading provider of data across North America. In order to develop the comprehensive business dataset associated with Business Analyst, Data Axle relies on numerous sources including directory listings such as Yellow Pages and business white pages; annual reports; 10-K and Securities and Exchange Commission (SEC) information; federal, state, and municipal government data; business magazines; newsletters and newspapers; and information from the United States (U.S.) Postal Service. Data Axle conducts annual telephone verifications with each business listed in the database to maintain an accurate and up to date database.
>
> *Source: ESRI Methodology Statement: 2020 US Business Locations and Business Summary Data, 2020*

economy.[15] In addition to the NAICS codes directly associated with activities documented in the *2011 Study*, a further review of the NAICS codes was conducted to identify other aviation support industries outside of the examples provided in the last study. This review was successful; however, the NAICS codes identified were often part of a larger industry sector not solely related to aviation services, so the results from this additional NAICS code search required additional review at the business level to determine which businesses should be counted as a part of the 2022 PA AEIS. Ultimately, a 10-mile buffer was used around both PIT and PHL, excluding airport property boundaries so as to not double-count any on-airport business or employment. This assessment identified 4,373 individuals employed within the 10-mile service areas of PIT and PHL that work in aviation support or services positions, as shown in **Table 4.3**.

Table 4.3. Aviation-Related Direct Business Employment Near PIT and PHL

Impact Type	2022 PA AEIS (2020 Base Year)
Aviation-Related Employment	4,373

Sources: ESRI Business Analyst, 2021; ESRI ArcPro, 2021; Kimley-Horn, 2022

It is important to note that employment information supplied in the Business Analyst tool is consistently and frequently updated with no option to review historical employment data for a specified period of time. As such, the employment estimates in this assessment are current as of January 2021 (reflecting calendar year 2020 data) rather than base year 2019.

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[15] "North American Industry Classification System." United States Census Bureau. https://www.census.gov/naics/.

4.2.4. Commercial Service Visitor Spending Information

In 2019, nearly 21 million visitors arrived via the commercial service airports in the Commonwealth from outside state borders to recreate, visit loved ones, or conduct business in Pennsylvania.[16] These air travelers spent money in the state during their stay, bringing "new" money into the Commonwealth, creating statewide economic impact as a result of the commercial airline service they utilized to arrive in the state. To identify how much commercial service visitors are spending, and on what, multiple sources were used, including recent individual airport economic impact studies, statewide tourism reports, and a commercial service visitor survey that was deployed at participating airports (see **Section 4.1** for more details). Due to the wide disparity in air travel between 2019 and 2020, different approaches were used to determine spending per commercial service visitor in both base years.

4.2.4.1. Spending Per Commercial Service Visitor - 2019

The first source considered was the commercial service visitor survey results specifically from PHL as it was the only airport to reach a statistically valid sample size of responses. The average spending for passengers arriving via PHL was $664 per person, per trip[17]. Recognizing that not all commercial airports are located in an urban area with higher costs of living similar to Philadelphia, this baseline amount was scaled utilizing U.S. General Services Administration (GSA) per diem rates for each of the counties/regions that are home to a Commercial Service airport. The results of this analysis are shown as "Option 1" in **Table 4.4**.

The second source considered was the per visitor spending used in the *2011 Study*, inflated to 2019 dollars. This is shown as "Option 2" in the table. The third option considered the findings of the *2017 Pittsburgh International Airport, Allegheny County Airport and the Allegheny County Airport Authority Economic Impact Study* which used 2015 as the base year for calculation. Similar to Option 1, these spending amounts were also scaled by GSA county/region using PIT's $666 per person, per trip base amount (also adjusted to 2019 dollars) and are shown as "Option 3" in the table.

To aid in the comparison of options, and to provide additional context, the Pennsylvania Tourism Office's *Economic Impact of Travel and Tourism in Pennsylvania, 2019* was reviewed and reported average spending per traveler of $123 for day visitors and $391 for overnight visitors (combining all travel modes, not specific to air-only travelers). Furthermore, it's important to note that the *2011 Study* used a higher average visitor expenditure at airports located in areas of Pennsylvania with Marcellus Shale natural gas extraction activity at the time of the last study.[18] This natural gas drilling employed many out-of-state workers for longer periods of time in the state, resulting in higher-than-average spending amounts. This activity is not occurring at the same levels it was at the time of the *2011 Study*, and therefore the higher passenger spending amounts are not continued in the 2022 AEIS. Considering this additional context,

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[16] In 2019, 20,911,135 airline passengers originated from out of state and arrived at a commercial service airport in Pennsylvania as their destination. Passengers traveling through with an airline connection in Pennsylvania destined for another destination outside of the Commonwealth were not counted. The isolation of out-of-state passengers arriving and staying in the state is important as it represents true visitors bringing money into the state during their trip, as opposed to state money being recirculated within the state. These findings were sourced from Airline Data, Inc. using Origin and Destination (O&D) data from the U.S. Department of Transportation.

[17] This finding is based on data collected during CY 2021.

[18] Airports included Altoona-Blair County Airport, Arnold Palmer Regional Airport, Bradford Regional Airport, DuBois Regional Airport, John Murtha Johnstown-Cambria County Airport, University Park Airport, Wilkes-Barre/Scranton International Airport, and Williamsport Regional Airport.

and the results of the three spending options, BOA selected Option 3 for the 2019 base year as it represented reasonable visitor spending in the 2019 calendar year.

Table 4.4. Commercial Service Spending Per Visitor Analysis for Base Year 2019

Associated City	Airport Name	FAA ID	GSA County	Option 1: Survey from PHL	Option 2: 2011 Study	Option 3: PIT 2017 Study
Allentown	Lehigh Valley International Airport	ABE	Lehigh / Northampton	$444	$987	$615
Altoona	Altoona-Blair County Airport	AOO	Locations w/o specified rates	$399	$1,470	$553
Bradford	Bradford Regional Airport	BFD	Locations w/o specified rates	$399	$1,470	$553
Dubois	Dubois Regional Airport	DUJ	Locations w/o specified rates	$399	$1,470	$553
Erie	Erie Intl./Tom Ridge Field	ERI	Erie	$404	$987	$560
Harrisburg	Harrisburg Int'l. Airport	MDT	Dauphin County excluding Hershey	$470	$987	$798
Johnstown	John Murtha Johnston-Cambria County	JST	Locations w/o specified rates	$399	$1,470	$553
Lancaster	Lancaster Airport	LNS	Lancaster	$451	$987	$626
Latrobe	Arnold Palmer Regional Airport	LBE	Locations w/o specified rates	$399	$1,470	$553
Philadelphia	Philadelphia International Airport	PHL	Philadelphia	$664	$1,413	$921
Pittsburgh	Pittsburgh International Airport	PIT	Allegheny	$481	$808	$666
State College	University Park Airport	UNV	Centre	$433	$1,470	$600
Wilkes-Barre/ Scranton	Wilkes-Barre/Scranton Int'l. Airport	AVP	Locations w/o specified rates	$399	$1,470	$553
Williamsport	Williamsport Regional Airport	IPT	Locations w/o specified rates	$399	$1,470	$553

Sources: 2022 PA AEIS Commercial Visitor Survey; 2011 Economic Impact of Aviation in Pennsylvania Study; 2017 Pittsburgh International Airport, Allegheny County Airport and the Allegheny County Airport Authority Economic Impact Study – all numbers adjusted to 2019 dollars; U.S. General Services Administration; Kimley-Horn, 2022

4.2.4.2. Spending Per Commercial Service Visitor - 2020

Due to the considerable changes in the number and type of visitors and their spending patterns during the COVID-19 pandemic, the per-person visitor spending amounts for base year 2020 differ from those developed for base year 2019. Commercial service visitor spending for base year 2020 was developed using the visitor spend amounts from 2019 and applying an adjustment factor based on the findings in the *Visitor Research 2020 Annual Travel Profile – Overnight, Prepared for Pennsylvania (PA Overnight Study)* developed by Longwoods International which shows an approximate 18.5% reduction in spending from 2019 to 2020. This study shows large differences in the composition of expenditures in 2020 as compared to 2019 as well. For example, a reduction was shown in the amount spent on lodging as a percent of total spending, and a higher amount was spent on local transportation, such as rental cars and

rideshare services. The adjustment factor applied included an overall reduction in spending and a change in the distribution of that spending across industry sectors. The estimations for 2020 use the actual distribution among expense types (food and beverage, lodging, etc.) from the *PA Overnight Study.* **Table 4.5** presents the spending per commercial service visitor at each commercial service airport after this adjustment to the 2019 base inputs was calculated. 2019 inputs are also provided.

Table 4.5. Commercial Service Spending Per Visitor for Base Year 2020

Associated City	Airport Name	FAA	GSA County	2019 Commercial Visitor Spending	2020 Commercial Visitor Spending w COVID Factor
Allentown	Lehigh Valley International Airport	ABE	Lehigh / Northampton	$615	$501
Altoona	Altoona-Blair County Airport	AOO	Locations w/o specified rates	$553	$451
Bradford	Bradford Regional Airport	BFD	Locations w/o specified rates	$553	$451
Dubois	Dubois Regional Airport	DUJ	Locations w/o specified rates	$553	$451
Erie	Erie Intl./Tom Ridge Field	ERI	Erie	$560	$456
Harrisburg	Harrisburg International Airport	MDT	Dauphin County excl. Hershey	$798	$650
Johnstown	John Murtha Johnston-Cambria County	JST	Locations w/o specified rates	$553	$451
Lancaster	Lancaster Airport	LNS	Lancaster	$626	$510
Latrobe	Arnold Palmer Regional Airport	LBE	Locations w/o specified rates	$553	$451
Philadelphia	Philadelphia International Airport	PHL	Philadelphia	$921	$751
Pittsburgh	Pittsburgh International Airport	PIT	Allegheny	$666	$543
State College	University Park Airport	UNV	Centre	$600	$489
Wilkes-Barre/Scranton	Wilkes-Barre/Scranton Int'l. Airport	AVP	Locations w/o specified rates	$553	$451
Williamsport	Williamsport Regional Airport	IPT	Locations w/o specified rates	$553	$451

Sources: 2022 PA AEIS Commercial Visitor Survey; 2017 Pittsburgh International Airport, Allegheny County Airport and the Allegheny County Airport Authority Economic Impact Study; – all numbers adjusted to 2019 dollars; U.S. General Services Administration; Visitor Research 2020 Annual Travel Profile – Overnight, Prepared for Pennsylvania, Longwoods International; Kimley-Horn, 2022

4.2.5. General Aviation Visitor Spending Information

Similar to visitors arriving in Pennsylvania using commercial service airlines, travelers fly to Pennsylvania from out of state using GA aircraft for a variety of reasons – personal and business. They also generate economic impact as a result of their use of the Commonwealth's airports, utilizing GA at both commercial service and GA airports. The following sub-sections summarize the key data used in estimating GA visitor spending and the multi-step process utilized to estimate the associated spending for both base years.

Due to the wide disparity in air travel between 2019 and 2020, different approaches were used to determine spending per GA visitor in both base years.

4.2.5.1. Transient Operations

Transient operations include those conducted with non-based aircraft that are bringing out-of-state visitors to the state. Unlike commercial passengers, there is no official source of GA passenger data that would allow for the identification of true visitors (i.e., having arrived from out of state with a final destination in Pennsylvania). As such, a multi-step process is used to derive the number of true visitors arriving via GA, starting with the identification of the annual number of transient operations at each study airport.

Airport representatives were asked to report the number of itinerant operations at their facility in 2019 and 2020. Itinerant operations are those departing and arriving from 20 miles or more away from the airport (all others are classified as local operations). Recognizing that not all itinerant operations will be coming from out of state (i.e., some will be coming from 20+ miles away but from another location within Pennsylvania and/or are based at the airport but are returning from a trip more than 20 miles away within the state), airport personnel were asked what percentage of itinerant operations they estimate to be coming from out of state. That subset of itinerant operations is known as transient operations.

Since total operations include both landings and takeoffs, the number of transient operations is divided in half to represent only operations leaving the airport and therefore not double counting the impacts of visitors (once on arrival and once on departure).

Nonresponsive airports were assigned a transient percentage based on the average reported by airport representatives by airport classification, rounded to the nearest 0.5%, as shown in **Table 4.6**. The responses of Limited and Special Use Airports were combined due to a small sample size.[19]

Table 4.6. 2019 and 2020 Average Transient Operation Percentages by Airport Classification

Airport Classification	Transient Operations Percentage	
	2019	**2020**
Commercial Service	46.0%	42.1%
Advanced	47.5%	48.5%
Intermediate	33.5%	32.5%
Basic	40.0%	38.5%
Limited	22.5%	22.5%
Special Use	22.5%	22.5%

Sources: 2022 PA AEIS Airport Manager Survey; Kimley-Horn, 2022

4.2.5.2. Passengers Per Transient Operation

The next step is to identify the average number of passengers traveling on each transient aircraft operation. Recognizing that airports accommodate different types of aircraft based on the design of their facilities, larger and more advanced airports are likely to support larger aircraft such as business jets

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[19] Averages were also applied for DUJ and N57, as the 100% these airports reported was likely in error.

while smaller airports are likely to accommodate smaller single-engine aircraft. The larger the aircraft, the more potential passengers on board. As such, an average number of passengers per transient operation was calculated by airport classification (rounded to the nearest 0.1) and applied to the nonresponsive airports, as presented in **Table 4.7**. The responses of Limited and Special Use Airports were combined due to a small sample size.[20]

Table 4.7. 2019 Average Transient Passengers per Operation by Airport Classification

Airport Classification	Transient Passengers per Operation	
	2019	**2020**
Commercial Service	3.8	3.6
Advanced	3.2	3.1
Intermediate	3.2	3.1
Basic	2.5	2.5
Limited	1.9	1.9
Special Use	1.9	1.9

Sources: 2022 PA AEIS Airport Manager Survey; Kimley-Horn, 2022

4.2.5.3. Spending Per GA Visitor – 2019

The third and final step is to apply a per person, per trip, spending amount to each of the GA transient passengers. Similar to the assessment completed for commercial service visitors, to better understand how much the GA visitors are spending in the Commonwealth and on what, multiple sources were used, including recent individual airport economic impact studies, statewide tourism reports, and a GA visitor survey that was developed and deployed at 60 of the study airports (see **Section 4.1** for more details).

The first source considered was the findings of the *2017 Pittsburgh International Airport, Allegheny County Airport and the Allegheny County Airport Authority Economic Impact Study* which used 2015 as the base year for calculation. This option used the GA visitor spending identified for passengers arriving to PIT and AGC (inflated to 2019 dollars) as a baseline for PIT and AGC's respective airport classifications, then scaled the spending by GSA per diem rates for each of the counties/regions that are home to a Commercial Service or Advanced airport. These amounts were then scaled down by airport classification for Intermediate (80% of Advanced by county), Basic (60% of Advanced by county), and Limited (40% of Advanced by county) airports. Special Use airports were assigned a baseline spending per visitor of $114 across all options, carrying forward the $100 per visitor spending from the *2011 Study*, adjusted to 2019 dollars. **Table 4.8** presents the range of per visitor spending and the average. Each airport's amount is different based on the GSA county/region it resides in.

The second source used the results of responses to the GA visitor survey, using averages reported by visitors arriving via GA to commercial service airports and the average of all other survey responses as the baseline average for Commercial Service and Advanced airports, respectively. Amounts were then scaled by GSA per diem rates for each of the counties/regions that are home to a Commercial Service or Advanced airport. These amounts were then scaled down by airport classification for Intermediate (80% of Advanced by county), Basic (60% of Advanced by county), and Limited (40% of Advanced by county)

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[20] The average was applied to VVS due to the unusually high number reported by airport representatives.

airports. Special Use airports remained at $114 per visitor as previously noted. **Table 4.8** presents the range of per visitor spending and the average spending.

In general, both sources were similar in average spending, however, Option 2 was selected for base year 2019 as it best represents the amounts spent by out-of-state visitors based on BOA's local knowledge of the airports.

Table 4.8. GA Spending Per Visitor Analysis for Base Year 2019

Airport Classification	Option 1: PIT 2017 Study		Option 2: GA Visitor Survey	
	Range	Average	Range	Average
Commercial Service	$199 - $331	**$236**	$237 - $395	**$282**
Advanced	$110 - $182	**$130**	$165 - $275	**$196**
Intermediate	$88 - $146	**$104**	$132 - $220	**$157**
Basic	$66 - $109	**$78**	$99 - $165	**$118**
Limited	$44 - $73	**$52**	$66 - $110	**$78**
Special Use	$114	**$114**	$114	**$114**

Sources: 2022 PA AEIS General Aviation Visitor Survey; 2017 Pittsburgh International Airport, Allegheny County Airport and the Allegheny County Airport Authority Economic Impact Study – all numbers adjusted to 2019 dollars; U.S. General Services Administration; Kimley-Horn, 2022

4.2.5.4. Spending Per GA Visitor – 2020

Due to the considerable changes in visitors and their spending patterns during the COVID-19 pandemic, the per-person GA visitor spending amounts for base year 2020 differ from those used for base year 2019. Similar to the approach used for commercial service visitor spending for 2020, GA visitor spending for base year 2020 was developed using the visitor spend amounts from 2019 and applying an adjustment factor based on the findings in the PA Overnight Study developed by Longwoods International which shows an approximate 18.5% reduction in spending from 2019 to 2020. This study shows large differences in the composition of expenditures in 2020 as compared to 2019. For example, a reduction was shown in the amount spent on lodging as a percentage of the total and a higher amount was spent on local transportation. The adjustment factor applied included an overall reduction in spending and a change in the distribution of spending across industry sectors. The estimations for 2020 use the actual distribution among expense types (food and beverage, lodging, etc.) from the PA Overnight Study. **Table 4.9** presents the spending per GA visitor at each airport classification after this adjustment to the 2019 base inputs was calculated

Table 4.9. GA Spending Per Visitor for Base Year 2020

Airport Classification	2019	2020
	GA Visitor Spending	**GA Visitor Spending w COVID Factor**
Commercial Service	$282	$230
Advanced	$196	$160
Intermediate	$157	$128
Basic	$118	$96
Limited	$78	$64
Special Use	$114	$93

Sources: 2022 PA AEIS General Aviation Visitor Survey; 2017 Pittsburgh International Airport, Allegheny County Airport and the Allegheny County Airport Authority Economic Impact Study – all numbers adjusted to 2019 dollars; U.S. General Services Administration; Visitor Research 2020 Annual Travel Profile – Overnight, Prepared for Pennsylvania, Longwoods International; Kimley-Horn, 2022

4.2.6. Off-Airport Aerospace Manufacturing & Air Cargo

The *2011 Study* included an assessment of the impact of off-airport aerospace and air cargo jobs across Pennsylvania. Similar to the impacts of aviation-related businesses near PIT and PHL, the *2011 Study* did not provide a detailed methodology to describe how this analysis was conducted. Therefore, several considerations and informed assumptions were necessary to execute the estimation of off-airport direct aerospace and air cargo jobs for both base years (2019 and 2020). The methodology for developing these estimates is similar to that used for determining the aviation-related jobs surrounding PIT and PHL. This analysis included two steps: determining NAICS codes associated with air cargo and aerospace and determining the geographic area in which to conduct the search.

A comprehensive search of NAICS codes was completed to identify which NAICS codes are related to aerospace manufacturing and air cargo. While there is a NAICS code dedicated almost exclusively to aerospace and aircraft manufacturing, it was identified that additional NAICS codes may also relate to the aerospace industry, even if not captured in that NAICS code title. Therefore, a detailed review of NAICS codes was conducted to capture all NAICS codes that may be related to the aerospace industry. Businesses that were identified under NAICS codes that are not strictly aviation-associated were reviewed and excluded as necessary so as to only include aerospace-related jobs. Included in the NAICS search were the top aerospace manufacturers in the state, shown in **Table** 4.10**.** While this is an extensive list, there were multiple firms without valid business or employment data within the state geographic boundary. Further filtering of individual businesses was conducted so that non-representative businesses, including storefronts, were excluded. Please note that this table is not inclusive of all aerospace manufacturing firms included in the assessment.

Table 4.10. Top Aerospace Firms Located in Pennsylvania

Pennsylvania Aerospace Firms	
Lockheed Martin	Aerojet Rocketdyne
Boeing	Elements Materials Technology
Northrop Grumman	Swedish Space

Pennsylvania Aerospace Firms	
Leidos	Gnostech
BAE Systems	Centauri
GE Aviation	Dragonfly Pictures
L3Harris	Strategem Group
ASRC Federal Holding Company	Combustion Research and Flow Technology
Leonardo	Quality Innovative Solutions
Orbital ATK	Delta Information Systems
Perspecta	Logic Soft
Sabre Systems	Sikorsky Aerospace Maintenance
Clear Align	Piasecki Aircraft Corporation
Global Systems Technologies	CHI Systems
Analytical Graphics	Integrated Deicing Services
Mercury Systems	General Atomics
Moog	Textron Systems
SAIC	PCC Structurals
Ball Corporation	United Launch Alliance
Raytheon Technologies	Huntington Ingalls Industries
CACI International	General Dynamics
Mission Essential	XSITE
Kratos Defense and Security Solutions	Flight Safety Foundation
Textron	USfalcon
Curiss-Wright	Spirent Federal
Olin	Mikros Systems
Amentum	

Source: https://www.glassdoor.com/Explore/top-aerospace-defense-companies-philadelphia_IS.4,21_ISEC10002_IL.32,44_IM676.htm

A similar comprehensive review of NAICS codes was conducted to determine codes that were related to air cargo. As with the aerospace search, businesses that were identified under NAICS codes that are not strictly aviation-associated were reviewed and excluded as necessary to only include air cargo-related jobs. Searched air cargo firms included, but were not limited to, UPS, DHL, FedEx, and Amazon Air.[21]

Once the NAICS codes were identified, Business Analyst was used to search statewide, excluding all study airport property boundaries to not double-count any employment associated with on-airport aerospace manufacturing or air cargo. The estimated number of employees working off-airport in the

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[21] The *2011 Study* specified FedEx, UPS, and DHL were assessed in the off-airport air cargo impacts analysis. Amazon Air is a new cargo operator that did not exist at the time of the last study. In 2019, Amazon Air was operating in Pennsylvania at the Lehigh Valley International Airport (ABE). The Amazon Air employment and associated activity are accounted for in the on-airport impacts for ABE. Business Analyst did not identify any off-airport activity by Amazon Air to be included in this assessment. In 2021, Amazon Air expanded to include operations at Pittsburgh International Airport. Since the 2022 PA AEIS covers calendar years 2019 and 2020, the impact from the expansion to PIT is not accounted for in this study.

aerospace industry in the Commonwealth is 11,648, and in the air cargo industry is 3,546, as shown in **Table 4.11**. The direct employment identified in the table was used to calculate multiplier and total impacts which are presented later in **Chapter 6**.

Table 4.11. Off-Airport Aerospace Manufacturing and Air Cargo Direct Employment

Impact Type	2022 PA AEIS (2020 Base Year)
Statewide Off-Airport Aerospace	11,648
Statewide Off-Airport Air Cargo	3,546

Sources: ESRI Business Analyst, 2021; ESRI ArcPro, 2021; Kimley-Horn, 2022

It should be noted that different employment data was unable to be obtained for both base years of 2019 and 2020 as ESRI's Business Analyst only reports "current" employment and industry information and does not include information for historical years. Therefore, direct employment associated with off-airport aerospace manufacturing and air cargo businesses is the same for both base years of 2019 and 2020. Since the same inputs (employment) and exact same industries were used in both years, any difference in output is strictly due to the new relationships for those industries estimated by IMPLAN. For example, IMPLAN industry 414 (Air Transportation) had payroll per employee of $118,960 in 2019 and $122,883 in 2020. In other words, while employment remained the same, payroll increased. For this specific industry, payroll increased despite the employment inputs remaining the same. This is not the case for all industries and is just one example for context.

4.2.7. Off-Airport Private Hospital Heliports

Pennsylvania's airports support the operation of air ambulance services, which enable the transportation of patients in life-threatening situations. However, air ambulance services are also offered off-airport, many of them private or in association with private hospitals. While on-airport air ambulance services and their associated economic impact are captured in the larger economic impact of their associated airport, off-airport air ambulance services (often associated with private or independent hospitals) are not routinely quantified in statewide aviation economic impact studies despite their reliance on air transportation and infrastructure in the state.

Pennsylvania has numerous air ambulance operators. These air ambulance providers operate at multiple locations, including at airport bases, hospital heliports, or other private facilities. The assessment of off-airport air ambulance activity at private hospital heliports (or other private facilities) is meant to capture the economic impact associated with air ambulance bases *not* located at airports.[22]

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[22] For simplicity, the term "private hospital heliport" also includes other private, off-airport, air ambulance bases from this point forward.

Pennsylvania has 10 air ambulance operators that have bases off-airport, including:

- AGH LifeFlight
- Conemaugh MedStar
- Geisinger Life Flight
- Guthrie Air (LifeNet of NY)
- JeffSTAT
- Life Lion
- LVHN MedEvac
- PennSTAR
- STAT MedEvac
- Temple MedFlight

The quality-of-life impacts associated with air ambulance services have been noted in previous studies, but the economic impacts are lesser known. Previous studies have not captured the specific economic impact associated with off-airport air ambulance activity at private hospital heliports, despite the reliance on the aviation system and infrastructure network. The 2022 AEIS includes an estimation of the impact of private hospital heliports as a separate category of impacts in the total economic impact of Pennsylvania's aviation system. The following sections document the methodology and assumptions made in this estimation process. Total impacts of the private hospital heliport operations are presented in **Section 6.3**.

Determining the impact of private hospital heliports begins with identifying those operators and the locations from which they operate, as this assessment *only* considers bases located off-airport. PennDOT BOA provided a list of the 10 air ambulance providers in the state, which was considered to be the totality of those types of operators for the purposes of this study.

Data were collected through a survey instrument which was disseminated to all 10 operators. This survey requested information necessary to calculate the economic impact associated with these operators, including:

- Operator Location and Annual Operations
- Non-Airport Employment
- Payroll
- Capital Improvement Expenditures
- Operating Expenses
- Aircraft Used for Operations
- Personnel Involved in a Typical Operation
- Other Information (Qualitative)

Data were collected over a period of two months and included several follow-up phone conversations with the operators. Six of the 10 operators fully responded to the survey, and one additional provided an estimation of total employment. Of the six responsive operators, three participated in follow-up phone conversations and provided additional contextual and qualitative information.

For the four operators who did not provide completed surveys, an estimation methodology was developed and used for the minimum required inputs so that economic impacts could be modeled. The following subsections provide a brief overview of those methodologies. It should be noted the same air ambulance providers that did not provide employment, payroll, and/or operating expense information for 2019 also didn't provide it for 2020. The same estimation methodologies for these inputs were used for the 2020 base year, using 2020 data instead of 2019 data. This resulted in slightly different inputs as base year 2020 averages were different than 2019 averages. For example, the average employment reported by responsive providers was 25 for base year 2019 and it was 27 for base year 2020.

4.2.7.1. Employment

Necessary employment data includes full-time (FT) and part-time (PT) employees for 2019 and 2020 (FT and PT employment is combined for a total employee headcount in the economic modeling process). Four providers did not supply FT or PT employment for 2019 or 2020. A desktop review of the affiliated hospitals and air ambulance providers was completed to determine if the needed information was available online. When this search did not result in usable data, the hospitals associated with each of the operators were contacted to see if employment associated specifically with the air ambulance operation could be determined. This resulted in employment numbers being provided for one additional operator. This left three air ambulance providers with no associated employment counts:

- Guthrie Air (LifeNet of NY)
- JeffSTAT
- PennSTAR

For these three operators, the average employment reported by responsive providers was used, with high and low outliers removed. For base year 2019, the average employment reported included 24 FT employees and one PT employee, for a total headcount of 25. For base year 2020, the average employment reported included 25 FT employees and two PT employees, for a total headcount of 27.

4.2.7.2. Payroll

Air ambulance operators were asked to provide payroll information associated with their off-airport employment at private hospital heliports in 2019 and 2020. The survey allowed for responses in a variety of formats, including:

- Total payroll amount (for all employees) OR
- Average annual salary/wage *per employee* OR
- Average annual salary *range* per employee (e.g., less than $20,000, $20,000 - $39,999, $40,000 - $59,999, etc.)

Six providers responded to the payroll question. Most of the respondents provided information in the form of a payroll range, with the most common range reported of $60,000 to $79,999 (three out of five responses). The midpoint of the range was used in calculations.

Four providers did not provide a response to the payroll question:

- Geisinger Life Flight
- Guthrie Air (LifeNet of NY)
- JeffSTAT
- PennSTAR

For these operators, the most common payroll range reported by those that did respond was identified and compared to what IMPLAN imputed based on the operator's estimated employment for both base years. The higher of these two options on an operator-by-operator basis was selected for the non-responsive providers.

4.2.7.3. Operating Expenses

Air ambulance operators were asked to provide their total operating expenses for 2019 and 2020, omitting payroll and capital expenditures. However, upon review of responses, it was evident that some operators did not report operating expenses consistent with the instructions, and left out key expenditures like fuel costs, maintenance, and upkeep of equipment, etc. In order to ensure that the total scope of operating expenses was included, and that providers were assessed equally, operating expenses were ultimately imputed from IMPLAN based on estimated employment, as is done in other impact calculations (like airport tenants).

Chapter 5. Total Airport Impacts

The prior chapters have documented the elements of economic impact and the methodologies utilized to calculate the impacts. The following sections present the economic impact of Pennsylvania's aviation system for both base years (2019 and 2020) in terms of employment, payroll, and output, with data separated for commercial service and GA airports. Each section includes a separate assessment of impacts based on the source (e.g., on-airport activity, visitor spending, etc.). **Appendix C** includes detailed tables that present impacts on the airport level.

5.1. Employment Impacts

5.1.1. On-Airport Activity

Table 5.1 presents the total employment supported by on-airport activity, such as airport management and operations staff, tenant employees, and workers associated with capital construction projects. Direct, multiplier, and total employment are presented for both base years. In 2019, nearly 86,000 staff were employed due to on-airport activity, while in 2020 this number dropped to approximately 60,600.

Table 5.1. 2019 and 2020 On-Airport Employment

Impact Element/Study Year	2022 PA AEIS		
	Direct Employment	Multiplier Employment	Total Employment
Commercial Service Airports On-Airport Employment			
2019	34,926	42,861	77,787
2020	28,089	25,064	53,153
GA Airports On-Airport Employment			
2019	3,780	4,417	8,197
2020	3,624	3,793	7,416
2019 Total On-Airport Employment	**38,706**	**47,278**	**85,983**
2020 Total On-Airport Employment	**31,712**	**28,857**	**60,570**

Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

5.1.2. Aviation-Related Businesses Near PIT and PHL

Table 5.2 presents the employment at off-airport aviation support businesses near PIT and PHL, such as off-airport airport parking employees, airline office staff, warehousing staff, and freight forwarders. Direct, multiplier, and total employment are provided for both base years. As previously explained, direct employment for base years 2019 and 2020 are identical.

Table 5.2. 2019 and 2020 Aviation-Related Employment Near PIT and PHL

Impact Element/Study Year	2022 PA AEIS		
	Direct Employment	Multiplier Employment	Total Employment
2019	4,373	3,584	7,957
2020	4,373	2,889	7,262

Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

5.1.3. Commercial Service Visitor Spending

Table 5.3 documents the direct, multiplier, and total employment generated by out-of-state visitors arriving in the state via one of Pennsylvania's commercial service airports for both base years. Total employment in 2020 decreased to slightly more than one-third of what it was in 2019 as a result of the tremendous impact of COVID-19 on commercial airlines and aviation as a whole across the globe.

Table 5.3. 2019 and 2020 Employment from Commercial Visitor Spending

Impact Element/ Study Year	2022 PA AEIS		
	Direct Employment	Multiplier Employment	Total Employment
2019	88,965	41,224	130,188
2020	25,963	9,284	35,247

Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

5.1.4. GA Visitor Spending

Table 5.4 presents the direct, multiplier, and total employment generated by out-of-state GA visitors arriving in the state via one of the state's study airports for both base years. This includes out of state visitors arriving at commercial service airports using GA, rather than airline service, as well as all visitors at GA airports. Total employment decreased by about half in 2020 when compared with the findings of the 2019 base year.

Table 5.4. 2019 and 2020 Employment from GA Visitor Spending

Impact Element/Study Year	2022 PA AEIS		
	Direct Employment	Multiplier Employment	Total Employment
Commercial Service Airports GA Visitor Employment			
2019	567	233	800
2020	288	106	393
GA Airports Visitor Employment			
2019	863	368	1,231
2020	526	192	718
2019 Total GA Visitor Employment	1,430	601	2,031
2020 Total GA Visitor Employment	814	297	1,112

Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

5.1.5. 2019 and 2020 Total Airport Employment

Table 5.5 presents the total employment associated with all airport activities for both base years. 2020 employment is roughly half of what it was for the 2019 base year as a result of the downturn in aviation activity from the pandemic.

Table 5.5. 2019 and 2020 Total Airport Employment

Impact Element/Study Year	2022 PA AEIS		
	Direct Employment	Multiplier Employment	Total Employment
Commercial Service Airports Total Employment			
2019	128,830	87,902	216,732
2020	58,713	37,343	96,056
GA Airports Total Employment			
2019	4,643	4,785	9,428
2020	4,150	3,985	8,135
2019 Total Employment	133,473	92,687	226,160
2020 Total Employment	62,863	41,327	104,190

Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

5.2. Payroll Impacts

5.2.1. On-Airport Activity

Table 5.6 documents the payroll impacts associated with the employment presented previously, including airport and tenant staff along with construction workers carrying out capital projects, for both base years. Payroll for the 2019 base year totaled just over $5.9B, and in 2020 it totaled just over $4.5B. This reduction in payroll is a direct result of the reduction in employment experienced during this time frame.

Table 5.6. 2019 and 2020 On-Airport Payroll

Impact Element/Study Year	2022 PA AEIS		
	Direct Payroll	Multiplier Payroll	Total Payroll
Commercial Service Airports On-Airport Payroll			
2019	$2,828,848,600	$2,541,200,900	$5,370,049,500
2020	$2,414,878,200	$1,570,370,100	$3,985,248,300
GA Airports On-Airport Payroll			
2019	$260,779,900	$293,091,000	$553,870,900
2020	$283,473,100	$269,251,800	$552,724,900
2019 Total On-Airport Payroll	$3,089,628,500	$2,834,291,900	$5,923,920,400
2020 Total On-Airport Payroll	$2,698,351,300	$1,839,621,900	$4,537,973,200

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

5.2.2. Aviation-Related Businesses Near PIT and PHL

Table 5.7 As previously noted, while the direct employment remained the same across both base years, slight increases in wages across both base years can be seen in the table.

Table 5.7 identifies payroll associated with the off-airport employment supporting aviation operations at PIT and PHL for both base years. As previously noted, while the direct employment remained the same across both base years, slight increases in wages across both base years can be seen in the table.

Table 5.7. 2019 and 2020 Aviation-Related Business Payroll Near PIT and PHL

Impact Element/Study Year	2022 PA AEIS		
	Direct Payroll	Multiplier Payroll	Total Payroll
2019	$238,889,200	$214,884,400	$453,773,600
2020	$272,764,700	$185,482,800	$458,247,500

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

5.2.3. Commercial Service Visitor Spending

Table 5.8 identifies payroll associated with commercial service visitor spending for both base years. As shown, base year 2020 total payroll decreased significantly compared to base year 2019 findings, which is expected with the notable decline in enplanements in 2020 as compared to 2019.

Table 5.8. 2019 and 2020 Payroll from Commercial Service Visitor Spending

Impact Element/Study Year	2022 PA AEIS		
	Direct Payroll	Multiplier Payroll	Total Payroll
2019	$3,511,150,100	$2,519,549,500	$6,030,699,600
2020	$1,085,875,100	$788,032,500	$1,873,907,600

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

5.2.4. GA Visitor Spending

Similar to the previous section, **Table 5.9** presents the total payroll associated with out-of-state GA visitor spending for both base years. GA visitor spending is significantly lower for base year 2020 compared with base year 2019 findings as expected based on reduced operations.

Table 5.9. 2019 and 2020 Payroll from GA Visitor Spending

Impact Element/Study Year	2022 PA AEIS		
	Direct Payroll	Multiplier Payroll	Total Payroll
Commercial Service Airports GA Visitor Payroll			
2019	$17,667,700	$14,186,300	$31,854,000
2020	$8,555,300	$6,750,300	$15,305,600
GA Airports GA Visitor Payroll			
2019	$29,705,700	$22,373,900	$52,079,600
2020	$16,245,200	$12,264,000	$28,509,200
2019 Total GA Visitor Payroll	$47,373,400	$36,560,200	$83,933,600
2020 Total GA Visitor Payroll	$24,800,500	$19,014,300	$43,814,800

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

5.2.5. 2019 and 2020 Total Airport Payroll

In total, for the 2019 base year, airport-related employment generated an annual payroll of approximately $12B, as shown in **Table 5.10**. For the 2020 base year, total payroll is about half what it is for the 2019 base year at $6.9B.

Table 5.10. 2019 and 2020 Total Airport Payroll

Impact Element/Study Year	2022 PA AEIS		
	Direct Payroll	Multiplier Payroll	Total Payroll
Commercial Service Airports Total Payroll			
2019	$6,596,555,600	$5,289,821,100	$11,886,376,700
2020	$3,782,073,300	$2,550,635,700	$6,332,709,000
GA Airports Total Payroll			
2019	$290,485,600	$315,464,900	$605,950,500
2020	$299,718,300	$281,515,800	$581,234,100
2019 Total Payroll	$6,887,041,200	$5,605,286,000	$12,492,327,200
2020 Total Payroll	$4,081,791,600	$2,832,151,500	$6,913,943,100

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

5.3. Output Impacts

5.3.1. On-Airport Activity

Table 5.11 documents the direct, multiplier, and total output associated with activity on-airport for both base years. On-airport output reflects impacts from airport operations, tenant operations, and capital expenditures. In 2019, the on-airport total output reached over $18B, while in 2020 it totaled just over $10.3B.

Table 5.11. 2019 and 2020 On-Airport Output

Impact Element/Study Year	2022 PA AEIS		
	Direct Output	Multiplier Output	Total Output
Commercial Service Airports On-Airport Output			
2019	$9,105,192,000	$7,236,522,400	$16,341,714,400
2020	$4,794,394,800	$4,074,220,300	$8,868,615,100
GA Airports On-Airport Output			
2019	$969,046,600	$772,077,700	$1,741,124,300
2020	$840,843,600	$660,435,500	$1,501,279,100
2019 Total On-Airport Output	$10,074,238,600	$8,008,600,100	$18,082,838,700
2020 Total On-Airport Output	$5,635,238,400	$4,734,655,800	$10,369,894,200

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

5.3.2. Aviation-Related Businesses Near PIT and PHL

Table 5.12 presents the output associated with the nearby off-airport businesses that support the operation of PIT and PHL for both base years. Output decreased from 2019 to 2020 by about $200,000,000.

Table 5.12. 2019 and 2020 Aviation-Related Business Output Near PIT and PHL

Impact Element/Study Year	2022 PA AEIS		
	Direct Output	Multiplier Output	Total Output
2019	$563,451,800	$596,531,700	$1,159,983,500
2020	$466,666,800	$484,595,100	$951,261,900

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

5.3.3. Commercial Service Visitor Spending

Table 5.13 identifies the direct, multiplier, and total output associated with expenditures made by out-of-state commercial service visitors to the state for both base years. The notable drop in enplanements that impacted employment and payroll can also be seen here in total output with nearly $14.7B in 2019 and only $4.3B in 2020.

Table 5.13. 2019 and 2020 Output from Commercial Service Visitor Spending

Impact Element/Study Year	2022 PA AEIS		
	Direct Output	Multiplier Output	Total Output
2019	$7,776,217,900	$6,900,989,600	$14,677,207,500
2020	$2,258,771,100	$2,082,132,100	$4,340,903,200

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

5.3.4. GA Visitor Spending

Table 5.14 identifies the direct, multiplier, and total output associated with expenditures made by out-of-state GA visitors to the state for both base years. Output generated by GA visitor spending was also down in 2020 compared to 2019 but to a lesser extent than was seen in the commercial visitor spending assessment. This is due to the varying degrees GA activity was impacted compared to commercial activity.

Table 5.14. 2019 and 2020 Output from GA Visitor Spending

Impact Element/Study Year	2022 PA AEIS		
	Direct Output	Multiplier Output	Total Output
Commercial Service Airports GA Visitor Output			
2019	$43,988,300	$38,988,900	$82,977,200
2020	$19,428,700	$17,821,300	$37,250,000
GA Airports GA Visitor Output			
2019	$69,385,300	$61,513,200	$130,898,500
2020	$35,223,900	$32,391,500	$67,615,400
2019 Total GA Visitor Output	**$113,373,600**	**$100,502,100**	**$213,875,700**
2020 Total GA Visitor Output	**$54,652,600**	**$50,212,800**	**$104,865,400**

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

5.3.5. 2019 and 2020 Total Airport Output

Table 5.15 documents the total direct, multiplier, and grand total output associated with airport-related activity for both base years. For the 2019 base year, approximately $34B was generated (on an annual basis) by airport-supported activity. Strong aviation markets in 2018 and 2019 reflect activity prior to the COVID-19 pandemic. For the 2020 base year, approximately $16B was generated by airport-supported activity, representing a significant dip from the previous year as a result of the pandemic.

Table 5.15. 2019 and 2020 Total Airport Output

Impact Element/Study Year	2022 PA AEIS		
	Direct Output	**Multiplier Output**	**Total Output**
Commercial Service Airports Total Output			
2019	$17,488,850,000	$14,773,032,600	$32,261,882,600
2020	$7,539,261,400	$6,658,768,800	$14,198,030,200
GA Airports Total Output			
2019	$1,038,431,900	$833,590,900	$1,872,022,800
2020	$876,067,500	$692,827,000	$1,568,894,500
2019 Total Output	**$18,527,281,900**	**$15,606,623,500**	**$34,133,905,400**
2020 Total Output	**$8,415,328,900**	**$7,351,595,800**	**$15,766,924,700**

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

Chapter 6. Additional Areas of Impact

In addition to the impacts generated directly as a result of the operations at airports, the 2022 PA AEIS examined three additional areas of economic activity related to aviation activity that occurs off airport property: off-airport aerospace manufacturing, off-airport air cargo, and off-airport private hospital heliports.

6.1. Off-Airport Aerospace Manufacturing

As detailed in **Section 4.2.6**, Pennsylvania is home to many aerospace manufacturing operations that are located off-airport. This activity is captured in **Table 6.1** in terms of jobs, payroll associated with those jobs, and total output from the activity for both base years. As previously explained, direct employment for base years 2019 and 2020 are identical. For the 2020 base year, total output increased by approximately $500M when compared to the 2019 base year. Both employment and payroll also increased from 2019 to 2020 as demand remained steady.

Table 6.1. 2019 and 2020 Off-Airport Aerospace Manufacturing Impacts

Impact Element	2022 PA AEIS (2019 Base Year)			2022 PA AEIS (2020 Base Year)		
	Employ-ment	Payroll	Output	Employ-ment	Payroll	Output
Direct Impacts	11,648	$1,153,613,900	$5,125,619,500	11,648	$1,203,710,700	$5,513,583,700
Multiplier Impacts	19,548	1,400,466,100	3,554,772,900	20,058	$1,554,150,300	3,683,001,100
Total Impacts	31,196	$2,554,080,000	$8,680,392,400	31,706	$2,757,861,000	$9,196,584,800

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019 and 2020, 2022; Kimley-Horn, 2022

6.2. Off-Airport Air Cargo

Section 4.2.6 also documents the air cargo activity found off-airport in the Commonwealth. As previously explained, direct employment for base years 2019 and 2020 are identical. Total output in 2019 was just over $1.1B, and in 2020 was approximately $1.07B, a reduction of about $61,000,000, as shown in **Table 6.2**. While air cargo activity as a whole (considering on- and off-airport businesses) increased during the pandemic as more people resorted to online shopping to stay out of stores and minimize exposure, this increased activity is not reflected in additional output associated with businesses located off-airport – rather it is seen in output generated by businesses on-airport. Employment stayed relatively level while payroll increased moderately reflecting increased wages for similar jobs in 2020 compared to 2019.

Table 6.2. 2019 and 2020 Off-Airport Air Cargo Impacts

Impact Element	2022 PA AEIS (2019 Base Year)			2022 PA AEIS (2020 Base Year)		
	Employ-ment	Payroll	Output	Employ-ment	Payroll	Output
Direct Impacts	3,546	$239,965,200	$576,923,100	3,546	$260,186,700	$531,353,800
Multiplier Impacts	3,293	190,599,900	551,461,300	3,349	$205,826,200	535,953,800
Total Impacts	6,839	$430,565,100	$1,128,384,400	6,895	$466,012,900	$1,067,307,600

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019 and 2020, 2022; Kimley-Horn, 2022

6.3. Off-Airport Private Hospital Heliports

As detailed in **Section 4.2.7**, a significant amount of aviation-reliant activity takes place off-airport at private heliports that support medevac operations. **Table 6.3** identifies the impact of these operations, including employment, payroll associated with those jobs, and total output for both base years. For base year 2019, this activity contributed nearly $150M annually in economic impact with nearly 900 jobs in Pennsylvania. During base year 2020, it contributed nearly $75M with almost 700 jobs.

Table 6.3. 2019 and 2020 Off-Airport Private Hospital Heliport Impacts

Impact Element	2022 PA AEIS (2019 Base Year)			2022 PA AEIS (2020 Base Year)		
	Employ-ment	Payroll	Output	Employ-ment	Payroll	Output
Direct Impacts	406	$34,173,200	$70,735,700	428	$24,467,200	$37,462,400
Multiplier Impacts	488	$28,973,500	$79,027,800	238	$14,582,000	$37,307,200
Total Impacts	894	$63,146,700	$149,763,500	666	$39,049,200	$74,769,600

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019 and 2020, 2022; Kimley-Horn, 2022

Chapter 7. Tax Impacts

In addition to the contributions of study airports in the form of jobs, payroll, and output, aviation activity also spurs additional impacts in the form of tax revenues. Tax revenues are generated on a variety of aviation-related activities such as sales tax on visitor spending, income tax on airport and tenant payroll, property taxes, fuel taxes, and more. These taxes are levied at various levels including locally (county and sub-county), statewide, and federally depending on the type of tax and applicability. These tax impacts are significant and generally would not otherwise be generated without the presence of airports, the connectivity they provide, and the businesses that support them. To clarify, generated taxes as discussed in this chapter are not directly provided back to the state for aviation-related purposes.

The following set of tables (**Table 7.1** through **Table 7.8**) present the tax impacts associated with activity in the same categories used in previous chapters of this report:

- On-Airport
- Aviation-Related Businesses Near PIT and PHL
- Commercial Service Visitor Spending
- GA Visitor Spending
- Total Airport
- Off-Airport Aerospace Manufacturing
- Off-Airport Air Cargo
- Off-Airport Private Hospital Heliports

Each table distinguishes between direct, multiplier, and total impacts at the local, state, and federal levels.

7.1. On-Airport Tax Impacts

Tenants generate tax revenue through business expenditures, including capital expenditures, generating sales and use taxes, and through the taxation of employees' income (personal income tax) and the spending of their income (additional sales and use taxes). **Table 7.1** presents the tax revenues generated by on-airport activity for both base years showing nearly $2.6B in tax impacts in base year 2019 compared to $1.3B in base year 2020.

Table 7.1. 2019 and 2020 On-Airport Tax Impacts

Impact Element/Study Year	Direct Tax Impacts	Multiplier Tax Impacts	Total Tax Impacts
Local			
2019	$379,361,500	$204,929,800	$584,291,300
2020	$54,627,900	$166,545,700	$221,173,600
State			
2019	$432,669,900	$258,521,000	$691,190,900
2020	$77,099,100	$185,988,000	$263,087,100
Federal			
2019	$663,378,700	$626,464,000	$1,289,842,700
2020	$522,129,000	$276,784,100	$798,913,100

Impact Element/Study Year	Direct Tax Impacts	Multiplier Tax Impacts	Total Tax Impacts
2019 Total On-Airport Tax Impacts	$1,475,410,100	$1,089,914,800	$2,565,324,900
2020 Total On-Airport Tax Impacts	$653,856,000	$629,317,800	$1,283,173,800

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

7.2. Tax Impacts from Aviation-Related Businesses Near PIT and PHL

Similar to airport business tenants, the off-airport aviation-related businesses at PIT and PHL that support the airports' operation generate tax revenue through expenditures (sales and use taxes) and employee payroll. **Table 7.2** presents the total tax impacts associated with these support businesses, at just over $143M for base year 2019 and $109M for base year 2020.

Table 7.2. 2019 and 2020 Tax Impacts from Aviation-Related Businesses Near PIT and PHL

Impact Element/Study Year	Direct Tax Impacts	Multiplier Tax Impacts	Total Tax Impacts
Local			
2019	$7,968,700	$13,371,200	$21,339,900
2020	$389,600	$13,153,700	$13,543,300
State			
2019	$11,164,900	$17,195,700	$28,360,600
2020	$3,351,100	$14,985,000	$18,336,100
Federal			
2019	$48,672,600	$44,825,800	$93,498,400
2020	$52,112,600	$25,424,700	$77,537,300
2019 Total Tax Impacts from Aviation-Related Businesses near PIT and PHL	$67,806,200	$75,392,700	$143,198,900
2020 Total Tax Impacts from Aviation-Related Businesses near PIT and PHL	$55,853,300	$53,563,400	$109,416,700

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

7.3. Commercial Service Visitor Tax Impacts

Table 7.3 presents the tax revenues generated by visitors coming to the Commonwealth through one of the 14 commercial service airports in the state on commercial airlines. These impacts include revenue from sales and use taxes, totaling nearly $2.2B in tax impacts for base year 2019 and $611M for base year 2020.

Table 7.3. 2019 and 2020 Commercial Service Visitor Tax Impacts

Impact Element/Study Year	Direct Tax Impacts	Multiplier Tax Impacts	Total Tax Impacts
Local			
2019	$250,464,100	$159,205,400	$409,669,500
2020	$138,507,900	$63,707,400	$202,215,300
State			
2019	$307,548,600	$203,575,900	$511,124,500
2020	$140,601,100	$70,854,700	$211,455,800
Federal			
2019	$760,860,600	$513,889,900	$1,274,750,500
2020	$95,533,500	$101,569,200	$197,102,700
2019 Total Commercial Service Visitor Tax Impacts	$1,318,873,300	$876,671,200	$2,195,544,500
2020 Total Commercial Service Visitor Tax Impacts	$374,642,500	$236,131,300	$610,773,800

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

7.4. GA Visitor Tax Impacts

Table 7.4 presents the tax revenues associated with spending by visitors arriving via GA to Pennsylvania from out of state, both to commercial service and GA airports. Similar to commercial service visitors, these impacts include revenue from sales and use taxes, totaling almost $32M in tax impacts for base year 2019 and $15M for base year 2020.

Table 7.4. 2019 and 2020 GA Visitor Tax Impacts

Impact Element/Study Year	Direct Tax Impacts	Multiplier Tax Impacts	Total Tax Impacts
Local			
2019	$3,692,900	$2,330,000	$6,022,900
2020	$3,362,100	$1,533,700	$4,895,800
State			
2019	$4,522,000	$2,975,900	$7,497,900
2020	$3,413,300	$1,706,400	$5,119,700
Federal			
2019	$10,952,700	$7,475,400	$18,428,100
2020	$2,324,800	$2,453,200	$4,778,000
2019 Total GA Visitor Tax Impacts	$19,167,600	$12,781,300	$31,948,900
2020 Total GA Visitor Tax Impacts	$9,100,200	$5,693,300	$14,793,500

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

7.5. 2019 and 2020 Total Airport Tax Impacts

Table 7.5 combines the tax impacts, or revenues, from all airport-related activity in the previous four tables, totaling nearly $5B in tax revenues for base year 2019 and almost $2B in tax revenues for base year 2020.

Table 7.5. 2019 and 2020 Total Airport Tax Impacts

Impact Element/Study Year	Direct Tax Impacts	Multiplier Tax Impacts	Total Tax Impacts
Local			
2019	$633,518,500	$366,465,200	$999,983,700
2020	$196,497,900	$231,786,800	$428,284,700
State			
2019	$744,740,500	$465,072,800	$1,209,813,300
2020	$221,113,500	$258,549,100	$479,662,600
Federal			
2019	$1,435,192,000	$1,147,829,300	$2,583,021,300
2020	$619,987,300	$380,806,500	$1,000,793,800
2019 Total Airport Tax Impacts	**$2,813,451,000**	**$1,979,367,300**	**$4,792,818,300**
2020 Total Airport Tax Impacts	**$1,037,598,700**	**$871,142,400**	**$1,908,741,100**

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

7.6. Off-Airport Aerospace Manufacturing Tax Impacts

Similar to tenants, the off-airport aerospace manufacturing businesses generate tax revenue through business expenditures (generating sales and use taxes) and through the taxation of employees' income (personal income tax) and spending of that income. **Table 7.6** presents the tax revenues generated by off-airport aerospace manufacturing businesses in the Commonwealth at nearly $800M for base year 2019 and over $714M for base year 2020. The table also shows that in 2020, local tax impacts were negative. These negative tax impacts are due to certain industries receiving more in payments from government entities than these industries paid in taxes. These excess amounts in payments were most likely due to stimulus and other recovery payments received by these industries.

Table 7.6. 2019 and 2020 Off-Airport Aerospace Manufacturing Tax Impacts

Impact Element/Study Year	Direct Tax Impacts	Multiplier Tax Impacts	Total Tax Impacts
Local			
2019	$26,611,200	$74,418,300	$101,029,500
2020	($16,562,600)	$94,953,600	$78,391,000
State			
2019	$48,916,400	$97,970,800	$146,887,200
2020	$9,022,300	$110,486,100	$119,508,400

Impact Element/Study Year	Direct Tax Impacts	Multiplier Tax Impacts	Total Tax Impacts
Federal			
2019	$253,253,900	$291,256,200	$544,510,100
2020	$284,562,600	$231,964,500	$516,527,100
2019 Total Off-Airport Aerospace Tax Impacts	$328,781,500	$463,645,300	$792,426,800
2020 Total Off-Airport Aerospace Tax Impacts	$277,022,300	$437,404,200	$714,426,500

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

7.7. Off-Airport Air Cargo Tax Impacts

Table 7.7 presents tax revenues generated from off-airport air cargo activity, totaling over $150M in annual tax impacts associated with business expenditures and employee income for base year 2019 and over $123M for base year 2020.

Table 7.7. 2019 and 2020 Off-Airport Air Cargo Tax Impacts

Impact Element/Study Year	Direct Tax Impacts	Multiplier Tax Impacts	Total Tax Impacts
Local			
2019	$223,700	$174,300	$398,000
2020	($3,448,500)	$25,319,400	$21,870,900
State			
2019	$14,157,900	$20,434,600	$34,592,500
2020	($10,500)	$26,445,200	$26,434,700
Federal			
2019	$49,777,700	$40,841,500	$90,619,200
2020	$55,173,100	$19,726,300	$74,899,400
2019 Total Off-Airport Air Cargo Tax Impacts	$74,606,700	$61,450,500	$152,753,100
2020 Total Off-Airport Air Cargo Tax Impacts	$51,714,073	$71,490,900	$123,204,985

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

7.8. Off-Airport Private Hospital Heliport Tax Impacts

Table 7.8 presents tax impacts generated by private hospital heliport operation off-airport, at nearly $15M annually from business expenditures and employee income for base year 2019 and almost $11M for base year 2020.

Table 7.8. 2019 and 2020 Off-Airport Private Hospital Heliport Tax Impacts

Impact Element/Study Year	Direct Tax Impacts	Multiplier Tax Impacts	Total Tax Impacts
Local			
2019	$549,300	$1,498,900	$2,048,200
2020	$160,400	$1,064,800	$1,225,200
State			
2019	$859,800	$1,914,900	$2,774,700
2020	$458,300	$1,203,600	$1,661,900
Federal			
2019	$5,147,300	$4,991,700	$10,139,000
2020	$5,857,700	$1,985,400	$7,843,100
2019 Total Off-Airport Private Hospital Heliport Tax Impacts	**$6,556,400**	**$8,405,600**	**$14,961,900**
2020 Total Off-Airport Private Hospital Heliport Tax Impacts	**$6,476,400**	**$4,253,800**	**$10,730,200**

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

Appendix A. Socioeconomic Trend Data

Table A-1. Population in Thousands by County

County	Historic	Base	Projected			CAGR			
	1999	2019	2024	2029	2039	1999 to 2019	2019 to 2024	2019 to 2029	2019 to 2039
Adams	90.4	107.1	112.9	118.7	129.8	0.9%	1.0%	1.0%	1.0%
Allegheny	1,287.2	1,214.4	1,198.0	1,180.0	1,131.9	0.3%	0.3%	0.3%	0.4%
Armstrong	72.6	67.4	67.1	66.7	65.1	0.4%	0.1%	0.1%	0.2%
Beaver	182.6	167.7	166.0	164.1	158.5	0.4%	0.2%	0.2%	0.3%
Bedford	49.9	49.3	49.6	49.9	49.8	0.1%	0.1%	0.1%	0.1%
Berks	370.9	428.2	443.2	458.0	483.4	0.7%	0.7%	0.7%	0.6%
Blair	129.8	126.0	126.0	125.8	123.8	0.1%	0.0%	0.0%	0.1%
Bradford	62.7	62.4	63.0	63.6	64.0	0.0%	0.2%	0.2%	0.1%
Bucks	593.9	647.7	669.4	690.7	726.8	0.4%	0.7%	0.6%	0.6%
Butler	172.9	192.3	198.9	205.4	216.7	0.5%	0.7%	0.7%	0.6%
Cambria	153.9	134.1	130.5	126.8	118.2	0.7%	0.5%	0.6%	0.6%
Cameron	6.0	4.6	4.5	4.3	4.0	1.3%	0.7%	0.7%	0.8%
Carbon	58.8	66.6	68.7	70.9	74.6	0.6%	0.7%	0.6%	0.6%
Centre	135.3	166.1	173.9	181.6	195.7	1.0%	0.9%	0.9%	0.8%
Chester	428.1	536.3	561.0	585.8	631.2	1.1%	0.9%	0.9%	0.8%
Clarion	41.8	38.9	39.0	39.0	38.6	0.4%	0.0%	0.0%	0.0%
Clearfield	83.2	81.8	82.3	82.8	82.6	0.1%	0.1%	0.1%	0.0%
Clinton	37.9	40.2	40.7	41.1	41.4	0.3%	0.2%	0.2%	0.1%
Columbia	64.3	68.8	70.4	72.0	74.5	0.3%	0.5%	0.5%	0.4%
Crawford	90.1	88.3	89.4	90.5	91.6	0.1%	0.3%	0.2%	0.2%
Cumberland	213.3	255.2	267.3	279.4	301.9	0.9%	0.9%	0.9%	0.8%
Dauphin	251.3	280.2	289.2	298.0	312.9	0.5%	0.6%	0.6%	0.6%
Delaware	550.8	570.3	577.8	584.4	590.8	0.2%	0.3%	0.2%	0.2%
Elk	35.3	30.8	30.3	29.9	28.6	0.7%	0.3%	0.3%	0.4%
Erie	281.3	280.2	282.0	283.4	283.2	0.0%	0.1%	0.1%	0.1%
Fayette	148.9	133.1	132.2	131.1	127.4	0.6%	0.1%	0.2%	0.2%
Forest	4.9	7.6	7.8	7.9	8.0	2.2%	0.3%	0.3%	0.2%
Franklin	128.9	161.0	169.3	177.7	193.0	1.1%	1.0%	1.0%	0.9%
Fulton	14.3	15.0	15.4	15.7	16.2	0.2%	0.5%	0.5%	0.4%
Greene	40.8	38.1	38.4	38.7	38.7	0.3%	0.2%	0.1%	0.1%
Huntingdon	45.6	46.1	46.5	46.7	46.7	0.1%	0.2%	0.1%	0.1%
Indiana	89.7	88.7	89.7	90.6	91.4	0.1%	0.2%	0.2%	0.1%
Jefferson	46.0	44.9	45.2	45.5	45.3	0.1%	0.1%	0.1%	0.0%
Juniata	22.6	25.6	26.4	27.3	28.7	0.6%	0.6%	0.6%	0.6%

County	Historic	Base	Projected			CAGR			
	1999	2019	2024	2029	2039	1999 to 2019	2019 to 2024	2019 to 2029	2019 to 2039
Lackawanna	214.0	213.3	214.0	214.4	212.8	0.0%	0.1%	0.0%	0.0%
Lancaster	467.9	565.4	599.6	634.8	703.3	1.0%	1.2%	1.2%	1.1%
Lawrence	94.9	87.9	87.1	86.2	83.3	0.4%	0.2%	0.2%	0.3%
Lebanon	119.9	141.3	146.4	151.5	160.3	0.8%	0.7%	0.7%	0.6%
Lehigh	310.5	371.7	386.3	400.8	426.7	0.9%	0.8%	0.8%	0.7%
Luzerne	320.9	319.7	320.6	321.0	318.5	0.0%	0.1%	0.0%	0.0%
Lycoming	120.2	117.6	118.7	119.6	120.1	0.1%	0.2%	0.2%	0.1%
McKean	46.3	42.2	41.9	41.6	40.4	0.5%	0.1%	0.2%	0.2%
Mercer	120.7	114.4	114.0	113.3	110.6	0.3%	0.1%	0.1%	0.2%
Mifflin	46.5	46.9	47.2	47.4	47.3	0.0%	0.1%	0.1%	0.0%
Monroe	134.9	175.0	184.2	193.7	211.6	1.3%	1.0%	1.0%	1.0%
Montgomery	744.7	843.0	870.0	896.3	940.3	0.6%	0.6%	0.6%	0.5%
Montour	18.1	19.0	19.3	19.7	20.1	0.2%	0.4%	0.4%	0.3%
Northampton	265.9	313.0	325.9	338.8	362.1	0.8%	0.8%	0.8%	0.7%
Northumberland	94.8	94.2	94.5	94.6	93.8	0.0%	0.1%	0.0%	0.0%
Perry	43.6	48.1	50.7	53.3	58.3	0.5%	1.1%	1.0%	1.0%
Philadelphia	1,520.1	1,550.3	1,540.4	1,528.1	1,486.0	0.1%	0.1%	0.1%	0.2%
Pike	45.1	61.2	66.7	72.6	85.0	1.5%	1.7%	1.7%	1.7%
Potter	17.8	17.4	17.5	17.6	17.7	0.1%	0.2%	0.2%	0.1%
Schuylkill	151.0	145.9	145.9	145.8	143.7	0.2%	0.0%	0.0%	0.1%
Snyder	37.6	41.4	42.5	43.6	45.4	0.5%	0.5%	0.5%	0.5%
Somerset	80.1	76.7	77.2	77.6	77.3	0.2%	0.1%	0.1%	0.0%
Sullivan	6.5	6.4	6.4	6.5	6.5	0.1%	0.1%	0.1%	0.1%
Susquehanna	42.2	43.0	44.1	45.2	47.0	0.1%	0.5%	0.5%	0.4%
Tioga	41.5	42.7	43.2	43.6	43.9	0.1%	0.2%	0.2%	0.1%
Union	41.5	47.2	49.7	52.2	57.0	0.6%	1.0%	1.0%	0.9%
Venango	57.9	53.1	52.6	52.1	50.6	0.4%	0.2%	0.2%	0.2%
Warren	44.1	40.4	40.0	39.7	38.5	0.4%	0.2%	-0.2%	-0.2%
Washington	203.1	211.3	214.4	217.3	220.7	0.2%	0.3%	0.3%	0.2%
Wayne	47.1	52.9	54.4	55.9	58.3	0.6%	0.6%	0.6%	0.5%
Westmoreland	371.2	359.8	360.3	360.2	356.1	-0.2%	0.0%	0.0%	-0.1%
Wyoming	28.3	28.4	28.6	28.8	28.9	0.0%	0.2%	0.2%	0.1%
York	378.9	461.3	482.8	504.5	544.6	1.0%	0.9%	0.9%	0.8%
Pennsylvania	**12,263.8**	**13,016.9**	**13,259.1**	**13,492.0**	**13,831.5**	**0.3%**	**0.4%**	**0.4%**	**0.3%**
U.S.	**279,040.2**	**333,598.1**	**349,344.3**	**365,567.7**	**396,688.1**	**0.9%**	**0.9%**	**0.9%**	**0.9%**

Source: Woods & Poole, Inc.

Table A-2. Median Age by County

County	Historic	Base	Projected			CAGR			
	1999	2019	2024	2029	2039	1999 to 2019	2019 to 2024	2019 to 2029	2019 to 2039
Adams	36.80	44.46	44.64	44.54	44.54	0.9%	0.1%	0.0%	0.0%
Allegheny	39.39	40.49	40.87	41.91	42.91	0.1%	0.2%	0.3%	0.3%
Armstrong	40.11	47.10	47.82	48.53	49.48	0.8%	0.3%	0.3%	0.2%
Beaver	40.36	45.29	45.38	46.16	47.79	0.6%	0.0%	0.2%	0.3%
Bedford	39.18	46.46	46.83	47.27	48.06	0.9%	0.2%	0.2%	0.2%
Berks	37.27	39.63	39.45	39.53	40.00	0.3%	-0.1%	0.0%	0.0%
Blair	39.17	42.74	42.64	42.52	43.21	0.4%	0.0%	-0.1%	0.1%
Bradford	38.54	45.54	45.82	46.43	47.47	0.8%	0.1%	0.2%	0.2%
Bucks	37.44	44.24	44.28	44.38	45.24	0.8%	0.0%	0.0%	0.1%
Butler	37.36	44.20	44.93	45.62	46.49	0.8%	0.3%	0.3%	0.3%
Cambria	40.79	45.20	45.36	45.57	46.19	0.5%	0.1%	0.1%	0.1%
Cameron	41.05	50.73	51.43	50.09	47.63	1.1%	0.3%	-0.1%	-0.3%
Carbon	40.32	47.04	47.74	48.08	48.84	0.8%	0.3%	0.2%	0.2%
Centre	28.57	30.64	31.77	33.28	33.16	0.4%	0.7%	0.8%	0.4%
Chester	36.71	41.12	41.53	41.56	41.76	0.6%	0.2%	0.1%	0.1%
Clarion	35.95	41.67	41.97	42.16	44.06	0.7%	0.1%	0.1%	0.3%
Clearfield	38.98	45.30	46.00	46.76	48.65	0.8%	0.3%	0.3%	0.4%
Clinton	37.57	37.08	36.28	37.31	38.46	-0.1%	-0.4%	0.1%	0.2%
Columbia	37.25	39.73	39.46	40.21	42.98	0.3%	-0.1%	0.1%	0.4%
Crawford	37.73	43.47	43.74	43.89	44.69	0.7%	0.1%	0.1%	0.1%
Cumberland	37.87	41.07	41.77	42.51	43.10	0.4%	0.3%	0.3%	0.2%
Dauphin	37.64	39.40	39.56	39.67	39.56	0.2%	0.1%	0.1%	0.0%
Delaware	37.16	38.80	38.92	39.19	39.58	0.2%	0.1%	0.1%	0.1%
Elk	39.04	48.82	50.58	51.84	53.93	1.1%	0.7%	0.6%	0.5%
Erie	35.92	39.61	40.31	41.36	43.13	0.5%	0.4%	0.4%	0.4%
Fayette	39.88	45.70	46.10	46.43	47.89	0.7%	0.2%	0.2%	0.2%
Forest	43.97	46.83	46.75	47.13	48.68	0.3%	0.0%	0.1%	0.2%
Franklin	38.01	41.40	41.29	41.21	41.02	0.4%	-0.1%	0.0%	0.0%
Fulton	37.85	45.53	46.09	45.98	46.57	0.9%	0.2%	0.1%	0.1%
Greene	37.91	43.56	44.59	45.3	47.63	0.7%	0.5%	0.4%	0.4%
Huntingdon	37.43	43.67	44.15	44.55	45.61	0.8%	0.2%	0.2%	0.2%
Indiana	35.88	38.65	38.69	39.9	43.05	0.4%	0.0%	0.3%	0.5%
Jefferson	39.49	44.13	44.25	44.74	45.97	0.6%	0.1%	0.1%	0.2%
Juniata	37.53	43.83	44.24	43.93	43.69	0.8%	0.2%	0.0%	0.0%
Lackawanna	40.10	42.48	42.56	42.95	43.89	0.3%	0.0%	0.1%	0.2%

County	Historic	Base	Projected			CAGR			
	1999	2019	2024	2029	2039	1999 to 2019	2019 to 2024	2019 to 2029	2019 to 2039
Lancaster	35.85	38.41	38.54	38.99	39.34	0.3%	0.1%	0.1%	0.1%
Lawrence	40.20	45.19	45.18	45.31	45.50	0.6%	0.0%	0.0%	0.0%
Lebanon	38.45	41.46	41.65	41.52	41.52	0.4%	0.1%	0.0%	0.0%
Lehigh	38.14	39.30	39.29	39.34	40.05	0.1%	0.0%	0.0%	0.1%
Luzerne	40.56	43.30	43.19	43.32	44.34	0.3%	-0.1%	0.0%	0.1%
Lycoming	38.08	41.23	41.64	42.31	43.85	0.4%	0.2%	0.3%	0.3%
McKean	38.38	43.92	44.54	45.02	46.39	0.7%	0.3%	0.2%	0.3%
Mercer	39.32	45.19	45.85	46.50	47.80	0.7%	0.3%	0.3%	0.3%
Mifflin	38.52	44.06	44.14	44.61	46.00	0.7%	0.0%	0.1%	0.2%
Monroe	36.99	43.21	43.20	42.90	44.57	0.8%	0.0%	-0.1%	0.2%
Montgomery	38.03	40.97	40.92	40.84	41.11	0.4%	0.0%	0.0%	0.0%
Montour	39.46	44.37	44.56	45.53	47.39	0.6%	0.1%	0.3%	0.3%
Northampton	38.19	42.24	42.54	43.00	44.78	0.5%	0.1%	0.2%	0.3%
Northumberland	40.50	44.68	44.75	45.17	46.12	0.5%	0.0%	0.1%	0.2%
Perry	37.11	43.56	43.93	44.08	44.70	0.8%	0.2%	0.1%	0.1%
Philadelphia	34.12	34.24	35.37	36.14	35.52	0.0%	0.7%	0.5%	0.2%
Pike	39.37	48.98	49.99	49.91	48.67	1.1%	0.4%	0.2%	0.0%
Potter	38.88	47.86	48.27	48.50	48.77	1.0%	0.2%	0.1%	0.1%
Schuylkill	40.67	44.95	45.17	45.50	46.18	0.5%	0.1%	0.1%	0.1%
Snyder	36.40	40.50	40.91	41.63	43.64	0.5%	0.2%	0.3%	0.4%
Somerset	39.95	46.89	47.77	48.69	50.41	0.8%	0.4%	0.4%	0.4%
Sullivan	42.72	53.76	53.33	51.25	48.52	1.2%	-0.2%	-0.5%	-0.5%
Susquehanna	39.08	48.92	50.27	50.71	51.26	1.1%	0.5%	0.4%	0.2%
Tioga	38.08	44.33	44.58	45.00	46.64	0.8%	0.1%	0.2%	0.3%
Union	35.58	39.94	40.78	41.44	42.90	0.6%	0.4%	0.4%	0.4%
Venango	39.81	47.10	47.52	47.92	48.25	0.8%	0.2%	0.2%	0.1%
Warren	40.18	48.25	49.17	49.52	50.80	0.9%	0.4%	0.3%	0.3%
Washington	40.49	45.04	45.19	45.38	46.08	0.5%	0.1%	0.1%	0.1%
Wayne	40.42	49.73	52.10	53.37	54.68	1.0%	0.9%	0.7%	0.5%
Westmoreland	41.00	47.69	47.98	48.21	49.00	0.8%	0.1%	0.1%	0.1%
Wyoming	37.36	45.77	46.88	47.81	49.50	1.0%	0.5%	0.4%	0.4%
York	37.57	41.19	41.27	41.12	41.25	0.5%	0.0%	0.0%	0.0%
Pennsylvania	**37.77**	**40.69**	**41.00**	**41.52**	**42.46**	**0.4%**	**0.2%**	**0.2%**	**0.2%**
U.S.	**35.16**	**38.17**	**38.62**	**39.12**	**39.90**	**0.4%**	**0.2%**	**0.2%**	**0.2%**

Source: Woods & Poole, Inc.

Table A-3. Employment in Thousands by County

County	Historic	Base	Projected			CAGR			
	1999	2019	2024	2029	2039	1999 to 2019	2019 to 2024	2019 to 2029	2019 to 2039
Adams	44.7	57.0	61.5	65.8	74.0	1.2%	1.5%	1.4%	1.3%
Allegheny	850.0	919.2	949.8	975.4	1,008.7	0.4%	0.7%	0.6%	0.5%
Armstrong	30.2	31.6	32.6	33.5	34.7	0.2%	0.7%	0.6%	0.5%
Beaver	72.6	74.7	76.9	78.7	80.9	0.1%	0.6%	0.5%	0.4%
Bedford	24.4	25.3	26.4	27.4	29.0	0.2%	0.9%	0.8%	0.7%
Berks	211.2	237.9	247.9	256.7	270.4	0.6%	0.8%	0.8%	0.6%
Blair	72.3	76.6	78.7	80.3	82.0	0.3%	0.5%	0.5%	0.3%
Bradford	31.4	37.3	39.2	40.9	44.0	0.9%	1.0%	0.9%	0.8%
Bucks	313.5	394.8	419.8	443.5	485.9	1.2%	1.2%	1.2%	1.0%
Butler	85.1	121.1	129.8	138.4	155.4	1.8%	1.4%	1.3%	1.3%
Cambria	75.0	74.4	76.6	78.5	80.9	0.0%	0.6%	0.5%	0.4%
Cameron	3.4	2.8	2.8	2.8	2.8	-1.0%	0.2%	0.1%	-0.1%
Carbon	22.5	26.9	28.3	29.6	32.1	0.9%	1.0%	1.0%	0.9%
Centre	93.1	126.3	138.0	149.3	170.6	1.5%	1.8%	1.7%	1.5%
Chester	274.6	377.5	407.2	436.5	493.0	1.6%	1.5%	1.5%	1.3%
Clarion	20.8	21.9	22.8	23.6	24.8	0.3%	0.8%	0.8%	0.6%
Clearfield	40.8	41.8	43.4	44.8	46.9	0.1%	0.8%	0.7%	0.6%
Clinton	17.2	20.2	21.2	22.0	23.4	0.8%	1.0%	0.9%	0.8%
Columbia	33.7	38.1	40.0	41.7	44.4	0.6%	1.0%	0.9%	0.8%
Crawford	45.2	47.4	48.7	49.8	51.0	0.2%	0.6%	0.5%	0.4%
Cumberland	157.6	174.9	186.7	198.0	218.0	0.5%	1.3%	1.2%	1.1%
Dauphin	203.5	238.1	254.5	270.2	298.8	0.8%	1.3%	1.3%	1.1%
Delaware	275.7	327.3	345.0	361.1	387.4	0.9%	1.1%	1.0%	0.8%
Elk	20.4	19.5	19.8	20.0	19.9	-0.2%	0.3%	0.3%	0.1%
Erie	160.2	170.3	178.7	186.2	198.5	0.3%	1.0%	0.9%	0.8%
Fayette	53.8	61.1	63.5	65.5	68.4	0.6%	0.8%	0.7%	0.6%
Forest	2.1	3.7	4.0	4.3	4.8	2.7%	1.5%	1.4%	1.3%
Franklin	64.4	82.9	88.8	94.7	105.8	1.3%	1.4%	1.3%	1.2%
Fulton	7.6	7.8	8.2	8.5	9.0	0.1%	0.9%	0.8%	0.7%
Greene	15.9	21.8	23.2	24.5	27.1	1.6%	1.3%	1.2%	1.1%
Huntingdon	17.9	19.4	20.1	20.8	21.6	0.4%	0.7%	0.7%	0.5%
Indiana	42.0	50.8	53.3	55.6	59.4	1.0%	1.0%	0.9%	0.8%
Jefferson	21.4	22.9	23.7	24.4	25.3	0.3%	0.7%	0.6%	0.5%
Juniata	10.0	12.7	13.4	14.1	15.2	1.2%	1.1%	1.0%	0.9%
Lackawanna	119.2	135.8	142.3	148.1	157.6	0.7%	0.9%	0.9%	0.7%

County	Historic	Base	Projected			CAGR			
	1999	2019	2024	2029	2039	1999 to 2019	2019 to 2024	2019 to 2029	2019 to 2039
Lancaster	276.7	338.6	365.1	391.0	440.4	1.0%	1.5%	1.4%	1.3%
Lawrence	42.1	42.0	43.2	44.2	45.3	0.0%	0.6%	0.5%	0.4%
Lebanon	52.8	69.8	74.0	78.1	85.6	1.4%	1.2%	1.1%	1.0%
Lehigh	202.4	248.6	266.1	283.2	315.2	1.0%	1.4%	1.3%	1.2%
Luzerne	168.2	185.7	192.4	198.2	206.8	0.5%	0.7%	0.7%	0.5%
Lycoming	65.3	75.3	79.5	83.5	90.6	0.7%	1.1%	1.0%	0.9%
McKean	23.5	22.3	22.8	23.2	23.6	-0.3%	0.5%	0.4%	0.3%
Mercer	61.0	64.7	66.5	68.0	69.9	0.3%	0.6%	0.5%	0.4%
Mifflin	22.1	23.1	23.7	24.2	24.7	0.2%	0.5%	0.5%	0.3%
Monroe	61.5	79.9	84.8	89.4	97.9	1.3%	1.2%	1.1%	1.0%
Montgomery	570.8	665.6	706.1	744.1	810.9	0.8%	1.2%	1.1%	1.0%
Montour	14.2	25.8	28.9	32.2	39.4	3.0%	2.3%	2.3%	2.1%
Northampton	109.4	151.0	160.6	169.9	186.4	1.6%	1.2%	1.2%	1.1%
Northumberland	39.3	39.0	40.3	41.3	42.9	0.0%	0.6%	0.6%	0.5%
Perry	12.3	14.8	15.7	16.5	17.9	0.9%	1.2%	1.1%	1.0%
Philadelphia	755.7	853.4	884.1	911.4	950.9	0.6%	0.7%	0.7%	0.5%
Pike	13.0	20.1	22.1	24.1	28.1	2.2%	1.9%	1.8%	1.7%
Potter	9.9	9.5	9.8	10.1	10.6	-0.2%	0.8%	0.7%	0.6%
Schuylkill	63.1	66.2	67.7	69.0	70.7	0.2%	0.5%	0.4%	0.3%
Snyder	21.4	23.1	24.3	25.4	27.3	0.4%	1.1%	1.0%	0.8%
Somerset	35.6	35.0	35.8	36.3	36.8	-0.1%	0.4%	0.4%	0.2%
Sullivan	2.8	3.2	3.4	3.5	3.6	0.6%	0.8%	0.7%	0.6%
Susquehanna	15.4	18.5	19.4	20.2	21.7	0.9%	1.0%	0.9%	0.8%
Tioga	18.4	20.4	21.4	22.3	23.8	0.5%	1.0%	0.9%	0.8%
Union	21.6	24.5	26.2	27.8	30.8	0.6%	1.3%	1.3%	1.1%
Venango	26.9	25.2	25.5	25.6	25.4	-0.3%	0.2%	0.2%	0.1%
Warren	21.3	21.8	22.6	23.2	24.1	0.1%	0.7%	0.6%	0.5%
Washington	91.6	123.5	130.2	136.3	147.0	1.5%	1.1%	1.0%	0.9%
Wayne	18.4	21.4	22.2	22.8	23.8	0.7%	0.8%	0.7%	0.5%
Westmoreland	169.7	182.5	189.2	194.8	202.3	0.4%	0.7%	0.7%	0.5%
Wyoming	12.9	13.7	14.2	14.7	15.5	0.3%	0.8%	0.7%	0.6%
York	204.2	240.7	256.5	271.5	299.1	0.8%	1.3%	1.2%	1.1%
Pennsylvania	**6,757.2**	**7,850.3**	**8,261.2**	**8,641.5**	**9,290.6**	**0.8%**	**1.0%**	**1.0%**	**0.8%**
U.S.	**161,531.4**	**200,555.4**	**214,840.2**	**228,826.3**	**255,383.8**	**1.1%**	**1.4%**	**1.3%**	**1.2%**

Source: Woods & Poole, Inc.

Table A-4. Per Capita Income by County

County	Historic	Base	Projected			CAGR			
	1999	2019	2024	2029	2039	1999 to 2019	2019 to 2024	2019 to 2029	2019 to 2039
Adams	$30,388	$41,637	$44,606	$47,330	$51,642	1.59%	1.39%	1.29%	1.08%
Allegheny	$39,901	$54,490	$59,682	$64,911	$74,864	1.57%	1.84%	1.77%	1.60%
Armstrong	$28,066	$41,053	$44,813	$48,422	$54,528	1.92%	1.77%	1.66%	1.43%
Beaver	$29,390	$41,471	$45,233	$48,838	$54,816	1.74%	1.75%	1.65%	1.40%
Bedford	$26,002	$35,559	$38,704	$41,667	$46,415	1.58%	1.71%	1.60%	1.34%
Berks	$34,449	$42,329	$45,434	$48,390	$53,424	1.04%	1.43%	1.35%	1.17%
Blair	$29,335	$38,471	$41,700	$44,786	$49,677	1.36%	1.62%	1.53%	1.29%
Bradford	$26,387	$37,629	$41,046	$44,376	$50,151	1.79%	1.75%	1.66%	1.45%
Bucks	$44,626	$61,342	$65,654	$69,699	$76,756	1.60%	1.37%	1.29%	1.13%
Butler	$33,639	$49,519	$54,369	$59,363	$69,606	1.95%	1.89%	1.83%	1.72%
Cambria	$27,461	$37,418	$40,529	$43,557	$48,967	1.56%	1.61%	1.53%	1.35%
Cameron	$27,557	$41,297	$45,235	$48,941	$54,869	2.04%	1.84%	1.71%	1.43%
Carbon	$28,140	$39,630	$42,908	$46,127	$51,845	1.73%	1.60%	1.53%	1.35%
Centre	$29,719	$39,733	$42,926	$46,017	$51,465	1.46%	1.56%	1.48%	1.30%
Chester	$53,427	$72,442	$78,986	$85,632	$99,241	1.53%	1.74%	1.69%	1.59%
Clarion	$26,297	$36,472	$39,701	$42,755	$47,665	1.65%	1.71%	1.60%	1.35%
Clearfield	$26,472	$38,572	$41,976	$45,259	$50,665	1.90%	1.71%	1.61%	1.37%
Clinton	$26,028	$35,018	$38,040	$40,863	$45,386	1.49%	1.67%	1.56%	1.31%
Columbia	$26,955	$36,122	$39,047	$41,778	$46,109	1.47%	1.57%	1.47%	1.23%
Crawford	$26,615	$34,762	$37,594	$40,227	$44,205	1.34%	1.58%	1.47%	1.21%
Cumberland	$38,052	$47,277	$50,915	$54,442	$60,605	1.09%	1.49%	1.42%	1.25%
Dauphin	$36,525	$45,006	$48,824	$52,559	$59,046	1.05%	1.64%	1.56%	1.37%
Delaware	$43,588	$55,335	$60,104	$64,760	$73,237	1.20%	1.67%	1.59%	1.41%
Elk	$30,952	$42,534	$46,282	$49,809	$55,675	1.60%	1.70%	1.59%	1.36%
Erie	$29,957	$38,039	$41,160	$44,193	$49,587	1.20%	1.59%	1.51%	1.33%
Fayette	$26,139	$37,238	$40,943	$44,520	$50,432	1.79%	1.92%	1.80%	1.53%
Forest	$24,542	$24,179	$26,940	$29,683	$34,352	-0.07%	2.19%	2.07%	1.77%
Franklin	$30,337	$39,230	$42,163	$44,955	$49,539	1.29%	1.45%	1.37%	1.17%
Fulton	$27,345	$35,056	$37,898	$40,501	$44,451	1.25%	1.57%	1.45%	1.19%
Greene	$24,147	$42,039	$46,525	$51,098	$59,925	2.81%	2.05%	1.97%	1.79%
Huntingdon	$23,775	$34,371	$37,170	$39,748	$43,601	1.86%	1.58%	1.46%	1.20%
Indiana	$27,030	$37,247	$40,828	$44,351	$50,567	1.62%	1.85%	1.76%	1.54%
Jefferson	$27,133	$36,054	$39,248	$42,297	$47,278	1.43%	1.71%	1.61%	1.36%
Juniata	$26,787	$36,198	$38,907	$41,315	$44,873	1.52%	1.45%	1.33%	1.08%
Lackawanna	$31,826	$41,583	$45,450	$49,208	$55,628	1.35%	1.79%	1.70%	1.47%
Lancaster	$33,461	$41,749	$44,801	$47,654	$52,359	1.11%	1.42%	1.33%	1.14%
Lawrence	$27,118	$38,763	$42,560	$46,189	$52,199	1.80%	1.89%	1.77%	1.50%

County	Historic	Base	Projected			CAGR			
	1999	2019	2024	2029	2039	1999 to 2019	2019 to 2024	2019 to 2029	2019 to 2039
Lebanon	$31,774	$40,541	$43,667	$46,636	$51,573	1.23%	1.50%	1.41%	1.21%
Lehigh	$36,141	$45,363	$49,523	$53,690	$61,379	1.14%	1.77%	1.70%	1.52%
Luzerne	$30,685	$39,895	$43,297	$46,569	$51,968	1.32%	1.65%	1.56%	1.33%
Lycoming	$27,515	$39,530	$42,698	$45,764	$51,172	1.83%	1.55%	1.48%	1.30%
McKean	$28,461	$38,478	$41,876	$45,142	$50,642	1.52%	1.71%	1.61%	1.38%
Mercer	$27,557	$36,095	$39,323	$42,413	$47,419	1.36%	1.73%	1.63%	1.37%
Mifflin	$25,322	$33,291	$35,996	$38,496	$42,175	1.38%	1.57%	1.46%	1.19%
Monroe	$29,049	$35,945	$38,439	$40,773	$44,417	1.07%	1.35%	1.27%	1.06%
Montgomery	$55,776	$75,192	$80,720	$86,051	$95,889	1.50%	1.43%	1.36%	1.22%
Montour	$30,208	$54,365	$58,962	$63,441	$71,372	2.98%	1.64%	1.56%	1.37%
Northampton	$34,187	$44,833	$48,237	$51,463	$56,775	1.36%	1.47%	1.39%	1.19%
Northumberland	$27,142	$36,020	$39,068	$41,951	$46,528	1.43%	1.64%	1.54%	1.29%
Perry	$29,922	$37,616	$39,869	$41,780	$44,244	1.15%	1.17%	1.06%	0.81%
Philadelphia	$29,154	$42,422	$46,466	$50,508	$57,599	1.89%	1.84%	1.76%	1.54%
Pike	$28,563	$39,018	$41,845	$44,407	$48,154	1.57%	1.41%	1.30%	1.06%
Potter	$26,978	$36,771	$40,045	$43,180	$48,305	1.56%	1.72%	1.62%	1.37%
Schuylkill	$27,415	$37,165	$40,075	$42,823	$47,140	1.53%	1.52%	1.43%	1.20%
Snyder	$29,566	$36,143	$39,096	$41,817	$45,918	1.01%	1.58%	1.47%	1.20%
Somerset	$25,644	$35,081	$37,811	$40,349	$44,161	1.58%	1.51%	1.41%	1.16%
Sullivan	$26,755	$38,350	$41,589	$44,603	$49,185	1.82%	1.63%	1.52%	1.25%
Susquehanna	$28,137	$35,033	$37,744	$40,259	$44,196	1.10%	1.50%	1.40%	1.17%
Tioga	$24,599	$34,385	$37,544	$40,589	$45,721	1.69%	1.77%	1.67%	1.43%
Union	$26,739	$33,867	$36,210	$38,430	$42,001	1.19%	1.35%	1.27%	1.08%
Venango	$28,125	$36,114	$39,055	$41,736	$45,481	1.26%	1.58%	1.46%	1.16%
Warren	$27,961	$37,606	$41,114	$44,482	$50,145	1.49%	1.80%	1.69%	1.45%
Washington	$32,991	$48,167	$52,899	$57,620	$66,623	1.91%	1.89%	1.81%	1.64%
Wayne	$27,742	$34,631	$37,387	$39,935	$43,727	1.12%	1.54%	1.44%	1.17%
Westmoreland	$31,641	$44,530	$48,495	$52,273	$58,613	1.72%	1.72%	1.62%	1.38%
Wyoming	$26,366	$35,420	$38,397	$41,247	$46,052	1.49%	1.63%	1.53%	1.32%
York	$33,804	$42,741	$45,870	$48,813	$53,721	1.18%	1.42%	1.34%	1.15%
Pennsylvania	**$35,167**	**$47,575**	**$51,632**	**$55,579**	**$62,580**	**1.52%**	**1.65%**	**1.57%**	**1.38%**
U.S.	**$35,294**	**$45,666**	**$49,204**	**$52,609**	**$58,548**	**1.30%**	**1.50%**	**1.43%**	**1.25%**

Source: Woods & Poole, Inc.

Table A-5. Gross Regional Product in Millions by County

County	Historic	Base	Projected			CAGR			
	1999	2019	2024	2029	2039	1999 to 2019	2019 to 2024	2019 to 2029	2019 to 2039
Adams	$2,255.01	$3,242.82	$3,615.20	$3,998.07	$4,796.59	1.8%	2.2%	2.1%	2.0%
Allegheny	$67,931.88	$88,088.90	$95,387.92	$102,625.66	$116,627.23	1.3%	1.6%	1.5%	1.4%
Armstrong	$1,579.13	$2,392.79	$2,585.72	$2,778.11	$3,162.54	2.1%	1.6%	1.5%	1.4%
Beaver	$4,558.15	$5,212.51	$5,577.77	$5,925.95	$6,561.75	0.7%	1.4%	1.3%	1.2%
Bedford	$1,239.51	$1,476.70	$1,604.75	$1,730.24	$1,976.30	0.9%	1.7%	1.6%	1.5%
Berks	$13,770.94	$17,743.78	$19,181.76	$20,582.23	$23,291.35	1.3%	1.6%	1.5%	1.4%
Blair	$4,448.54	$5,198.85	$5,548.90	$5,883.46	$6,493.40	0.8%	1.3%	1.2%	1.1%
Bradford	$1,763.66	$2,771.61	$3,045.04	$3,327.28	$3,917.92	2.3%	1.9%	1.8%	1.7%
Bucks	$21,667.81	$30,735.68	$33,858.50	$37,015.17	$43,447.23	1.8%	2.0%	1.9%	1.7%
Butler	$5,390.73	$9,711.33	$11,009.02	$12,439.35	$15,804.42	3.0%	2.5%	2.5%	2.5%
Cambria	$4,216.64	$4,770.60	$5,120.32	$5,464.13	$6,114.55	0.6%	1.4%	1.4%	1.2%
Cameron	$188.22	$176.56	$184.98	$191.57	$201.05	-0.3%	0.9%	0.8%	0.7%
Carbon	$1,083.56	$1,767.89	$1,959.62	$2,168.61	$2,645.75	2.5%	2.1%	2.1%	2.0%
Centre	$5,211.99	$9,035.58	$10,339.69	$11,709.73	$14,615.21	2.8%	2.7%	2.6%	2.4%
Chester	$23,676.36	$41,280.90	$47,184.89	$53,614.61	$68,278.59	2.8%	2.7%	2.6%	2.5%
Clarion	$1,167.99	$1,495.36	$1,628.58	$1,762.00	$2,031.10	1.2%	1.7%	1.7%	1.5%
Clearfield	$2,235.67	$2,799.95	$3,043.81	$3,289.25	$3,770.95	1.1%	1.7%	1.6%	1.5%
Clinton	$940.58	$1,419.48	$1,542.80	$1,660.55	$1,882.13	2.1%	1.7%	1.6%	1.4%
Columbia	$1,884.02	$2,416.18	$2,647.36	$2,876.68	$3,334.07	1.3%	1.8%	1.8%	1.6%
Crawford	$2,463.58	$2,913.83	$3,134.00	$3,346.07	$3,749.85	0.8%	1.5%	1.4%	1.3%
Cumberland	$10,944.37	$14,193.53	$15,866.33	$17,622.29	$21,331.51	1.3%	2.3%	2.2%	2.1%
Dauphin	$14,772.51	$20,920.10	$23,287.88	$25,740.36	$30,844.84	1.8%	2.2%	2.1%	2.0%
Delaware	$21,119.27	$27,925.30	$30,726.25	$33,562.27	$39,264.44	1.4%	1.9%	1.9%	1.7%
Elk	$1,241.56	$1,279.69	$1,310.90	$1,329.40	$1,339.28	0.2%	0.5%	0.4%	0.2%

County	Historic	Base	Projected			CAGR			
	1999	2019	2024	2029	2039	1999 to 2019	2019 to 2024	2019 to 2029	2019 to 2039
Erie	$9,935.55	$11,623.75	$12,733.70	$13,842.29	$16,037.77	0.8%	1.8%	1.8%	1.6%
Fayette	$2,779.39	$3,855.32	$4,174.56	$4,489.50	$5,099.25	1.6%	1.6%	1.5%	1.4%
Forest	$105.56	$289.96	$331.65	$376.94	$477.91	5.2%	2.7%	2.7%	2.5%
Franklin	$3,643.38	$5,425.25	$6,036.95	$6,673.14	$8,007.22	2.0%	2.2%	2.1%	2.0%
Fulton	$469.26	$529.81	$574.86	$616.50	$693.41	0.6%	1.6%	1.5%	1.4%
Greene	$965.27	$2,325.81	$2,486.67	$2,644.81	$2,953.06	4.5%	1.3%	1.3%	1.2%
Huntingdon	$959.59	$1,201.60	$1,290.05	$1,373.35	$1,523.58	1.1%	1.4%	1.3%	1.2%
Indiana	$2,614.29	$4,649.29	$5,124.01	$5,614.96	$6,647.07	2.9%	2.0%	1.9%	1.8%
Jefferson	$1,198.81	$1,584.17	$1,726.00	$1,870.41	$2,173.41	1.4%	1.7%	1.7%	1.6%
Juniata	$469.61	$631.68	$692.69	$751.84	$867.34	1.5%	1.9%	1.8%	1.6%
Lackawanna	$7,107.09	$9,047.62	$9,854.87	$10,658.83	$12,222.21	1.2%	1.7%	1.7%	1.5%
Lancaster	$17,860.85	$24,285.08	$27,348.23	$30,540.65	$37,367.29	1.5%	2.4%	2.3%	2.2%
Lawrence	$2,405.25	$2,815.11	$3,039.44	$3,252.79	$3,651.49	0.8%	1.5%	1.5%	1.3%
Lebanon	$3,118.60	$4,583.09	$5,059.97	$5,552.22	$6,581.64	1.9%	2.0%	1.9%	1.8%
Lehigh	$15,090.81	$21,098.72	$23,735.55	$26,562.17	$32,735.17	1.7%	2.4%	2.3%	2.2%
Luzerne	$10,511.59	$12,350.21	$12,878.36	$13,340.56	$14,023.47	0.8%	0.8%	0.8%	0.6%
Lycoming	$3,788.28	$5,460.03	$5,994.50	$6,536.88	$7,647.59	1.8%	1.9%	1.8%	1.7%
McKean	$1,356.54	$1,768.27	$1,881.16	$1,989.34	$2,195.75	1.3%	1.2%	1.2%	1.1%
Mercer	$3,462.98	$4,214.41	$4,506.46	$4,786.17	$5,307.68	1.0%	1.3%	1.3%	1.2%
Mifflin	$1,218.52	$1,389.41	$1,438.73	$1,478.05	$1,528.25	0.7%	0.7%	0.6%	0.5%
Monroe	$3,377.82	$5,336.12	$5,922.56	$6,544.68	$7,920.15	2.3%	2.1%	2.1%	2.0%
Montgomery	$50,798.54	$73,768.29	$81,625.33	$89,590.75	$105,832.15	1.9%	2.0%	2.0%	1.8%
Montour	$1,058.90	$2,457.91	$2,844.84	$3,291.08	$4,398.12	4.3%	3.0%	3.0%	3.0%
Northampton	$7,110.04	$10,992.15	$12,134.68	$13,303.85	$15,694.23	2.2%	2.0%	1.9%	1.8%
Northumberland	$2,194.56	$2,485.15	$2,668.74	$2,847.25	$3,186.28	0.6%	1.4%	1.4%	1.3%
Perry	$583.08	$764.98	$840.84	$916.31	$1,067.28	1.4%	1.9%	1.8%	1.7%

Appendix A. Socioeconomic Trend Data

County	Historic	Base	Projected			CAGR			
	1999	2019	2024	2029	2039	1999 to 2019	2019 to 2024	2019 to 2029	2019 to 2039
Philadelphia	$65,552.82	$96,161.59	$104,247.54	$112,476.56	$128,952.35	1.9%	1.6%	1.6%	1.5%
Pike	$595.79	$1,062.08	$1,214.83	$1,378.83	$1,739.29	2.9%	2.7%	2.6%	2.5%
Potter	$540.00	$645.49	$706.12	$768.16	$897.06	0.9%	1.8%	1.8%	1.7%
Schuylkill	$3,607.05	$4,403.74	$4,661.27	$4,907.02	$5,365.80	1.0%	1.1%	1.1%	1.0%
Snyder	$1,138.82	$1,327.69	$1,454.94	$1,579.76	$1,824.26	0.8%	1.8%	1.8%	1.6%
Somerset	$1,920.80	$2,338.97	$2,494.86	$2,642.73	$2,914.98	1.0%	1.3%	1.2%	1.1%
Sullivan	$125.07	$198.84	$218.20	$238.01	$279.57	2.3%	1.9%	1.8%	1.7%
Susquehanna	$783.83	$1,427.91	$1,507.05	$1,589.92	$1,767.43	3.0%	1.1%	1.1%	1.1%
Tioga	$956.19	$1,382.33	$1,517.56	$1,655.45	$1,939.02	1.9%	1.9%	1.8%	1.7%
Union	$1,279.24	$1,710.40	$1,897.40	$2,092.87	$2,501.77	1.5%	2.1%	2.0%	1.9%
Venango	$1,555.98	$1,628.94	$1,659.45	$1,676.80	$1,678.49	0.2%	0.4%	0.3%	0.1%
Warren	$1,255.05	$1,593.68	$1,715.74	$1,834.40	$2,060.80	1.2%	1.5%	1.4%	1.3%
Washington	$5,836.51	$11,045.67	$12,319.23	$13,654.14	$16,575.60	3.2%	2.2%	2.1%	2.1%
Wayne	$971.45	$1,376.27	$1,488.61	$1,597.36	$1,805.65	1.8%	1.6%	1.5%	1.4%
Westmoreland	$10,256.51	$12,784.74	$13,809.67	$14,792.58	$16,623.94	1.1%	1.6%	1.5%	1.3%
Wyoming	$819.89	$1,035.52	$1,109.41	$1,181.43	$1,324.21	1.2%	1.4%	1.3%	1.2%
York	$13,409.20	$17,592.44	$19,530.59	$21,526.28	$25,727.44	1.4%	2.1%	2.0%	1.9%
Pennsylvania	**$480,540.01**	**$671,619.36**	**$737,889.85**	**$805,680.62**	**$945,298.44**	**1.7%**	**1.9%**	**1.8%**	**1.7%**
U.S.	**$11,838,349.17**	**$17,878,105.01**	**$19,924,725.89**	**$22,068,956.35**	**$26,654,149.78**	**2.1%**	**2.2%**	**2.1%**	**2.0%**

Source: Woods & Poole, Inc.

Appendix B. Airports Needing Estimations

Table B-1. Airports with Estimated Employment

Associated City	Airport Name	FAA ID	Airport Classification
Bellefonte	Bellefonte Airport	N96	Basic
Bensalem	Total RF Heliport	00A	Special Use
Bethel	Grimes Airport	8N1	Limited
Canadensis	Flying Dollar Airport	8N4	Limited
Corry	Corry-Lawrence Airport	8G2	Intermediate
Cresco	Rocky Hill Ultralight Airport	48P	Special Use
East Stroudsburg	Stroudsburg-Pocono Airport	N53	Limited
Horsham	Horsham Valley Airways Heliport	N48	Special Use
Mars	Lakehill Airport	P09	Limited
Mount Pleasant	Mount Pleasant/Scottdale Airport	P45	Limited
P99	W.P.H.S. Heliport	P99	Special Use
Philipsburg	Mid-State Airport	PSB	Basic
Philipsburg	Albert Airport	1N3	Limited
Pittsburgh	Pittsburgh Northeast Airport	9G1	Basic
Sterling	Spring Hill Airport	70N	Limited
Stewartstown	Shoestring Aviation Airfield	0P2	Special Use
Sunbury	Sunbury Seaplane Base	H11	Special Use
Unionville	Ridge Soaring Gliderport	79N	Special Use

Source: Kimley-Horn, 2022

Table B-2. Airports with Estimated Operating Expenses

Associated City	Airport Name	FAA ID	Airport Classification	Estimate
Bally	Butter Valley Golfport	7N8	Limited	Minimum
Bellefonte	Bellefonte Airport	N96	Basic	Average
Bensalem	Total RF Heliport	00A	Special Use	Average
Bethel	Grimes Airport	8N1	Limited	Average
Breezewood	Greater Breezewood Regional	P17	Special Use	Minimum
Canadensis	Flying Dollar Airport	8N4	Limited	Average
Clearfield	Clearfield-Lawrence Airport	FIG	Intermediate	Average
Corry	Corry-Lawrence Airport	8G2	Intermediate	Average
Cresco	Rocky Hill Ultralight Airport	48P	Special Use	Average
East Stroudsburg	Stroudsburg-Pocono Airport	N53	Limited	Average
Erwinna	Van Sant Airport	9N1	Limited	Minimum
Essington	Philadelphia Seaplane Base	9N2	Special Use	Minimum
Grove City	Grove City Airport	29D	Advanced	Average

Associated City	Airport Name	FAA ID	Airport Classification	Estimate
Horsham	Horsham Valley Airways Heliport	N48	Special Use	Average
Lehighton	Beltzville Airport	14N	Limited	Minimum
Mars	Lakehill Airport	P09	Limited	Average
Mount Pleasant	Mount Pleasant/Scottdale	P45	Limited	Average
Mount Pleasant	W.P.H.S. Heliport	P99	Special Use	Average
New Castle	New Castle Municipal Airport	UCP	Intermediate	Average
Philadelphia	Penn's Landing Heliport	P72	Special Use	Average
Philipsburg	Mid-State Airport	PSB	Basic	Average
Pittsburgh	Pittsburgh Northeast Airport	9G1	Basic	Average
Stewartstown	Shoestring Aviation Airfield	0P2	Special Use	Average
Sunbury	Sunbury Seaplane Base	H11	Special Use	Average
Unionville	Ridge Soaring Gliderport	79N	Special Use	Average
Wilkes-Barre	Wilkes-Barre Wyoming Valley	WBW	Basic	Minimum

Source: Kimley-Horn, 2022

Table B-3. Airports with Estimated Share of Transient Operations

Associated City	Airport Name	FAA ID	Airport Classification
Bellefonte	Bellefonte Airport	N96	Basic
Bensalem	Total RF Heliport	00A	Special Use
Bethel	Grimes Airport	8N1	Limited
Canadensis	Flying Dollar Airport	8N4	Limited
Clearfield	Clearfield-Lawrence Airport	FIG	Intermediate
Corry	Corry-Lawrence Airport	8G2	Intermediate
Cresco	Rocky Hill Ultralight Airport	48P	Special Use
Dubois	Dubois Regional Airport	DUJ	Commercial Service
East Stroudsburg	Stroudsburg-Pocono Airport	N53	Limited
Horsham	Horsham Valley Airways Heliport	N48	Special Use
Jersey Shore	Jersey Shore Airport	P96	Limited
Mars	Lakehill Airport	P09	Limited
Mount Pleasant	Mount Pleasant/Scottdale	P45	Limited
Mount Pleasant	W.P.H.S. Heliport	P99	Special Use
Philipsburg	Albert Airport	1N3	Limited
Philipsburg	Mid-State Airport	PSB	Basic
Pittsburgh	Pittsburgh Northeast Airport	9G1	Basic
Sterling	Spring Hill Airport	70N	Limited
Stewartstown	Shoestring Aviation Airfield	0P2	Special Use
Sunbury	Sunbury Airport	71N	Limited
Sunbury	Sunbury Seaplane Base	H11	Special Use

Associated City	Airport Name	FAA ID	Airport Classification
Toughkenamon	New Garden Flying Field	N57	Basic
Unionville	Ridge Soaring Gliderport	79N	Special Use
Williamsburg	Cove Valley Airport	6G6	Limited

Source: Kimley-Horn, 2022

Table B-4. Airports with Estimated Passengers Per Transient Operation

Associated City	Airport Name	FAA ID	Airport Classification
Bensalem	Total RF Heliport	00A	Special Use
Stewartstown	Shoestring Aviation Airfield	0P2	Special Use
Philipsburg	Albert Airport	1N3	Limited
Cresco	Rocky Hill Ultralight Airport	48P	Special Use
Williamsburg	Cove Valley Airport	6G6	Limited
Sterling	Spring Hill Airport	70N	Limited
Sunbury	Sunbury Airport	71N	Limited
Unionville	Ridge Soaring Gliderport	79N	Special Use
Corry	Corry-Lawrence Airport	8G2	Intermediate
Bethel	Grimes Airport	8N1	Limited
Canadensis	Flying Dollar Airport	8N4	Limited
Pittsburgh	Pittsburgh Northeast Airport	9G1	Basic
Sunbury	Sunbury Seaplane Base	H11	Special Use
Horsham	Horsham Valley Airways Heliport	N48	Special Use
East Stroudsburg	Stroudsburg-Pocono Airport	N53	Limited
Toughkenamon	New Garden Flying Field Airport	N57	Basic
Bellefonte	Bellefonte Airport	N96	Basic
Mars	Lakehill Airport	P09	Limited
Mount Pleasant	Mount Pleasant/Scottdale Airport	P45	Limited
Germansville	Flying M Aerodrome	P91	Limited
Mount Pleasant	W.P.H.S. Heliport	P99	Special Use
Philipsburg	Mid-State Airport	PSB	Basic
Connellsville	Joseph A. Hardy Connellsville Airport	VVS	Intermediate

Source: Kimley-Horn, 2022

2022 Pennsylvania Aviation Economic Impact Study

Appendix C. Detailed Airport Impact Tables

Table C-1. On-Airport Employment

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Employment	Multiplier Employment	Total Employment	Direct Employment	Multiplier Employment	Total Employment
Commercial Service Airports								
Allentown	Lehigh Valley International Airport	ABE	1,177	899	2,075	1,093	704	1,796
Altoona	Altoona-Blair County Airport	AOO	69	57	126	70	49	119
Bradford	Bradford Regional Airport	BFD	29	27	56	28	25	53
DuBois	DuBois Regional Airport	DUJ	51	74	124	50	69	120
Erie	Erie Intl./Tom Ridge Field	ERI	179	206	385	179	187	365
Harrisburg	Harrisburg International Airport	MDT	1,321	1,269	2,590	1,304	1,127	2,431
Johnstown	John Murtha Johnstown-Cambria County Airport	JST	360	132	491	301	157	458
Lancaster	Lancaster Airport	LNS	269	250	519	267	193	460
Latrobe	Arnold Palmer Regional Airport	LBE	346	264	610	366	193	559
Philadelphia	Philadelphia International Airport	PHL	24,600	31,978	56,578	18,939	17,102	36,041
Pittsburgh	Pittsburgh International Airport	PIT	5,758	6,983	12,741	4,789	4,640	9,429
State College	University Park Airport	UNV	305	310	615	307	256	564
Wilkes-Barre/Scranton	Wilkes-Barre/Scranton Int'l. Airport	AVP	368	324	692	306	288	594
Williamsport	Williamsport Regional Airport	IPT	94	89	183	90	74	164
General Aviation Airports								
Allentown	Allentown Queen City Municipal Airport	XLL	30	25	55	33	14	47
Bally	Butter Valley Golfport	7N8	1	1	2	1	1	2

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Employment	Multiplier Employment	Total Employment	Direct Employment	Multiplier Employment	Total Employment
Beaver Falls	Beaver County Airport	BVI	74	54	128	83	37	120
Bedford	Bedford County Airport	HMZ	27	25	52	28	17	45
Bellefonte	Bellefonte Airport	N96	7	9	16	7	4	11
Bensalem	Total RF Heliport	00A	0	0	0	-	0	0
Bethel	Grimes Airport	8N1	2	1	3	2	1	3
Bloomsburg	Bloomsburg Municipal Airport	N13	19	19	38	19	10	30
Breezewood	Greater Breezewood Regional	P17	0	0	0	0	0	0
Brogue	Baublitz Commercial Airport	9W8	1	1	2	1	1	2
Butler	Pittsburgh-Butler Regional Airport	BTP	88	65	153	2	1	2
Butler	Butler Farm Show Airport	3G9	2	1	2	98	53	151
Canadensis	Flying Dollar Airport	8N4	1	1	2	1	0	1
Carlisle	Carlisle Airport	N94	13	7	21	14	7	21
Centre Hall	Centre Airpark	N16	0	0	0	0	0	0
Centre Hall	Penn's Cave Airport	N74	0	0	0	0	0	0
Chambersburg	Franklin County Regional Airport	N68	8	5	14	9	6	15
Clarion	Clarion County Airport	AXQ	27	15	42	24	14	38
Clearfield	Clearfield-Lawrence Airport	FIG	4	3	7	4	2	6
Coatesville	Chester Co./ G.O. Carlson Airport	MQS	83	86	169	80	50	130
Connellsville	Joseph A. Hardy Connellsville Airport	VVS	85	66	151	84	77	162
Corry	Corry-Lawrence Airport	8G2	15	13	27	14	8	22
Cresco	Rocky Hill Ultralight Airport	48P	0	0	0	0	0	0
Danville	Danville Airport	8N8	6	6	12	4	2	6

Appendix C. Detailed Airport Impact Tables

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Employment	Multiplier Employment	Total Employment	Direct Employment	Multiplier Employment	Total Employment
Dover	Lazy B Ranch Airport	0P8	0	0	0	0	0	0
Doylestown	Doylestown Airport	DYL	30	28	58	30	17	47
East Stroudsburg	Stroudsburg-Pocono Airport	N53	6	3	9	6	2	8
Easton	Braden Airpark	N43	11	8	19	11	5	16
Ebensburg	Ebensburg Airport	9G8	1	1	3	2	1	3
Eighty Four	Bandel Airport	22D	1	0	1	1	0	1
Erie	Thermal-G Gliderport	03G	0	0	0	0	0	0
Erwinna	Vansant Airport	9N1	10	8	18	10	5	15
Essington	Philadelphia Seaplane Base	9N2	0	0	0	0	0	0
Factoryville	Seamans Airport	9N3	3	3	6	4	2	6
Fairfield	Mid Atlantic Soaring Center	W73	0	1	1	0	1	1
Finleyville	Finleyville Airpark	G05	4	3	7	4	2	6
Franklin	Venango Regional Airport	FKL	15	8	23	14	7	21
Fredericksburg	Farmers Pride Airport	9N7	1	2	3	1	1	2
Freeport	McVille Airport	6P7	9	4	13	9	2	12
Germansville	Flying M Aerodrome	P91	0	0	0	0	0	0
Gettysburg	Gettysburg Regional Airport	W05	5	4	9	4	4	8
Greenville	Greenville Municipal Airport	4G1	2	2	3	2	2	4
Grove City	Grove City Airport	29D	64	51	115	69	43	111
Harrisburg	Capital City Airport	CXY	120	130	250	116	126	242
Hazleton	Hazleton Regional Airport	HZL	33	33	66	43	46	89
Honesdale	Cherry Ridge Airport	N30	9	6	15	6	2	9
Horsham	Horsham Valley Airways Heliport	N48	0	0	0	0	0	0

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Employment	Multiplier Employment	Total Employment	Direct Employment	Multiplier Employment	Total Employment
Indiana	Indiana Co./Jimmy Stewart Field	IDI	8	4	12	6	2	8
Irwin	Inter County Airport	31D	0	0	0	0	0	0
Jeannette	Greensburg-Jeannette Regional Airport	5G8	0	0	0	0	0	0
Jersey Shore	Jersey Shore Airport	P96	0	0	0	0	0	0
Kralltown	Bermudian Valley Airpark	07N	0	0	0	0	0	0
Lebanon	Keller Brothers Airport	08N	0	0	0	0	0	0
Lehighton	Beltzville Airport	14N	0	0	0	0	0	0
Lehighton	Jake Arner Memorial Airport	22N	21	22	42	23	19	42
Lock Haven	William T. Piper Memorial Airport	LHV	39	35	73	39	25	63
Meadville	Port Meadville Airport	GKJ	20	16	36	20	13	34
Mifflintown	Mifflintown Airport	P34	0	0	0	0	0	0
Monongahela	Rostraver Airport	FWQ	63	76	138	62	58	121
Morgantown	Morgantown Airport	O03	2	2	4	2	1	3
Mount Joy/Marietta	Donegal Springs Airpark	N71	14	10	25	14	8	22
Mount Pleasant	Mount Pleasant/Scottdale Airport	P45	1	1	2	1	0	1
Mount Pleasant	W.P.H.S. Heliport	P99	51	56	107	51	44	95
Mount Pocono	Pocono Mountains Municipal Airport	MPO	41	30	71	35	14	50
Myerstown	Deck Airport	9D4	6	6	12	6	5	10
New Castle	New Castle Municipal Airport	UCP	12	12	24	12	7	19
Palmyra	Reigle Field Airport	58N	10	3	13	9	2	11
Perkasie	Pennridge Airport	CKZ	20	19	39	21	12	34
Philadelphia	Northeast Philadelphia Airport	PNE	1,347	2,208	3,556	187	73	259

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Employment	Multiplier Employment	Total Employment	Direct Employment	Multiplier Employment	Total Employment
Philadelphia	Wings Field Airport	LOM	183	125	309	14	35	49
Philadelphia	Penn's Landing Heliport	P72	14	44	58	1,198	2,105	3,303
Philipsburg	Mid-State Airport	PSB	3	4	7	1	1	2
Philipsburg	Albert Airport	1N3	1	1	2	3	2	5
Pittsburgh	Allegheny County Airport	AGC	342	339	681	316	237	553
Pittsburgh	Pittsburgh Northeast Airport	9G1	3	3	6	1	1	2
Pittsfield	Brokenstraw Airport	P15	1	1	2	316	237	553
Pottstown	Heritage Field	PTW	11	8	19	42	20	62
Pottstown	Pottstown Municipal Airport	N47	33	28	62	9	6	14
Pottsville	Schuylkill Co./Joe Zerbey Airport	ZER	65	56	122	66	78	145
Punxsutawney	Punxsutawney Municipal Airport	N35	3	2	6	4	2	5
Quakertown	Quakertown Airport	UKT	20	16	36	35	20	55
Reading	Reading Regional/Carl A. Spaatz Field	RDG	200	193	393	175	147	322
Reedsville	Mifflin County Airport	RVL	7	4	11	7	3	10
Selinsgrove	Penn Valley Airport	SEG	32	32	64	32	19	50
Shamokin	Northumberland County Airport	N79	0	2	2	1	2	3
Slatington	Slatington Airport	69N	2	2	4	2	1	3
Smoketown	Smoketown Airport	S37	13	12	26	16	12	28
Somerset	Somerset County Airport	2G9	7	4	11	6	3	9
St Marys	St. Marys Municipal Airport	OYM	5	5	10	6	3	10
Sterling	Spring Hill Airport	70N	1	1	2	1	0	1
Stewartstown	Shoestring Aviation Airfield	0P2	0	0	0	0	0	0

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Employment	Multiplier Employment	Total Employment	Direct Employment	Multiplier Employment	Total Employment
Sunbury	Sunbury Airport	71N	4	2	6	4	1	5
Sunbury	Sunbury Seaplane Base	H11	0	0	0	0	0	0
Titusville	Titusville Airport	6G1	3	2	5	3	2	5
Toughkenamon	New Garden Flying Field Airport	N57	36	30	66	28	14	42
Towanda	Bradford County Airport	N27	11	8	19	13	8	21
Tower City	Bendigo Airport	74N	0	0	0	0	0	0
Tunkhannock	Skyhaven Airport	76N	15	15	30	15	8	23
Unionville	Ridge Soaring Gliderport	79N	0	0	0	0	0	0
Washington	Washington County Airport	AFJ	135	139	274	129	93	222
Waynesburg	Greene County Airport	WAY	16	3	19	16	3	19
Wellsboro	Wellsboro Johnston Airport	N38	2	1	3	2	1	3
Wellsville	Kampel Airport	2N5	0	0	0	0	0	0
West Chester	Brandywine Airport	OQN	34	22	56	35	17	52
Wilkes-Barre	Wilkes-Barre Wyoming Valley Airport	WBW	3	3	6	1	1	2
Williamsburg	Cove Valley Airport	6G6	0	0	0	0	0	0
York	York Airport	THV	35	31	66	37	27	64
Zelienople	Zelienople Municipal Airport	PJC	66	80	146	70	62	133
		Total	38,706	47,278	85,983	31,712	28,857	60,570

Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

Appendix C. Detailed Airport Impact Tables

Table C-2. Aviation-Related Employment Near PIT and PHL

Airport Name	FAA ID	2019 Base Year			2020 Base Year		
		Direct Employment	Multiplier Employment	Total Employment	Direct Employment	Multiplier Employment	Total Employment
Pittsburgh International Airport	PIT	2,003	1,522	3,525	2,003	1,352	3,355
Philadelphia International Airport	PHL	2,370	2,062	4,432	2,370	1,537	3,907
Total		**4,373**	**3,584**	**7,957**	**4,373**	**2,889**	**7,262**

Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

Table C-3. Commercial Service Visitor-Related Employment

Airport Name	FAA ID	2019 Base Year			2020 Base Year		
		Direct Employment	Multiplier Employment	Total Employment	Direct Employment	Multiplier Employment	Total Employment
Lehigh Valley International Airport	ABE	1,867	793	2,659	718	269	987
Altoona-Blair County Airport	AOO	14	5	20	4	1	5
Wilkes-Barre/Scranton Int'l. Airport	AVP	1,100	426	1,526	6	2	8
Bradford Regional Airport	BFD	17	6	23	7	3	10
DuBois Regional Airport	DUJ	24	9	33	121	42	163
Erie Intl./Tom Ridge Field	ERI	395	149	544	1,380	506	1,886
Williamsport Regional Airport	IPT	73	29	102	8	3	11
John Murtha Johnston-Cambria County Airport	JST	21	8	29	7	2	9
Arnold Palmer Regional Airport	LBE	755	310	1,065	228	87	315
Lancaster Airport	LNS	21	9	30	24,199	8,638	32,837
Harrisburg International Airport	MDT	3,286	1,315	4,601	6,363	2,570	8,933
Philadelphia International Airport	PHL	62,129	29,295	91,424	267	82	349
Pittsburgh International Airport	PIT	18,454	8,566	27,020	336	116	451
University Park Airport	UNV	808	304	1,111	20	7	27
Total		**88,965**	**41,224**	**130,188**	**33,664**	**12,328**	**45,992**

Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

Table C-4. GA Visitor-Related Employment

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Employment	Multiplier Employment	Total Employment	Direct Employment	Multiplier Employment	Total Employment
Commercial Service Airports								
Allentown	Lehigh Valley International Airport	ABE	55	23	78	39	14	53
Altoona	Altoona-Blair County Airport	AOO	9	4	13	7	3	10
Bradford	Bradford Regional Airport	BFD	0	0	0	0	0	0
DuBois	DuBois Regional Airport	DUJ	2	1	3	2	1	2
Erie	Erie Intl./Tom Ridge Field	ERI	19	7	27	8	3	11
Harrisburg	Harrisburg International Airport	MDT	131	52	183	75	28	103
Johnstown	John Murtha Johnston-Cambria County Airport	JST	2	1	3	0	0	0
Lancaster	Lancaster Airport	LNS	70	28	97	48	17	65
Latrobe	Arnold Palmer Regional Airport	LBE	50	20	70	19	7	26
Philadelphia	Philadelphia International Airport	PHL	133	59	192	22	8	30
Pittsburgh	Pittsburgh International Airport	PIT	53	23	76	37	15	52
State College	University Park Airport	UNV	21	8	29	18	5	23
Wilkes-Barre/ Scranton	Wilkes-Barre/Scranton Int'l. Airport	AVP	14	5	19	11	4	14
Williamsport	Williamsport Regional Airport	IPT	8	3	11	3	1	4
General Aviation Airports								
Allentown	Allentown Queen City Municipal Airport	XLL	0	0	1	0	0	0
Bally	Butter Valley Golfport	7N8	0	0	0	0	0	0

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Employment	Multiplier Employment	Total Employment	Direct Employment	Multiplier Employment	Total Employment
Beaver Falls	Beaver County Airport	BVI	8	4	12	9	4	13
Bedford	Bedford County Airport	HMZ	2	1	3	1	0	1
Bellefonte	Bellefonte Airport	N96	1	0	2	1	0	1
Bensalem	Total RF Heliport	00A	0	0	0	0	0	0
Bethel	Grimes Airport	8N1	0	0	0	0	0	0
Bloomsburg	Bloomsburg Municipal Airport	N13	1	0	1	1	0	1
Breezewood	Greater Breezewood Regional	P17	0	0	0	0	0	0
Brogue	Baublitz Commercial Airport	9W8	0	0	0	0	0	0
Butler	Pittsburg-Butler Regional Airport	BTP	10	4	14	0	0	0
Butler	Butler Farm Show Airport	3G9	0	0	0	17	6	23
Canadensis	Flying Dollar Airport	8N4	0	0	0	0	0	0
Carlisle	Carlisle Airport	N94	7	3	10	3	1	4
Centre Hall	Centre Airpark	N16	0	0	0	0	0	0
Centre Hall	Penn's Cave Airport	N74	0	0	0	0	0	0
Chambersburg	Franklin County Regional Airport	N68	3	1	4	2	1	3
Clarion	Clarion County Airport	AXQ	1	0	2	1	0	1
Clearfield	Clearfield-Lawrence Airport	FIG	2	1	3	1	0	1
Coatesville	Chester County G.O. Carlson Airport	MQS	66	29	95	62	22	84
Connellsville	Joseph A. Hardy Connellsville Airport	VVS	14	6	20	8	3	10
Corry	Corry-Lawrence Airport	8G2	1	0	2	0	0	0

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Employment	Multiplier Employment	Total Employment	Direct Employment	Multiplier Employment	Total Employment
Cresco	Rocky Hill Ultralight Airport	48P	0	0	0	0	0	0
Danville	Danville Airport	8N8	0	0	0	0	0	0
Dover	Lazy B Ranch Airport	0P8	0	0	0	0	0	0
Doylestown	Doylestown Airport	DYL	8	4	12	8	3	11
East Stroudsburg	Stroudsburg-Pocono Airport	N53	0	0	0	0	0	0
Easton	Braden Airpark	N43	0	0	0	0	0	0
Ebensburg	Ebensburg Airport	9G8	0	0	0	0	0	0
Eighty Four	Bandel Airport	22D	0	0	0	0	0	0
Erie	Thermal-G Gliderport	03G	0	0	0	0	0	0
Erwinna	Van Sant Airport	9N1	0	0	0	0	0	0
Essington	Philadelphia Seaplane Base	9N2	0	0	0	0	0	0
Factoryville	Seamans Airport	9N3	1	0	1	0	0	1
Fairfield	Mid Atlantic Soaring Center	W73	0	0	0	0	0	0
Finleyville	Finleyville Airpark	G05	0	0	0	0	0	0
Franklin	Venango Regional Airport	FKL	9	3	12	3	1	4
Fredericksburg	Farmers Pride Airport	9N7	0	0	0	0	0	0
Freeport	McVille Airport	6P7	0	0	0	0	0	0
Germansville	Flying M Aerodrome	P91	0	0	1	0	0	0
Gettysburg	Gettysburg Regional Airport	W05	2	1	3	2	1	2
Greenville	Greenville Municipal Airport	4G1	2	1	2	1	0	2
Grove City	Grove City Airport	29D	3	1	4	2	1	3
Harrisburg	Capital City Airport	CXY	61	24	85	58	21	79

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Employment	Multiplier Employment	Total Employment	Direct Employment	Multiplier Employment	Total Employment
Hazleton	Hazleton Regional Airport	HZL	0	0	0	0	0	0
Honesdale	Cherry Ridge Airport	N30	2	1	3	2	1	2
Horsham	Horsham Valley Airways Heliport	N48	0	0	0	0	0	0
Indiana	Indiana Co./Jimmy Stewart Field	IDI	3	1	5	3	1	4
Irwin	Inter County Airport	31D	0	0	0	0	0	0
Jeannette	Greensburg-Jeannette Regional Airport	5G8	0	0	0	0	0	0
Jersey Shore	Jersey Shore Airport	P96	0	0	0	0	0	0
Kralltown	Bermudian Valley Airpark	07N	0	0	0	0	0	0
Lebanon	Keller Brothers Airport	08N	1	0	1	1	0	1
Lehighton	Beltzville Airport	14N	0	0	0	0	0	0
Lehighton	Jake Arner Memorial Airport	22N	0	0	1	0	0	0
Lock Haven	William T. Piper Memorial Airport	LHV	2	1	3	1	0	1
Meadville	Port Meadville Airport	GKJ	1	1	2	1	0	1
Mifflintown	Mifflintown Airport	P34	0	0	0	0	0	0
Monongahela	Rostraver Airport	FWQ	4	2	6	3	1	5
Morgantown	Morgantown Airport	O03	0	0	0	0	0	0
Mount Joy/Marietta	Donegal Springs Airpark	N71	0	0	0	0	0	0
Mount Pleasant	Mount Pleasant/Scottdale Airport	P45	0	0	0	0	0	0
Mount Pleasant	W.P.H.S. Heliport	P99	0	0	0	0	0	0
Mount Pocono	Pocono Mountains Municipal Airport	MPO	11	5	16	9	3	13

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Employment	Multiplier Employment	Total Employment	Direct Employment	Multiplier Employment	Total Employment
Myerstown	Deck Airport	9D4	2	1	3	2	1	3
New Castle	New Castle Municipal Airport	UCP	9	4	13	8	3	11
Palmyra	Reigle Field Airport	58N	0	0	0	0	0	0
Perkasie	Pennridge Airport	CKZ	5	2	7	2	1	3
Philadelphia	Northeast Philadelphia Airport	PNE	376	165	541	5	2	6
Philadelphia	Wings Field Airport	LOM	6	3	8	0	0	0
Philadelphia	Penn's Landing Heliport	P72	0	0	0	167	60	227
Philipsburg	Mid-State Airport	PSB	0	0	0	0	0	0
Philipsburg	Albert Airport	1N3	0	0	0	0	0	0
Pittsburgh	Allegheny County Airport	AGC	72	32	105	39	16	54
Pittsburgh	Pittsburgh Northeast Airport	9G1	0	0	0	0	0	0
Pittsfield	Brokenstraw Airport	P15	0	0	0	0	0	0
Pottstown	Heritage Field	PTW	0	0	1	1	0	2
Pottstown	Pottstown Municipal Airport	N47	1	1	2	0	0	0
Pottsville	Schuylkill Co./Joe Zerbey Airport	ZER	8	3	11	5	2	7
Punxsutawney	Punxsutawney Municipal Airport	N35	0	0	0	0	0	0
Quakertown	Quakertown Airport	UKT	1	1	2	1	0	2
Reading	Reading Regional/Carl A. Spaatz Field	RDG	34	14	48	9	4	13
Reedsville	Mifflin County Airport	RVL	3	1	4	2	1	3
Selinsgrove	Penn Valley Airport	SEG	2	1	3	2	1	3
Shamokin	Northumberland County Airport	N79	2	1	3	2	1	2

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Employment	Multiplier Employment	Total Employment	Direct Employment	Multiplier Employment	Total Employment
Slatington	Slatington Airport	69N	0	0	0	0	0	0
Smoketown	Smoketown Airport	S37	0	0	0	0	0	0
Somerset	Somerset County Airport	2G9	6	2	9	6	2	7
St Marys	St. Marys Municipal Airport	OYM	2	1	3	2	1	2
Sterling	Spring Hill Airport	70N	0	0	0	0	0	0
Stewartstown	Shoestring Aviation Airfield	0P2	0	0	0	0	0	0
Sunbury	Sunbury Airport	71N	0	0	0	0	0	0
Sunbury	Sunbury Seaplane Base	H11	0	0	0	0	0	0
Titusville	Titusville Airport	6G1	1	0	2	1	0	1
Toughkenamon	New Garden Flying Field Airport	N57	2	1	3	2	1	3
Towanda	Bradford County Airport	N27	15	6	21	12	4	16
Tower City	Bendigo Airport	74N	0	0	0	0	0	0
Tunkhannock	Skyhaven Airport	76N	2	1	2	2	1	3
Unionville	Ridge Soaring Gliderport	79N	2	1	2	1	0	2
Washington	Washington County Airport	AFJ	45	18	63	31	12	43
Waynesburg	Greene County Airport	WAY	0	0	0	0	0	0
Wellsboro	Wellsboro Johnston Airport	N38	1	0	1	0	0	0
Wellsville	Kampel Airport	2N5	0	0	0	0	0	0
West Chester	Brandywine Airport	OQN	15	6	21	10	3	13
Wilkes-Barre	Wilkes-Barre Wyoming Valley Airport	WBW	2	1	3	1	0	2

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Employment	Multiplier Employment	Total Employment	Direct Employment	Multiplier Employment	Total Employment
Williamsburg	Cove Valley Airport	6G6	0	0	0	0	0	0
York	York Airport	THV	8	3	11	2	1	3
Zelienople	Zelienople Municipal Airport	PJC	4	2	6	7	3	10
		Total	1,430	601	2,031	811	297	1,105

Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

Table C-5. Total Airport Employment

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Employment	Multiplier Employment	Total Employment	Direct Employment	Multiplier Employment	Total Employment
Commercial Service Airports								
Allentown	Lehigh Valley International Airport	ABE	3,098	1,715	4,813	1,849	988	2,837
Altoona	Altoona-Blair County Airport	AOO	93	66	159	82	53	134
Bradford	Bradford Regional Airport	BFD	46	33	79	35	27	61
DuBois	DuBois Regional Airport	DUJ	78	83	161	59	72	132
Erie	Erie Intl./Tom Ridge Field	ERI	593	363	956	308	231	539
Harrisburg	Harrisburg International Airport	MDT	4,739	2,636	7,375	2,759	1,661	4,420
Johnstown	John Murtha Johnston-Cambria County Airport	JST	383	140	523	309	160	468
Lancaster	Lancaster Airport	LNS	360	286	646	321	213	534
Latrobe	Arnold Palmer Regional Airport	LBE	1,151	594	1,745	613	286	899
Philadelphia	Philadelphia International Airport	PHL	86,862	61,332	148,193	43,161	25,748	68,909
Pittsburgh	Pittsburgh International Airport	PIT	24,264	15,573	39,837	11,189	7,226	18,415
State College	University Park Airport	UNV	1,133	621	1,755	592	344	936
Wilkes-Barre/ Scranton	Wilkes-Barre/Scranton Int'l. Airport	AVP	1,482	755	2,237	652	407	1,059
Williamsport	Williamsport Regional Airport	IPT	175	121	296	113	82	195
General Aviation Airports								
Allentown	Allentown Queen City Municipal Airport	XLL	31	25	56	33	14	47

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Employment	Multiplier Employment	Total Employment	Direct Employment	Multiplier Employment	Total Employment
Bally	Butter Valley Golfport	7N8	1	1	2	1	1	2
Beaver Falls	Beaver County Airport	BVI	82	58	140	93	40	133
Bedford	Bedford County Airport	HMZ	29	26	55	29	17	47
Bellefonte	Bellefonte Airport	N96	8	9	17	8	5	13
Bensalem	Total RF Heliport	00A	0	0	0	0	0	0
Bethel	Grimes Airport	8N1	2	1	4	2	1	3
Bloomsburg	Bloomsburg Municipal Airport	N13	19	19	39	20	11	31
Breezewood	Greater Breezewood Regional	P17	0	0	0	0	0	0
Brogue	Baublitz Commercial Airport	9W8	1	1	2	1	1	2
Butler	Pittsburg-Butler Regional Airport	BTP	98	69	167	2	1	2
Butler	Butler Farm Show Airport	3G9	2	1	2	115	59	174
Canadensis	Flying Dollar Airport	8N4	1	1	2	1	0	1
Carlisle	Carlisle Airport	N94	21	10	31	17	8	25
Centre Hall	Centre Airpark	N16	0	0	0	0	0	0
Centre Hall	Penn's Cave Airport	N74	0	0	0	0	0	0
Chambersburg	Franklin County Regional Airport	N68	11	7	18	12	7	19
Clarion	Clarion County Airport	AXQ	28	15	43	25	14	39
Clearfield	Clearfield-Lawrence Airport	FIG	6	3	9	5	2	7
Coatesville	Chester County G.O. Carlson Airport	MQS	149	115	265	142	72	214
Connellsville	Joseph A. Hardy Connellsville Airport	VVS	99	72	171	92	80	172
Corry	Corry-Lawrence Airport	8G2	16	13	29	15	8	22

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Employment	Multiplier Employment	Total Employment	Direct Employment	Multiplier Employment	Total Employment
Cresco	Rocky Hill Ultralight Airport	48P	0	0	0	0	0	0
Danville	Danville Airport	8N8	7	6	12	4	2	7
Dover	Lazy B Ranch Airport	0P8	0	0	0	0	0	0
Doylestown	Doylestown Airport	DYL	39	31	70	38	20	58
East Stroudsburg	Stroudsburg-Pocono Airport	N53	6	3	9	6	2	8
Easton	Braden Airpark	N43	11	8	19	11	5	16
Ebensburg	Ebensburg Airport	9G8	1	1	3	2	1	3
Eighty Four	Bandel Airport	22D	1	0	1	1	0	1
Erie	Thermal-G Gliderport	03G	0	0	0	0	0	0
Erwinna	Van Sant Airport	9N1	10	8	19	10	5	15
Essington	Philadelphia Seaplane Base	9N2	0	0	0	0	0	0
Factoryville	Seamans Airport	9N3	4	3	6	4	2	7
Fairfield	Mid Atlantic Soaring Center	W73	0	1	1	0	1	1
Finleyville	Finleyville Airpark	G05	5	3	8	4	2	7
Franklin	Venango Regional Airport	FKL	24	11	35	17	8	25
Fredericksburg	Farmers Pride Airport	9N7	1	2	3	1	1	3
Freeport	McVille Airport	6P7	9	4	13	9	2	12
Germansville	Flying M Aerodrome	P91	0	0	1	0	0	1
Gettysburg	Gettysburg Regional Airport	W05	7	5	12	6	4	10
Greenville	Greenville Municipal Airport	4G1	3	2	5	4	2	6
Grove City	Grove City Airport	29D	67	52	119	71	43	114
Harrisburg	Capital City Airport	CXY	181	155	336	174	147	321

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Employment	Multiplier Employment	Total Employment	Direct Employment	Multiplier Employment	Total Employment
Hazleton	Hazleton Regional Airport	HZL	33	33	66	43	46	89
Honesdale	Cherry Ridge Airport	N30	11	6	17	8	3	11
Horsham	Horsham Valley Airways Heliport	N48	0	0	0	0	0	0
Indiana	Indiana Co./Jimmy Stewart Field	IDI	11	5	16	9	3	13
Irwin	Inter County Airport	31D	0	0	0	0	0	0
Jeannette	Greensburg-Jeannette Regional Airport	5G8	0	0	0	0	0	0
Jersey Shore	Jersey Shore Airport	P96	0	0	0	0	0	0
Kralltown	Bermudian Valley Airpark	07N	0	0	1	0	0	1
Lebanon	Keller Brothers Airport	08N	1	0	1	1	0	1
Lehighton	Beltzville Airport	14N	0	0	0	0	0	0
Lehighton	Jake Arner Memorial Airport	22N	21	22	43	23	19	42
Lock Haven	William T. Piper Memorial Airport	LHV	41	35	77	40	25	65
Meadville	Port Meadville Airport	GKJ	21	17	38	21	14	34
Mifflintown	Mifflintown Airport	P34	0	0	0	0	0	0
Monongahela	Rostraver Airport	FWQ	67	77	144	66	60	125
Morgantown	Morgantown Airport	O03	2	2	4	2	1	3
Mount Joy/Marietta	Donegal Springs Airpark	N71	15	11	25	14	8	23
Mount Pleasant	Mount Pleasant/Scottdale Airport	P45	1	1	2	1	0	1
Mount Pleasant	W.P.H.S. Heliport	P99	51	56	107	51	44	95
Mount Pocono	Pocono Mountains Municipal Airport	MPO	52	35	86	45	18	62

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Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Employment	Multiplier Employment	Total Employment	Direct Employment	Multiplier Employment	Total Employment
Myerstown	Deck Airport	9D4	8	7	15	8	5	13
New Castle	New Castle Municipal Airport	UCP	21	16	37	20	10	29
Palmyra	Reigle Field Airport	58N	10	3	13	9	2	11
Perkasie	Pennridge Airport	CKZ	25	21	46	24	13	37
Philadelphia	Northeast Philadelphia Airport	PNE	1,723	2,374	4,097	191	74	266
Philadelphia	Wings Field Airport	LOM	189	128	317	14	35	49
Philadelphia	Penn's Landing Heliport	P72	14	44	58	1,365	2,165	3,530
Philipsburg	Mid-State Airport	PSB	3	4	7	1	1	2
Philipsburg	Albert Airport	1N3	1	1	2	3	2	5
Pittsburgh	Allegheny County Airport	AGC	414	371	785	355	253	608
Pittsburgh	Pittsburgh Northeast Airport	9G1	3	3	6	3	2	5
Pittsfield	Brokenstraw Airport	P15	1	1	2	1	1	2
Pottstown	Heritage Field	PTW	11	8	19	44	20	64
Pottstown	Pottstown Municipal Airport	N47	35	29	63	9	6	15
Pottsville	Schuylkill Co./Joe Zerbey Airport	ZER	73	59	133	71	80	152
Punxsutawney	Punxsutawney Municipal Airport	N35	4	2	6	4	2	6
Quakertown	Quakertown Airport	UKT	22	16	38	36	21	57
Reading	Reading Regional/Carl A. Spaatz Field	RDG	234	207	441	185	150	335
Reedsville	Mifflin County Airport	RVL	10	5	16	9	4	13
Selinsgrove	Penn Valley Airport	SEG	34	33	67	33	19	53
Shamokin	Northumberland County Airport	N79	3	3	5	3	3	5

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Employment	Multiplier Employment	Total Employment	Direct Employment	Multiplier Employment	Total Employment
Slatington	Slatington Airport	69N	2	2	4	2	1	3
Smoketown	Smoketown Airport	S37	14	13	26	17	12	29
Somerset	Somerset County Airport	2G9	13	7	19	11	5	17
St Marys	St. Marys Municipal Airport	OYM	8	6	14	8	4	12
Sterling	Spring Hill Airport	70N	1	1	2	1	0	1
Stewartstown	Shoestring Aviation Airfield	0P2	0	0	0	0	0	0
Sunbury	Sunbury Airport	71N	4	2	6	4	1	5
Sunbury	Sunbury Seaplane Base	H11	0	0	0	0	0	0
Titusville	Titusville Airport	6G1	4	2	6	4	2	6
Toughkenamon	New Garden Flying Field Airport	N57	39	31	70	30	15	44
Towanda	Bradford County Airport	N27	27	14	40	25	12	37
Tower City	Bendigo Airport	74N	0	0	0	0	0	0
Tunkhannock	Skyhaven Airport	76N	16	16	32	17	9	26
Unionville	Ridge Soaring Gliderport	79N	2	1	2	1	0	2
Washington	Washington County Airport	AFJ	181	157	338	160	105	265
Waynesburg	Greene County Airport	WAY	16	3	19	16	3	19
Wellsboro	Wellsboro Johnston Airport	N38	2	1	3	2	1	4
Wellsville	Kampel Airport	2N5	0	0	0	0	0	0
West Chester	Brandywine Airport	OQN	48	29	77	44	21	65
Wilkes-Barre	Wilkes-Barre Wyoming Valley Airport	WBW	6	3	9	2	1	4
Williamsburg	Cove Valley Airport	6G6	0	0	0	0	0	0

Appendix C. Detailed Airport Impact Tables

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Employment	Multiplier Employment	Total Employment	Direct Employment	Multiplier Employment	Total Employment
York	York Airport	THV	43	34	77	39	27	67
Zelienople	Zelienople Municipal Airport	PJC	70	82	152	77	65	142
		Total	129,100	89,102	218,203	66,190	41,482	107,673

Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

Note: Totals do not include impacts related to off-airport businesses near PHL and PIT. Aviation-related employment near PIT and PHL can be found in Table C-2.

Table C-6. On-Airport Payroll

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Payroll	Multiplier Payroll	Total Payroll	Direct Payroll	Multiplier Payroll	Total Payroll
Commercial Service Airports								
Allentown	Lehigh Valley International Airport	ABE	$60,452,800	$53,417,900	$113,870,700	$62,726,200	$44,514,500	$107,240,700
Altoona	Altoona-Blair County Airport	AOO	$3,997,900	$3,352,100	$7,350,000	$5,821,400	$3,014,100	$8,835,400
Bradford	Bradford Regional Airport	BFD	$2,043,700	$1,621,300	$3,665,000	$2,149,300	$1,601,700	$3,750,900
DuBois	DuBois Regional Airport	DUJ	$4,499,000	$4,592,300	$9,091,300	$4,585,300	$4,620,300	$9,205,600
Erie	Erie Intl./Tom Ridge Field	ERI	$13,178,900	$12,583,100	$25,762,100	$15,086,800	$12,092,800	$27,179,600
Harrisburg	Harrisburg International Airport	MDT	$91,617,300	$74,952,800	$166,570,000	$106,992,400	$70,452,300	$177,444,700
Johnstown	John Murtha Johnston-Cambria County Airport	JST	$15,772,800	$7,525,600	$23,298,400	$23,855,800	$9,577,900	$33,433,700
Lancaster	Lancaster Airport	LNS	$15,280,900	$15,019,700	$30,300,600	$19,470,300	$12,220,700	$31,691,000
Latrobe	Arnold Palmer Regional Airport	LBE	$17,685,300	$15,814,100	$33,499,300	$18,360,100	$12,301,000	$30,661,100
Philadelphia	Philadelphia International Airport	PHL	$2,073,592,900	$1,891,565,200	$3,965,158,100	$1,683,390,900	$1,065,086,900	$2,748,477,800
Pittsburgh	Pittsburgh International Airport	PIT	$478,642,300	$416,935,600	$895,577,900	$416,672,300	$295,147,100	$711,819,400
State College	University Park Airport	UNV	$27,643,100	$18,352,900	$45,996,000	$27,957,700	$16,083,400	$44,041,100
Wilkes-Barre/Scranton	Wilkes-Barre/Scranton Int'l. Airport	AVP	$18,187,100	$20,012,600	$38,199,700	$22,378,800	$18,800,700	$41,179,500
Williamsport	Williamsport Regional Airport	IPT	$6,254,600	$5,455,800	$11,710,400	$5,430,900	$4,856,600	$10,287,500
General Aviation Airports								
Allentown	Allentown Queen City Municipal Airport	XLL	$1,299,300	$1,489,200	$2,788,500	$1,331,100	$882,300	$2,213,400
Bally	Butter Valley Golfport	7N8	$71,700	$69,400	$141,100	$76,400	$52,700	$129,100
Beaver Falls	Beaver County Airport	BVI	$3,560,000	$3,262,900	$6,822,900	$3,723,800	$2,315,000	$6,038,700

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Payroll	Multiplier Payroll	Total Payroll	Direct Payroll	Multiplier Payroll	Total Payroll
Bedford	Bedford County Airport	HMZ	$1,563,400	$1,513,500	$3,076,900	$1,779,600	$1,070,000	$2,849,600
Bellefonte	Bellefonte Airport	N96	$678,200	$508,100	$1,186,300	$558,700	$256,200	$814,900
Bensalem	Total RF Heliport	00A	$0	$3,100	$3,100	$0	$1,900	$1,900
Bethel	Grimes Airport	8N1	$90,900	$85,100	$176,000	$35,000	$36,500	$71,500
Bloomsburg	Bloomsburg Municipal Airport	N13	$1,249,500	$1,159,900	$2,409,400	$957,400	$664,300	$1,621,600
Breezewood	Greater Breezewood Regional	P17	$12,700	$13,300	$26,000	$9,500	$10,600	$20,100
Brogue	Baublitz Commercial Airport	9W8	$61,200	$79,600	$140,800	$87,700	$75,800	$163,500
Butler	Pittsburgh-Butler Regional Airport	BTP	$4,358,600	$3,875,000	$8,233,600	$37,300	$34,300	$71,700
Butler	Butler Farm Show Airport	3G9	$34,400	$32,500	$66,800	$5,617,300	$3,313,900	$8,931,200
Canadensis	Flying Dollar Airport	8N4	$58,800	$56,800	$115,600	$0	$10,000	$10,000
Carlisle	Carlisle Airport	N94	$510,900	$442,200	$953,100	$778,100	$417,700	$1,195,700
Centre Hall	Centre Airpark	N16	$4,600	$9,700	$14,300	$6,700	$9,600	$16,300
Centre Hall	Penn's Cave Airport	N74	$0	$6,100	$6,100	$11,500	$14,400	$25,900
Chambersburg	Franklin County Regional Airport	N68	$408,600	$316,900	$725,500	$533,100	$394,100	$927,100
Clarion	Clarion County Airport	AXQ	$1,214,600	$878,600	$2,093,200	$1,354,400	$860,600	$2,215,100
Clearfield	Clearfield-Lawrence Airport	FIG	$81,900	$163,600	$245,500	$98,000	$101,100	$199,100
Coatesville	Chester County G.O. Carlson Airport	MQS	$5,687,900	$5,137,400	$10,825,300	$5,671,600	$3,128,500	$8,800,100
Connellsville	Joseph A. Hardy Connellsville Airport	VVS	$1,802,100	$4,571,200	$6,373,300	$1,836,100	$5,672,900	$7,508,900
Corry	Corry-Lawrence Airport	8G2	$977,000	$744,600	$1,721,600	$692,400	$474,000	$1,166,400
Cresco	Rocky Hill Ultralight Airport	48P	$0	$3,100	$3,100	$0	$1,900	$1,900
Danville	Danville Airport	8N8	$217,600	$366,800	$584,400	$151,800	$139,200	$291,000
Dover	Lazy B Ranch Airport	0P8	$0	$6,100	$6,100	$0	$5,600	$5,600

Appendix C. Detailed Airport Impact Tables

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Payroll	Multiplier Payroll	Total Payroll	Direct Payroll	Multiplier Payroll	Total Payroll
Doylestown	Doylestown Airport	DYL	$625,400	$1,702,500	$2,327,900	$688,600	$1,085,600	$1,774,200
East Stroudsburg	Stroudsburg-Pocono Airport	N53	$232,700	$185,500	$418,200	$207,700	$138,800	$346,500
Easton	Braden Airpark	N43	$508,300	$465,400	$973,700	$586,700	$320,400	$907,100
Ebensburg	Ebensburg Airport	9G8	$67,800	$84,000	$151,800	$36,400	$62,300	$98,600
Eighty Four	Bandel Airport	22D	$20,400	$18,000	$38,400	$20,400	$11,400	$31,800
Erie	Thermal-G Gliderport	03G	$900	$3,800	$4,600	$800	$2,700	$3,500
Erwinna	Van Sant Airport	9N1	$441,400	$514,400	$955,900	$452,000	$312,800	$764,800
Essington	Philadelphia Seaplane Base	9N2	$0	$3,100	$3,100	$0	$1,900	$1,900
Factoryville	Seamans Airport	9N3	$155,700	$155,800	$311,500	$187,700	$142,400	$330,100
Fairfield	Mid Atlantic Soaring Center	W73	$1,500	$54,300	$55,700	$1,600	$51,800	$53,400
Finleyville	Finleyville Airpark	G05	$151,600	$181,500	$333,100	$151,400	$141,900	$293,300
Franklin	Venango Regional Airport	FKL	$626,800	$472,000	$1,098,800	$621,100	$420,300	$1,041,400
Fredericksburg	Farmers Pride Airport	9N7	$64,900	$90,900	$155,800	$88,800	$83,700	$172,500
Freeport	McVille Airport	6P7	$229,700	$226,100	$455,800	$266,600	$148,900	$415,500
Germansville	Flying M Aerodrome	P91	$700	$16,900	$17,600	$1,000	$16,400	$17,400
Gettysburg	Gettysburg Regional Airport	W05	$327,800	$250,800	$578,500	$308,300	$235,900	$544,200
Greenville	Greenville Municipal Airport	4G1	$110,100	$99,900	$210,000	$149,800	$108,300	$258,100
Grove City	Grove City Airport	29D	$3,268,400	$3,016,300	$6,284,800	$3,959,000	$2,668,300	$6,627,300
Harrisburg	Capital City Airport	CXY	$7,617,300	$8,075,500	$15,692,800	$8,078,000	$8,339,100	$16,417,100
Hazleton	Hazleton Regional Airport	HZL	$1,665,000	$1,939,500	$3,604,500	$5,035,500	$2,885,900	$7,921,400
Honesdale	Cherry Ridge Airport	N30	$315,200	$349,200	$664,300	$226,600	$157,300	$383,900
Horsham	Horsham Valley Airways Heliport	N48	$0	$3,100	$3,100	$0	$1,900	$1,900
Indiana	Indiana Co./Jimmy Stewart Field	IDI	$272,600	$233,500	$506,100	$189,400	$136,700	$326,100

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Payroll	Multiplier Payroll	Total Payroll	Direct Payroll	Multiplier Payroll	Total Payroll
Irwin	Inter County Airport	31D	$0	$6,100	$6,100	$100	$4,300	$4,400
Jeannette	Greensburg-Jeannette Regional Airport	5G8	$0	$7,100	$7,100	$1,900	$19,500	$21,300
Jersey Shore	Jersey Shore Airport	P96	$0	$6,100	$6,100	$0	$3,900	$3,900
Kralltown	Bermudian Valley Airpark	07N	$0	$20,500	$20,500	$0	$19,500	$19,500
Lebanon	Keller Brothers Airport	08N	$0	$6,100	$6,100	$0	$4,300	$4,300
Lehighton	Beltzville Airport	14N	$0	$6,200	$6,200	$400	$4,200	$4,700
Lehighton	Jake Arner Memorial Airport	22N	$1,369,300	$1,274,400	$2,643,700	$1,724,400	$1,179,800	$2,904,200
Lock Haven	William T. Piper Memorial Airport	LHV	$2,246,300	$2,136,700	$4,383,000	$2,060,300	$1,604,400	$3,664,800
Meadville	Port Meadville Airport	GKJ	$1,165,800	$974,400	$2,140,200	$1,224,300	$847,600	$2,071,900
Mifflintown	Mifflintown Airport	P34	$1,500	$14,200	$15,700	$500	$10,900	$11,400
Monongahela	Rostraver Airport	FWQ	$4,890,900	$4,547,500	$9,438,400	$5,161,700	$3,684,200	$8,845,900
Morgantown	Morgantown Airport	O03	$117,600	$122,700	$240,300	$150,700	$78,100	$228,800
Mount Joy/Marietta	Donegal Springs Airpark	N71	$741,700	$637,400	$1,379,100	$778,500	$524,700	$1,303,200
Mount Pleasant	Mount Pleasant/Scottdale Airport	P45	$57,400	$56,100	$113,600	$0	$8,200	$8,200
Mount Pleasant	W.P.H.S. Heliport	P99	$3,468,500	$3,391,600	$6,860,100	$3,615,700	$2,804,100	$6,419,700
Mount Pocono	Pocono Mountains Municipal Airport	MPO	$1,673,600	$1,823,400	$3,497,000	$1,261,200	$925,100	$2,186,400
Myerstown	Deck Airport	9D4	$364,600	$350,600	$715,200	$453,900	$295,500	$749,400
New Castle	New Castle Municipal Airport	UCP	$345,300	$722,600	$1,067,900	$273,700	$430,100	$703,800
Palmyra	Reigle Field Airport	58N	$147,900	$173,500	$321,400	$135,500	$97,700	$233,100
Perkasie	Pennridge Airport	CKZ	$1,241,300	$1,104,100	$2,345,500	$1,186,300	$778,000	$1,964,300
Philadelphia	Northeast Philadelphia Airport	PNE	$118,865,100	$159,368,500	$278,233,700	$5,493,600	$4,644,900	$10,138,500
Philadelphia	Wings Field Airport	LOM	$5,320,500	$7,653,400	$12,973,900	$5,150,200	$2,426,000	$7,576,100

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Payroll	Multiplier Payroll	Total Payroll	Direct Payroll	Multiplier Payroll	Total Payroll
Philadelphia	Penn's Landing Heliport	P72	$5,072,800	$2,761,400	$7,834,200	$132,593,000	$160,880,400	$293,473,400
Philipsburg	Mid-State Airport	PSB	$290,700	$217,800	$508,400	$78,800	$35,700	$114,500
Philipsburg	Albert Airport	1N3	$96,900	$72,600	$169,500	$236,300	$107,100	$343,400
Pittsburgh	Allegheny County Airport	AGC	$25,383,900	$20,361,500	$45,745,400	$23,563,100	$15,150,200	$38,713,300
Pittsburgh	Pittsburgh Northeast Airport	9G1	$204,400	$182,400	$386,700	$220,600	$100,900	$321,400
Pittsfield	Brokenstraw Airport	P15	$78,800	$72,400	$151,200	$77,200	$42,600	$119,700
Pottstown	Heritage Field	PTW	$560,200	$453,600	$1,013,700	$2,379,800	$1,212,800	$3,592,600
Pottstown	Pottstown Municipal Airport	N47	$1,746,200	$1,692,300	$3,438,600	$546,900	$351,200	$898,100
Pottsville	Schuylkill Co./Joe Zerbey Airport	ZER	$5,312,300	$3,324,000	$8,636,300	$6,040,300	$5,017,700	$11,057,900
Punxsutawney	Punxsutawney Municipal Airport	N35	$150,300	$131,100	$281,400	$161,100	$113,000	$274,100
Quakertown	Quakertown Airport	UKT	$983,300	$957,000	$1,940,300	$1,989,200	$1,277,800	$3,266,900
Reading	Reading Regional/ Carl A. Spaatz Field	RDG	$12,636,300	$11,578,200	$24,214,400	$13,538,000	$9,377,200	$22,915,100
Reedsville	Mifflin County Airport	RVL	$288,900	$248,200	$537,100	$261,700	$207,500	$469,200
Selinsgrove	Penn Valley Airport	SEG	$2,805,400	$1,886,300	$4,691,700	$1,872,700	$1,172,200	$3,044,800
Shamokin	Northumberland County Airport	N79	$24,200	$115,800	$139,900	$47,800	$133,800	$181,600
Slatington	Slatington Airport	69N	$117,900	$123,700	$241,600	$151,200	$79,300	$230,500
Smoketown	Smoketown Airport	S37	$736,400	$762,000	$1,498,300	$1,309,200	$754,600	$2,063,800
Somerset	Somerset County Airport	2G9	$283,700	$260,700	$544,400	$237,300	$217,000	$454,300
St Marys	St. Marys Municipal Airport	OYM	$395,300	$323,900	$719,200	$350,100	$213,700	$563,800
Sterling	Spring Hill Airport	70N	$79,500	$65,300	$144,800	$0	$8,800	$8,800
Stewartstown	Shoestring Aviation Airfield	0P2	$0	$3,100	$3,100	$0	$1,900	$1,900
Sunbury	Sunbury Airport	71N	$140,800	$93,900	$234,700	$73,700	$36,600	$110,300

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Payroll	Multiplier Payroll	Total Payroll	Direct Payroll	Multiplier Payroll	Total Payroll
Sunbury	Sunbury Seaplane Base	H11	$0	$3,100	$3,100	$0	$1,900	$1,900
Titusville	Titusville Airport	6G1	$124,400	$113,400	$237,800	$176,500	$140,500	$316,900
Toughkena-mon	New Garden Flying Field Airport	N57	$2,118,600	$1,795,900	$3,914,500	$1,451,600	$877,000	$2,328,600
Towanda	Bradford County Airport	N27	$463,800	$465,500	$929,300	$572,000	$518,900	$1,090,900
Tower City	Bendigo Airport	74N	$12,200	$14,800	$27,000	$2,600	$7,900	$10,500
Tunkhannock	Skyhaven Airport	76N	$1,076,200	$901,400	$1,977,600	$937,800	$505,900	$1,443,700
Unionville	Ridge Soaring Gliderport	79N	$0	$3,100	$3,100	$0	$1,900	$1,900
Washington	Washington County Airport	AFJ	$8,292,400	$8,313,100	$16,605,500	$8,833,100	$5,849,200	$14,682,200
Waynesburg	Greene County Airport	WAY	$180,900	$204,400	$385,300	$180,900	$194,600	$375,500
Wellsboro	Wellsboro Johnston Airport	N38	$58,700	$68,000	$126,700	$84,000	$76,700	$160,700
Wellsville	Kampel Airport	2N5	$0	$6,100	$6,100	$0	$4,700	$4,700
West Chester	Brandywine Airport	OQN	$1,184,200	$1,368,400	$2,552,500	$1,580,500	$1,090,000	$2,670,500
Wilkes-Barre	Wilkes-Barre Wyoming Valley Airport	WBW	$187,000	$154,500	$341,500	$64,000	$61,000	$125,100
Williamsburg	Cove Valley Airport	6G6	$0	$6,100	$6,100	$0	$4,300	$4,300
York	York Airport	THV	$2,214,200	$1,884,300	$4,098,500	$2,538,900	$1,718,000	$4,257,000
Zelienople	Zelienople Municipal Airport	PJC	$4,814,200	$4,761,600	$9,575,900	$6,045,800	$3,894,700	$9,940,500
		Total	$3,089,628,600	$2,834,291,900	$5,923,920,400	$2,698,351,300	$1,839,621,900	$4,537,973,200

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

Table C-7. Aviation-Related Payroll Near PIT and PHL

Airport Name	FAA ID	2019 Base Year			2020 Base Year		
		Direct Payroll	Multiplier Payroll	Total Payroll	Direct Payroll	Multiplier Payroll	Total Payroll
Pittsburgh International Airport	PIT	$109,303,900	$89,223,500	$198,527,400	$133,104,300	$84,419,200	$217,523,500
Philadelphia International Airport	PHL	$129,585,400	$125,660,800	$255,246,200	$139,660,400	$101,063,600	$240,724,000
	Total	$238,889,200	$214,884,400	$453,773,600	$272,764,700	$185,482,800	$458,247,500

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

Table C-8. Commercial Service Visitor-Related Payroll

Airport Name	FAA ID	2019 Base Year			2020 Base Year		
		Direct Payroll	Multiplier Payroll	Total Payroll	Direct Payroll	Multiplier Payroll	Total Payroll
Lehigh Valley International Airport	ABE	$58,679,300	$48,414,200	$107,093,500	$21,213,100	$17,233,900	$38,447,100
Altoona-Blair County Airport	AOO	$356,600	$329,100	$685,600	$102,000	$87,200	$189,200
Wilkes-Barre/Scranton Int'l Airport	AVP	$30,564,600	$26,007,600	$56,572,200	$9,080,400	$7,396,300	$16,476,700
Bradford Regional Airport	BFD	$423,000	$385,800	$808,700	$146,900	$124,500	$271,400
DuBois Regional Airport	DUJ	$602,300	$547,100	$1,149,300	$197,400	$162,100	$359,600
Erie Intl./Tom Ridge Field	ERI	$10,199,400	$9,118,600	$19,318,000	$3,105,600	$2,675,800	$5,781,500
Williamsport Regional Airport	IPT	$2,017,800	$1,745,700	$3,763,500	$546,100	$456,700	$1,002,800
John Murtha Johnston-Cambria County Airport	JST	$528,500	$487,700	$1,016,200	$202,200	$172,800	$375,100
Arnold Palmer Regional Airport	LBE	$21,872,600	$18,934,200	$40,806,800	$6,886,800	$5,541,100	$12,427,900
Lancaster Airport	LNS	$604,000	$522,700	$1,126,700	$188,900	$155,200	$344,100
Harrisburg International Airport	MDT	$92,834,700	$80,335,800	$173,170,600	$39,363,700	$32,346,000	$71,709,700
Philadelphia International Airport	PHL	$2,542,820,000	$1,788,909,300	$4,331,729,300	$752,584,200	$552,109,600	$1,304,693,800
Pittsburgh International Airport	PIT	$729,294,800	$525,249,400	$1,254,544,200	$246,028,600	$164,292,100	$410,320,700
University Park Airport	UNV	$20,352,600	$18,562,300	$38,914,900	$6,228,900	$5,279,100	$11,508,000
Total		$3,511,150,100	$2,519,549,500	$6,030,699,600	$1,085,875,000	$788,032,500	$1,873,907,600

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

Table C-9. GA Visitor-Related Payroll

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Payroll	Multiplier Payroll	Total Payroll	Direct Payroll	Multiplier Payroll	Total Payroll
Commercial Service Airports								
Allentown	Lehigh Valley International Airport	ABE	$1,705,000	$1,409,000	$3,114,000	$1,137,700	$924,300	$2,062,100
Altoona	Altoona-Blair County Airport	AOO	$233,800	$214,600	$448,400	$188,200	$160,800	$349,000
Bradford	Bradford Regional Airport	BFD	$7,000	$6,300	$13,300	$5,800	$4,900	$10,800
DuBois	DuBois Regional Airport	DUJ	$60,100	$54,200	$114,300	$40,600	$33,400	$74,000
Erie	Erie Intl./Tom Ridge Field	ERI	$496,800	$444,400	$941,200	$200,600	$172,800	$373,400
Harrisburg	Harrisburg International Airport	MDT	$3,661,500	$3,157,300	$6,818,900	$2,151,100	$1,767,600	$3,918,600
Johnstown	John Murtha Johnston-Cambria County Airport	JST	$49,700	$45,700	$95,400	$2,600	$2,200	$4,800
Lancaster	Lancaster Airport	LNS	$1,944,700	$1,676,900	$3,621,500	$1,356,100	$1,114,400	$2,470,500
Latrobe	Arnold Palmer Regional Airport	LBE	$1,425,600	$1,222,600	$2,648,300	$562,200	$452,400	$1,014,600
Philadelphia	Philadelphia International Airport	PHL	$5,002,200	$3,561,300	$8,563,500	$695,800	$510,500	$1,206,300
Pittsburgh	Pittsburgh International Airport	PIT	$1,985,500	$1,425,300	$3,410,800	$1,444,600	$964,700	$2,409,300
State College	University Park Airport	UNV	$519,100	$472,500	$991,600	$412,300	$349,400	$761,800
Wilkes-Barre/ Scranton	Wilkes-Barre/Scranton Int'l. Airport	AVP	$367,400	$314,000	$681,400	$284,500	$231,700	$516,200
Williamsport	Williamsport Regional Airport	IPT	$209,100	$182,200	$391,300	$73,200	$61,200	$134,300
General Aviation Airports								
Allentown	Allentown Queen City Municipal Airport	XLL	$14,800	$12,300	$27,100	$6,000	$4,900	$10,800
Bally	Butter Valley Golfport	7N8	$3,900	$2,800	$6,800	$2,000	$1,500	$3,500
Beaver Falls	Beaver County Airport	BVI	$304,100	$218,300	$522,500	$353,300	$235,900	$589,200
Bedford	Bedford County Airport	HMZ	$53,000	$48,600	$101,600	$23,500	$20,100	$43,500

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Payroll	Multiplier Payroll	Total Payroll	Direct Payroll	Multiplier Payroll	Total Payroll
Bellefonte	Bellefonte Airport	N96	$32,900	$30,000	$62,900	$25,200	$21,400	$46,600
Bensalem	Total RF Heliport	00A	$1,000	$700	$1,800	$800	$600	$1,400
Bethel	Grimes Airport	8N1	$2,800	$2,300	$5,100	$2,200	$1,800	$4,000
Bloomsburg	Bloomsburg Municipal Airport	N13	$19,300	$16,800	$36,100	$22,800	$19,100	$41,800
Breezewood	Greater Breezewood Regional	P17	$600	$500	$1,100	$2,100	$1,800	$3,900
Brogue	Baublitz Commercial Airport	9W8	$1,900	$1,600	$3,500	$1,500	$1,200	$2,800
Butler	Pittsburgh-Butler Regional Airport	BTP	$250,200	$225,600	$475,700	$900	$800	$1,700
Butler	Butler Farm Show Airport	3G9	$1,500	$1,300	$2,800	$446,900	$367,000	$813,900
Canadensis	Flying Dollar Airport	8N4	$1,300	$1,000	$2,300	$1,000	$800	$1,800
Carlisle	Carlisle Airport	N94	$209,100	$180,300	$389,400	$76,800	$63,100	$139,900
Centre Hall	Centre Airpark	N16	$100	$100	$200	$100	$100	$100
Centre Hall	Penn's Cave Airport	N74	$1,600	$1,500	$3,100	$1,000	$800	$1,800
Chambersburg	Franklin County Regional Airport	N68	$83,800	$72,300	$156,100	$68,000	$55,900	$123,900
Clarion	Clarion County Airport	AXQ	$29,800	$26,900	$56,600	$23,900	$19,600	$43,500
Clearfield	Clearfield-Lawrence Airport	FIG	$50,800	$46,200	$97,000	$20,400	$17,300	$37,700
Coatesville	Chester County G.O. Carlson Airport	MQS	$2,489,400	$1,772,300	$4,261,800	$1,915,000	$1,404,900	$3,319,900
Connellsville	Joseph A. Hardy Connellsville Airport	VVS	$403,700	$346,200	$749,900	$227,700	$183,200	$410,800
Corry	Corry-Lawrence Airport	8G2	$28,900	$25,900	$54,800	$800	$700	$1,400
Cresco	Rocky Hill Ultralight Airport	48P	$400	$400	$800	$400	$300	$600
Danville	Danville Airport	8N8	$8,600	$7,500	$16,100	$5,700	$4,800	$10,500
Dover	Lazy B Ranch Airport	0P8	$500	$400	$900	$400	$300	$700
Doylestown	Doylestown Airport	DYL	$313,300	$223,100	$536,400	$244,200	$179,100	$423,300

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Payroll	Multiplier Payroll	Total Payroll	Direct Payroll	Multiplier Payroll	Total Payroll
East Stroudsburg	Stroudsburg-Pocono Airport	N53	$5,000	$4,100	$9,100	$4,000	$3,200	$7,200
Easton	Braden Airpark	N43	$10,400	$8,600	$19,000	$6,100	$5,000	$11,100
Ebensburg	Ebensburg Airport	9G8	$1,200	$1,100	$2,300	$500	$400	$900
Eighty Four	Bandel Airport	22D	$0	$0	$0	$0	$0	$0
Erie	Thermal-G Gliderport	03G	$500	$400	$900	$300	$200	$500
Erwinna	Van Sant Airport	9N1	$7,500	$5,300	$12,800	$5,800	$4,300	$10,100
Essington	Philadelphia Seaplane Base	9N2	$100	$100	$200	$0	$0	$0
Factoryville	Seamans Airport	9N3	$16,000	$13,700	$29,700	$10,700	$8,700	$19,400
Fairfield	Mid Atlantic Soaring Center	W73	$1,000	$900	$1,900	$100	$100	$200
Finleyville	Finleyville Airpark	G05	$8,800	$7,500	$16,300	$7,100	$5,700	$12,800
Franklin	Venango Regional Airport	FKL	$229,700	$205,400	$435,100	$76,400	$65,800	$142,200
Fredericksburg	Farmers Pride Airport	9N7	$3,500	$3,000	$6,500	$2,800	$2,300	$5,200
Freeport	McVille Airport	6P7	$2,500	$2,300	$4,800	$2,100	$1,700	$3,800
Germansville	Flying M Aerodrome	P91	$12,200	$10,100	$22,400	$9,800	$8,000	$17,800
Gettysburg	Gettysburg Regional Airport	W05	$55,300	$47,700	$102,900	$44,900	$36,900	$81,700
Greenville	Greenville Municipal Airport	4G1	$40,600	$36,300	$76,900	$31,100	$26,800	$57,800
Grove City	Grove City Airport	29D	$71,700	$64,200	$135,900	$57,300	$49,300	$106,600
Harrisburg	Capital City Airport	CXY	$1,711,300	$1,475,600	$3,186,900	$1,651,900	$1,357,400	$3,009,300
Hazleton	Hazleton Regional Airport	HZL	$5,000	$4,300	$9,300	$8,100	$6,600	$14,700
Honesdale	Cherry Ridge Airport	N30	$52,800	$45,100	$97,900	$42,800	$34,900	$77,700
Horsham	Horsham Valley Airways Heliport	N48	$0	$0	$0	$0	$0	$0
Indiana	Indiana Co./Jimmy Stewart Field	IDI	$83,600	$75,400	$159,100	$83,000	$68,200	$151,200
Irwin	Inter County Airport	31D	$0	$0	$0	$0	$0	$0

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Payroll	Multiplier Payroll	Total Payroll	Direct Payroll	Multiplier Payroll	Total Payroll
Jeannette	Greensburg-Jeannette Regional Airport	5G8	$500	$400	$900	$400	$400	$800
Jersey Shore	Jersey Shore Airport	P96	$200	$200	$400	$200	$100	$300
Kralltown	Bermudian Valley Airpark	07N	$7,000	$6,000	$13,000	$5,700	$4,700	$10,300
Lebanon	Keller Brothers Airport	08N	$23,000	$19,800	$42,800	$18,700	$15,300	$34,000
Lehighton	Beltzville Airport	14N	$100	$100	$100	$200	$200	$300
Lehighton	Jake Arner Memorial Airport	22N	$11,700	$9,600	$21,300	$9,300	$7,500	$16,800
Lock Haven	William T. Piper Memorial Airport	LHV	$54,500	$49,600	$104,200	$24,100	$20,400	$44,600
Meadville	Port Meadville Airport	GKJ	$37,400	$33,400	$70,800	$16,600	$14,300	$30,900
Mifflintown	Mifflintown Airport	P34	$2,900	$2,600	$5,500	$1,500	$1,300	$2,800
Monongahela	Rostraver Airport	FWQ	$124,400	$106,700	$231,100	$100,200	$80,600	$180,900
Morgantown	Morgantown Airport	O03	$0	$0	$0	$0	$0	$0
Mount Joy/Marietta	Donegal Springs Airpark	N71	$9,400	$8,100	$17,500	$7,600	$6,300	$13,900
Mount Pleasant	Mount Pleasant/ Scottdale Airport	P45	$200	$200	$400	$200	$200	$400
Mount Pleasant	W.P.H.S. Heliport	P99	$5,100	$4,400	$9,500	$4,100	$3,300	$7,400
Mount Pocono	Pocono Mountains Municipal Airport	MPO	$338,900	$280,000	$618,900	$271,100	$220,300	$491,400
Myerstown	Deck Airport	9D4	$60,500	$52,100	$112,600	$55,700	$45,800	$101,500
New Castle	New Castle Municipal Airport	UCP	$327,800	$235,300	$563,100	$301,300	$201,200	$502,500
Palmyra	Reigle Field Airport	58N	$100	$100	$100	$100	$0	$100
Perkasie	Pennridge Airport	CKZ	$188,000	$133,800	$321,800	$73,200	$53,700	$127,000
Philadelphia	Northeast Philadelphia Airport	PNE	$14,113,900	$10,048,200	$24,162,100	$144,000	$105,600	$249,600
Philadelphia	Wings Field Airport	LOM	$216,400	$154,100	$370,500	$3,800	$2,800	$6,500
Philadelphia	Penn's Landing Heliport	P72	$9,600	$6,800	$16,500	$5,195,000	$3,811,200	$9,006,200
Philipsburg	Mid-State Airport	PSB	$8,200	$7,500	$15,700	$0	$0	$100

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Payroll	Multiplier Payroll	Total Payroll	Direct Payroll	Multiplier Payroll	Total Payroll
Philipsburg	Albert Airport	1N3	$100	$100	$100	$6,300	$5,300	$11,700
Pittsburgh	Allegheny County Airport	AGC	$2,734,600	$1,963,100	$4,697,700	$1,496,200	$999,200	$2,495,400
Pittsburgh	Pittsburgh Northeast Airport	9G1	$9,700	$7,000	$16,700	$8,100	$5,400	$13,500
Pittsfield	Brokenstraw Airport	P15	$100	$100	$100	$0	$0	$100
Pottstown	Heritage Field	PTW	$14,500	$10,300	$24,900	$35,700	$26,200	$61,900
Pottstown	Pottstown Municipal Airport	N47	$43,600	$31,100	$74,700	$1,400	$1,000	$2,500
Pottsville	Schuylkill Co./Joe Zerbey Airport	ZER	$249,100	$205,800	$454,900	$150,900	$122,600	$273,400
Punxsutawney	Punxsutawney Municipal Airport	N35	$7,800	$7,100	$14,900	$6,500	$5,300	$11,900
Quakertown	Quakertown Airport	UKT	$53,800	$38,300	$92,100	$41,900	$30,800	$72,700
Reading	Reading Regional/Carl A. Spaatz Field	RDG	$1,052,300	$869,600	$1,921,900	$278,300	$226,100	$504,500
Reedsville	Mifflin County Airport	RVL	$80,800	$73,500	$154,300	$52,200	$44,300	$96,500
Selinsgrove	Penn Valley Airport	SEG	$64,300	$56,000	$120,400	$50,600	$42,300	$93,000
Shamokin	Northumberland County Airport	N79	$57,900	$50,400	$108,300	$45,600	$38,100	$83,700
Slatington	Slatington Airport	69N	$2,600	$2,100	$4,700	$2,100	$1,700	$3,700
Smoketown	Smoketown Airport	S37	$9,900	$8,600	$18,500	$8,100	$6,600	$14,700
Somerset	Somerset County Airport	2G9	$155,400	$142,700	$298,100	$142,200	$121,500	$263,600
St Marys	St. Marys Municipal Airport	OYM	$60,000	$54,600	$114,600	$40,500	$34,300	$74,800
Sterling	Spring Hill Airport	70N	$4,700	$4,000	$8,700	$3,800	$3,100	$6,900
Stewartstown	Shoestring Aviation Airfield	0P2	$2,500	$2,100	$4,600	$2,000	$1,600	$3,700
Sunbury	Sunbury Airport	71N	$2,300	$2,000	$4,300	$1,800	$1,500	$3,300
Sunbury	Sunbury Seaplane Base	H11	$0	$0	$0	$0	$0	$0
Titusville	Titusville Airport	6G1	$28,800	$25,800	$54,700	$22,100	$19,000	$41,100

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Payroll	Multiplier Payroll	Total Payroll	Direct Payroll	Multiplier Payroll	Total Payroll
Toughkena-mon	New Garden Flying Field Airport	N57	$85,900	$61,100	$147,000	$64,400	$47,300	$111,700
Towanda	Bradford County Airport	N27	$418,200	$364,300	$782,500	$329,100	$275,200	$604,300
Tower City	Bendigo Airport	74N	$900	$800	$1,700	$700	$600	$1,300
Tunkhannock	Skyhaven Airport	76N	$44,000	$37,600	$81,500	$57,100	$46,500	$103,500
Unionville	Ridge Soaring Gliderport	79N	$41,200	$37,500	$78,700	$32,800	$27,800	$60,600
Washington	Washington County Airport	AFJ	$1,300,000	$1,114,900	$2,414,900	$942,800	$758,600	$1,701,400
Waynesburg	Greene County Airport	WAY	$3,900	$3,400	$7,300	$3,200	$2,600	$5,700
Wellsboro	Wellsboro Johnston Airport	N38	$14,100	$12,300	$26,400	$8,100	$6,700	$14,800
Wellsville	Kampel Airport	2N5	$0	$0	$0	$0	$0	$0
West Chester	Brandywine Airport	OQN	$550,500	$391,900	$942,400	$300,300	$220,300	$520,600
Wilkes-Barre	Wilkes-Barre Wyoming Valley Airport	WBW	$61,800	$52,800	$114,700	$33,100	$27,000	$60,100
Williamsburg	Cove Valley Airport	6G6	$100	$100	$200	$0	$0	$100
York	York Airport	THV	$219,100	$188,900	$408,000	$62,200	$51,100	$113,400
Zelienople	Zelienople Municipal Airport	PJC	$165,400	$118,700	$284,100	$264,500	$176,600	$441,200
		Total	$47,373,400	$36,560,200	$83,933,600	$24,800,300	$19,014,200	$43,814,500

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

Table C-10. Total Airport Payroll

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Payroll	Multiplier Payroll	Total Payroll	Direct Payroll	Multiplier Payroll	Total Payroll
Commercial Service Airports								
Allentown	Lehigh Valley International Airport	ABE	$120,837,200	$103,241,100	$224,078,200	$85,077,100	$62,672,800	$147,749,900
Altoona	Altoona-Blair County Airport	AOO	$4,588,300	$3,895,800	$8,484,000	$6,111,500	$3,262,100	$9,373,600
Bradford	Bradford Regional Airport	BFD	$2,473,600	$2,013,400	$4,487,000	$2,302,000	$1,731,100	$4,033,100
DuBois	DuBois Regional Airport	DUJ	$5,161,400	$5,193,600	$10,354,900	$4,823,300	$4,815,900	$9,639,200
Erie	Erie Intl./Tom Ridge Field	ERI	$23,875,100	$22,146,100	$46,021,300	$18,393,000	$14,941,400	$33,334,400
Harrisburg	Harrisburg International Airport	MDT	$188,113,600	$158,446,000	$346,559,500	$148,507,200	$104,565,900	$253,073,100
Johnstown	John Murtha Johnston-Cambria County Airport	JST	$16,351,000	$8,059,000	$24,410,100	$24,060,600	$9,752,900	$33,813,600
Lancaster	Lancaster Airport	LNS	$17,829,600	$17,219,200	$35,048,800	$21,015,300	$13,490,300	$34,505,600
Latrobe	Arnold Palmer Regional Airport	LBE	$40,983,400	$35,970,900	$76,954,400	$25,809,100	$18,294,500	$44,103,600
Philadelphia	Philadelphia International Airport	PHL	$4,621,415,100	$3,684,035,800	$8,305,450,900	$2,436,671,000	$1,617,706,900	$4,054,377,900
Pittsburgh	Pittsburgh International Airport	PIT	$1,209,922,600	$943,610,300	$2,153,533,000	$664,145,600	$460,403,900	$1,124,549,400
State College	University Park Airport	UNV	$48,514,800	$37,387,700	$85,902,500	$34,598,900	$21,711,900	$56,310,800
Wilkes-Barre/ Scranton	Wilkes-Barre/Scranton Int'l. Airport	AVP	$49,119,000	$46,334,200	$95,453,300	$31,743,600	$26,428,800	$58,172,400
Williamsport	Williamsport Regional Airport	IPT	$8,481,500	$7,383,700	$15,865,200	$6,050,200	$5,374,400	$11,424,600
General Aviation Airports								
Allentown	Allentown Queen City Municipal Airport	XLL	$1,314,100	$1,501,500	$2,815,600	$1,337,100	$887,100	$2,224,200
Bally	Butter Valley Golfport	7N8	$75,700	$72,200	$147,900	$78,400	$54,200	$132,600

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Payroll	Multiplier Payroll	Total Payroll	Direct Payroll	Multiplier Payroll	Total Payroll
Beaver Falls	Beaver County Airport	BVI	$3,864,100	$3,481,200	$7,345,400	$4,077,100	$2,550,900	$6,628,000
Bedford	Bedford County Airport	HMZ	$1,616,400	$1,562,200	$3,178,600	$1,803,100	$1,090,100	$2,893,200
Bellefonte	Bellefonte Airport	N96	$711,100	$538,100	$1,249,200	$583,900	$277,500	$861,500
Bensalem	Total RF Heliport	00A	$1,000	$3,800	$4,900	$800	$2,500	$3,400
Bethel	Grimes Airport	8N1	$93,700	$87,400	$181,100	$37,300	$38,300	$75,600
Bloomsburg	Bloomsburg Municipal Airport	N13	$1,268,800	$1,176,700	$2,445,500	$980,200	$683,300	$1,663,500
Breezewood	Greater Breezewood Regional	P17	$13,300	$13,900	$27,100	$11,600	$12,400	$24,000
Brogue	Baublitz Commercial Airport	9W8	$63,000	$81,200	$144,300	$89,200	$77,000	$166,200
Butler	Pittsburgh-Butler Regional Airport	BTP	$4,608,700	$4,100,600	$8,709,300	$38,300	$35,100	$73,300
Butler	Butler Farm Show Airport	3G9	$35,800	$33,800	$69,600	$6,064,200	$3,680,900	$9,745,100
Canadensis	Flying Dollar Airport	8N4	$60,100	$57,900	$117,900	$1,000	$10,800	$11,800
Carlisle	Carlisle Airport	N94	$720,000	$622,500	$1,342,500	$854,900	$480,800	$1,335,600
Centre Hall	Centre Airpark	N16	$4,700	$9,800	$14,500	$6,800	$9,600	$16,400
Centre Hall	Penn's Cave Airport	N74	$1,600	$7,600	$9,300	$12,500	$15,200	$27,700
Chambers-burg	Franklin County Regional Airport	N68	$492,400	$389,100	$881,600	$601,100	$450,000	$1,051,100
Clarion	Clarion County Airport	AXQ	$1,244,400	$905,500	$2,149,900	$1,378,300	$880,200	$2,258,600
Clearfield	Clearfield-Lawrence Airport	FIG	$132,700	$209,800	$342,500	$118,400	$118,400	$236,800
Coatesville	Chester County G.O. Carlson Airport	MQS	$8,177,300	$6,909,700	$15,087,000	$7,586,600	$4,533,400	$12,120,000
Connellsville	Joseph A. Hardy Connellsville Airport	VVS	$2,205,800	$4,917,400	$7,123,200	$2,063,800	$5,856,000	$7,919,800
Corry	Corry-Lawrence Airport	8G2	$1,006,000	$770,500	$1,776,500	$693,100	$474,700	$1,167,800
Cresco	Rocky Hill Ultralight Airport	48P	$400	$3,400	$3,900	$400	$2,200	$2,600

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Payroll	Multiplier Payroll	Total Payroll	Direct Payroll	Multiplier Payroll	Total Payroll
Danville	Danville Airport	8N8	$226,200	$374,300	$600,500	$157,600	$144,000	$301,500
Dover	Lazy B Ranch Airport	0P8	$500	$6,600	$7,100	$400	$6,000	$6,400
Doylestown	Doylestown Airport	DYL	$938,700	$1,925,600	$2,864,300	$932,800	$1,264,700	$2,197,500
East Stroudsburg	Stroudsburg-Pocono Airport	N53	$237,700	$189,600	$427,200	$211,700	$142,000	$353,700
Easton	Braden Airpark	N43	$518,700	$474,000	$992,700	$592,800	$325,400	$918,200
Ebensburg	Ebensburg Airport	9G8	$69,000	$85,100	$154,100	$36,900	$62,700	$99,500
Eighty Four	Bandel Airport	22D	$20,400	$18,000	$38,400	$20,400	$11,400	$31,800
Erie	Thermal-G Gliderport	03G	$1,300	$4,200	$5,500	$1,100	$2,900	$4,000
Erwinna	Van Sant Airport	9N1	$448,900	$519,800	$968,700	$457,800	$317,100	$774,900
Essington	Philadelphia Seaplane Base	9N2	$100	$3,100	$3,200	$0	$1,900	$1,900
Factoryville	Seamans Airport	9N3	$171,700	$169,500	$341,200	$198,400	$151,100	$349,600
Fairfield	Mid Atlantic Soaring Center	W73	$2,500	$55,100	$57,600	$1,700	$51,900	$53,600
Finleyville	Finleyville Airpark	G05	$160,400	$189,100	$349,400	$158,500	$147,600	$306,100
Franklin	Venango Regional Airport	FKL	$856,500	$677,400	$1,533,800	$697,500	$486,100	$1,183,500
Fredericks-burg	Farmers Pride Airport	9N7	$68,400	$93,900	$162,300	$91,700	$86,000	$177,700
Freeport	McVille Airport	6P7	$232,200	$228,400	$460,600	$268,700	$150,600	$419,300
Germansville	Flying M Aerodrome	P91	$13,000	$27,000	$40,000	$10,800	$24,300	$35,100
Gettysburg	Gettysburg Regional Airport	W05	$383,000	$298,400	$681,500	$353,200	$272,800	$625,900
Greenville	Greenville Municipal Airport	4G1	$150,600	$136,200	$286,900	$180,900	$135,000	$315,900
Grove City	Grove City Airport	29D	$3,340,100	$3,080,500	$6,420,700	$4,016,300	$2,717,600	$6,733,900
Harrisburg	Capital City Airport	CXY	$9,328,600	$9,551,100	$18,879,700	$9,729,900	$9,696,500	$19,426,400
Hazleton	Hazleton Regional Airport	HZL	$1,670,000	$1,943,800	$3,613,800	$5,043,600	$2,892,500	$7,936,100
Honesdale	Cherry Ridge Airport	N30	$368,000	$394,200	$762,200	$269,400	$192,200	$461,500

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Payroll	Multiplier Payroll	Total Payroll	Direct Payroll	Multiplier Payroll	Total Payroll
Horsham	Horsham Valley Airways Heliport	N48	$0	$3,100	$3,100	$0	$1,900	$1,900
Indiana	Indiana Co./Jimmy Stewart Field	IDI	$356,200	$309,000	$665,200	$272,400	$204,900	$477,200
Irwin	Inter County Airport	31D	$0	$6,200	$6,200	$100	$4,300	$4,400
Jeannette	Greensburg-Jeannette Regional Airport	5G8	$500	$7,500	$8,000	$2,300	$19,800	$22,100
Jersey Shore	Jersey Shore Airport	P96	$200	$6,300	$6,500	$200	$4,000	$4,200
Kralltown	Bermudian Valley Airpark	07N	$7,000	$26,500	$33,500	$5,700	$24,100	$29,800
Lebanon	Keller Brothers Airport	08N	$23,000	$26,000	$49,000	$18,700	$19,600	$38,300
Lehighton	Beltzville Airport	14N	$100	$6,200	$6,300	$600	$4,400	$5,000
Lehighton	Jake Arner Memorial Airport	22N	$1,380,900	$1,284,000	$2,665,000	$1,733,700	$1,187,300	$2,921,000
Lock Haven	William T. Piper Memorial Airport	LHV	$2,300,800	$2,186,300	$4,487,200	$2,084,500	$1,624,900	$3,709,300
Meadville	Port Meadville Airport	GKJ	$1,203,100	$1,007,800	$2,210,900	$1,240,900	$861,900	$2,102,800
Mifflintown	Mifflintown Airport	P34	$4,400	$16,900	$21,200	$2,000	$12,200	$14,200
Monongahela	Rostraver Airport	FWQ	$5,015,300	$4,654,200	$9,669,500	$5,262,000	$3,764,800	$9,026,800
Morgantown	Morgantown Airport	O03	$117,600	$122,700	$240,300	$150,700	$78,100	$228,800
Mount Joy/Marietta	Donegal Springs Airpark	N71	$751,000	$645,500	$1,396,500	$786,100	$530,900	$1,317,000
Mount Pleasant	Mount Pleasant/Scottdale Airport	P45	$57,700	$56,300	$114,000	$200	$8,400	$8,600
Mount Pleasant	W.P.H.S. Heliport	P99	$3,473,600	$3,396,000	$6,869,500	$3,619,800	$2,807,400	$6,427,100
Mount Pocono	Pocono Mountains Municipal Airport	MPO	$2,012,400	$2,103,500	$4,115,900	$1,532,400	$1,145,400	$2,677,800
Myerstown	Deck Airport	9D4	$425,100	$402,700	$827,800	$509,600	$341,300	$850,800
New Castle	New Castle Municipal Airport	UCP	$673,100	$957,900	$1,631,000	$575,000	$631,400	$1,206,400

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Payroll	Multiplier Payroll	Total Payroll	Direct Payroll	Multiplier Payroll	Total Payroll
Palmyra	Reigle Field Airport	58N	$148,000	$173,500	$321,500	$135,500	$97,700	$233,200
Perkasie	Pennridge Airport	CKZ	$1,429,300	$1,238,000	$2,667,300	$1,259,600	$831,700	$2,091,300
Philadelphia	Northeast Philadelphia Airport	PNE	$132,979,000	$169,416,800	$302,395,800	$5,637,600	$4,750,500	$10,388,100
Philadelphia	Wings Field Airport	LOM	$5,536,900	$7,807,400	$13,344,400	$5,153,900	$2,428,700	$7,582,700
Philadelphia	Penn's Landing Heliport	P72	$5,082,400	$2,768,300	$7,850,700	$137,788,000	$164,691,600	$302,479,600
Philipsburg	Mid-State Airport	PSB	$298,900	$225,200	$524,100	$78,800	$35,700	$114,500
Philipsburg	Albert Airport	1N3	$96,900	$72,600	$169,600	$242,600	$112,500	$355,000
Pittsburgh	Allegheny County Airport	AGC	$28,118,500	$22,324,600	$50,443,100	$25,059,300	$16,149,400	$41,208,700
Pittsburgh	Pittsburgh Northeast Airport	9G1	$214,100	$189,300	$403,400	$228,600	$106,300	$334,900
Pittsfield	Brokenstraw Airport	P15	$78,900	$72,400	$151,300	$77,200	$42,600	$119,800
Pottstown	Heritage Field	PTW	$574,700	$463,900	$1,038,600	$2,415,500	$1,239,000	$3,654,500
Pottstown	Pottstown Municipal Airport	N47	$1,789,900	$1,723,400	$3,513,300	$548,300	$352,200	$900,500
Pottsville	Schuylkill Co./Joe Zerbey Airport	ZER	$5,561,300	$3,529,800	$9,091,100	$6,191,100	$5,140,200	$11,331,300
Punxsutawney	Punxsutawney Municipal Airport	N35	$158,100	$138,200	$296,300	$167,600	$118,300	$286,000
Quakertown	Quakertown Airport	UKT	$1,037,100	$995,300	$2,032,400	$2,031,100	$1,308,500	$3,339,600
Reading	Reading Regional/Carl A. Spaatz Field	RDG	$13,688,600	$12,447,800	$26,136,400	$13,816,300	$9,603,300	$23,419,600
Reedsville	Mifflin County Airport	RVL	$369,700	$321,800	$691,400	$313,900	$251,800	$565,800
Selinsgrove	Penn Valley Airport	SEG	$2,869,700	$1,942,300	$4,812,100	$1,923,300	$1,214,500	$3,137,800
Shamokin	Northumberland County Airport	N79	$82,100	$166,200	$248,300	$93,400	$171,900	$265,300
Slatington	Slatington Airport	69N	$120,500	$125,800	$246,300	$153,200	$81,000	$234,200
Smoketown	Smoketown Airport	S37	$746,300	$770,500	$1,516,800	$1,317,300	$761,200	$2,078,500
Somerset	Somerset County Airport	2G9	$439,100	$403,400	$842,600	$379,500	$338,500	$717,900

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Payroll	Multiplier Payroll	Total Payroll	Direct Payroll	Multiplier Payroll	Total Payroll
St Marys	St. Marys Municipal Airport	OYM	$455,300	$378,500	$833,800	$390,600	$248,100	$638,600
Sterling	Spring Hill Airport	70N	$84,200	$69,300	$153,500	$3,800	$11,900	$15,700
Stewartstown	Shoestring Aviation Airfield	0P2	$2,500	$5,200	$7,700	$2,000	$3,600	$5,600
Sunbury	Sunbury Airport	71N	$143,000	$95,900	$239,000	$75,500	$38,100	$113,700
Sunbury	Sunbury Seaplane Base	H11	$0	$3,100	$3,100	$0	$1,900	$1,900
Titusville	Titusville Airport	6G1	$153,300	$139,200	$292,500	$198,500	$159,500	$358,000
Toughkena-mon	New Garden Flying Field Airport	N57	$2,204,500	$1,857,000	$4,061,500	$1,516,000	$924,300	$2,440,300
Towanda	Bradford County Airport	N27	$882,000	$829,800	$1,711,800	$901,100	$794,100	$1,695,200
Tower City	Bendigo Airport	74N	$13,100	$15,500	$28,700	$3,400	$8,500	$11,800
Tunkhannock	Skyhaven Airport	76N	$1,120,200	$939,000	$2,059,100	$994,900	$552,400	$1,547,300
Unionville	Ridge Soaring Gliderport	79N	$41,200	$40,600	$81,800	$32,800	$29,700	$62,500
Washington	Washington County Airport	AFJ	$9,592,400	$9,428,000	$19,020,400	$9,775,900	$6,607,800	$16,383,700
Waynesburg	Greene County Airport	WAY	$184,800	$207,800	$392,600	$184,100	$197,200	$381,200
Wellsboro	Wellsboro Johnston Airport	N38	$72,800	$80,300	$153,000	$92,100	$83,400	$175,500
Wellsville	Kampel Airport	2N5	$0	$6,100	$6,100	$0	$4,700	$4,700
West Chester	Brandywine Airport	OQN	$1,734,700	$1,760,300	$3,495,000	$1,880,800	$1,310,300	$3,191,100
Wilkes-Barre	Wilkes-Barre Wyoming Valley Airport	WBW	$248,800	$207,400	$456,200	$97,100	$88,000	$185,200
Williamsburg	Cove Valley Airport	6G6	$100	$6,200	$6,300	$0	$4,300	$4,400
York	York Airport	THV	$2,433,300	$2,073,200	$4,506,500	$2,601,200	$1,769,200	$4,370,400

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Payroll	Multiplier Payroll	Total Payroll	Direct Payroll	Multiplier Payroll	Total Payroll
Zelienople	Zelienople Municipal Airport	PJC	$4,979,600	$4,880,300	$9,860,000	$6,310,300	$4,071,400	$10,381,700
		Total	$6,648,152,000	$5,390,401,600	$12,038,553,600	$3,809,026,900	$2,646,668,600	$6,455,695,600

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022.

Note: Totals do not include impacts related to off-airport businesses near PHL and PIT. Aviation-related payroll near PIT and PHL can be found in Table C-7

Table C-11. On-Airport Output

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Output	Multiplier Output	Total Output	Direct Output	Multiplier Output	Total Output
Commercial Service Airports								
Allentown	Lehigh Valley International Airport	ABE	$177,566,400	$150,850,400	$328,416,800	$138,681,000	$116,002,700	$254,683,700
Altoona	Altoona-Blair County Airport	AOO	$10,267,500	$9,492,000	$19,759,500	$8,807,800	$7,939,000	$16,746,800
Bradford	Bradford Regional Airport	BFD	$5,831,500	$4,568,100	$10,399,700	$5,086,000	$4,198,500	$9,284,600
DuBois	DuBois Regional Airport	DUJ	$17,336,300	$12,630,700	$29,967,000	$15,877,400	$12,015,600	$27,893,000
Erie	Erie Intl./Tom Ridge Field	ERI	$45,557,100	$34,910,600	$80,467,600	$39,384,700	$31,401,800	$70,786,500
Harrisburg	Harrisburg International Airport	MDT	$255,887,200	$214,315,300	$470,202,500	$208,759,600	$185,447,200	$394,206,800
Johnstown	John Murtha Johnston-Cambria County Airport	JST	$51,685,700	$21,572,200	$73,257,900	$46,576,200	$25,105,200	$71,681,400
Lancaster	Lancaster Airport	LNS	$50,492,500	$41,907,200	$92,399,700	$40,010,600	$31,291,800	$71,302,300
Latrobe	Arnold Palmer Regional Airport	LBE	$42,116,800	$43,928,700	$86,045,600	$35,896,800	$32,564,300	$68,461,100
Philadelphia	Philadelphia International Airport	PHL	$6,792,592,100	$5,394,705,800	$12,187,297,900	$3,210,076,700	$2,756,328,900	$5,966,405,600
Pittsburgh	Pittsburgh International Airport	PIT	$1,475,798,400	$1,184,120,200	$2,659,918,600	$900,904,500	$768,643,200	$1,669,547,800
State College	University Park Airport	UNV	$79,316,000	$52,358,700	$131,674,700	$60,771,600	$41,529,500	$102,301,100
Wilkes-Barre/ Scranton	Wilkes-Barre/ Scranton Int'l. Airport	AVP	$81,349,500	$55,808,400	$137,157,800	$66,987,800	$48,785,100	$115,772,800

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Output	Multiplier Output	Total Output	Direct Output	Multiplier Output	Total Output
Williamsport	Williamsport Regional Airport	IPT	$19,395,000	$15,354,300	$34,749,200	$16,574,200	$12,967,400	$29,541,600
General Aviation Airports								
Allentown	Allentown Queen City Municipal Airport	XLL	$4,536,300	$4,069,600	$8,605,900	$3,592,900	$2,207,000	$5,799,900
Bally	Butter Valley Golfport	7N8	$185,200	$187,300	$372,500	$146,200	$133,400	$279,700
Beaver Falls	Beaver County Airport	BVI	$10,267,200	$8,995,500	$19,262,700	$8,614,700	$6,026,400	$14,641,100
Bedford	Bedford County Airport	HMZ	$3,940,500	$4,202,400	$8,143,000	$2,920,700	$2,821,500	$5,742,100
Bellefonte	Bellefonte Airport	N96	$1,240,500	$1,385,900	$2,626,400	$661,300	$656,900	$1,318,300
Bensalem	Total RF Heliport	00A	$7,500	$8,400	$15,900	$5,000	$5,000	$10,000
Bethel	Grimes Airport	8N1	$229,300	$239,500	$468,800	$171,300	$96,700	$268,000
Bloomsburg	Bloomsburg Municipal Airport	N13	$3,203,400	$3,159,400	$6,362,700	$1,957,100	$1,718,900	$3,676,000
Breezewood	Greater Breezewood Regional	P17	$41,200	$38,900	$80,100	$31,700	$29,400	$61,100
Brogue	Baublitz Commercial Airport	9W8	$208,200	$215,400	$423,700	$207,100	$193,300	$400,500
Butler	Pittsburgh-Butler Regional Airport	BTP	$11,515,400	$10,798,500	$22,313,900	$128,800	$93,400	$222,200
Butler	Butler Farm Show Airport	3G9	$113,300	$93,800	$207,100	$10,185,700	$8,605,400	$18,791,100
Canadensis	Flying Dollar Airport	8N4	$138,700	$155,000	$293,700	$89,300	$21,500	$110,900
Carlisle	Carlisle Airport	N94	$1,312,300	$1,226,900	$2,539,100	$1,271,300	$1,077,000	$2,348,400
Centre Hall	Centre Airpark	N16	$26,700	$27,400	$54,000	$27,500	$25,900	$53,400
Centre Hall	Penn's Cave Airport	N74	$15,000	$16,800	$31,800	$42,000	$39,300	$81,300
Chambers-burg	Franklin County Regional Airport	N68	$1,080,300	$932,200	$2,012,500	$1,168,100	$1,078,100	$2,246,200
Clarion	Clarion County Airport	AXQ	$3,136,200	$2,538,300	$5,674,500	$2,709,500	$2,281,900	$4,991,400
Clearfield	Clearfield-Lawrence Airport	FIG	$678,600	$444,400	$1,122,900	$468,200	$263,400	$731,600
Coatesville	Chester County G.O. Carlson Airport	MQS	$13,932,900	$14,259,400	$28,192,400	$8,999,700	$8,167,900	$17,167,600

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Output	Multiplier Output	Total Output	Direct Output	Multiplier Output	Total Output
Connellsville	Joseph A. Hardy Connellsville Airport	VVS	$20,414,400	$13,023,100	$33,437,500	$20,955,000	$15,038,900	$35,993,900
Corry	Corry-Lawrence Airport	8G2	$2,386,700	$2,114,600	$4,501,300	$1,670,500	$1,243,200	$2,913,800
Cresco	Rocky Hill Ultralight Airport	48P	$7,500	$8,400	$15,900	$5,000	$5,000	$10,000
Danville	Danville Airport	8N8	$1,395,600	$966,400	$2,362,000	$510,000	$347,000	$857,000
Dover	Lazy B Ranch Airport	0P8	$15,000	$16,800	$31,800	$14,500	$14,400	$28,900
Doylestown	Doylestown Airport	DYL	$11,195,200	$4,964,900	$16,160,200	$5,927,400	$2,646,200	$8,573,600
East Stroudsburg	Stroudsburg-Pocono Airport	N53	$614,000	$531,000	$1,145,000	$454,100	$362,000	$816,200
Easton	Braden Airpark	N43	$1,187,800	$1,276,800	$2,464,600	$941,500	$823,900	$1,765,300
Ebensburg	Ebensburg Airport	9G8	$210,200	$230,600	$440,800	$237,400	$163,900	$401,300
Eighty Four	Bandel Airport	22D	$39,500	$49,400	$88,900	$39,500	$28,600	$68,100
Erie	Thermal-G Gliderport	03G	$9,800	$10,400	$20,200	$7,300	$7,000	$14,300
Erwinna	Van Sant Airport	9N1	$1,607,400	$1,377,900	$2,985,300	$1,143,000	$776,400	$1,919,400
Essington	Philadelphia Seaplane Base	9N2	$7,500	$8,400	$15,900	$5,000	$5,000	$10,000
Factoryville	Seamans Airport	9N3	$475,700	$417,600	$893,300	$490,800	$367,000	$857,800
Fairfield	Mid Atlantic Soaring Center	W73	$133,400	$148,300	$281,700	$133,800	$132,900	$266,600
Finleyville	Finleyville Airpark	G05	$629,500	$500,900	$1,130,400	$548,700	$368,000	$916,700
Franklin	Venango Regional Airport	FKL	$1,282,400	$1,355,100	$2,637,600	$1,254,500	$1,132,400	$2,386,900
Fredericksburg	Farmers Pride Airport	9N7	$237,900	$246,800	$484,800	$227,800	$213,700	$441,600
Freeport	McVille Airport	6P7	$583,800	$617,900	$1,201,600	$400,800	$383,500	$784,400
Germansville	Flying M Aerodrome	P91	$41,800	$46,300	$88,000	$42,500	$42,100	$84,600
Gettysburg	Gettysburg Regional Airport	W05	$806,700	$742,700	$1,549,400	$705,100	$645,300	$1,350,400
Greenville	Greenville Municipal Airport	4G1	$265,100	$278,900	$544,100	$310,700	$292,900	$603,500
Grove City	Grove City Airport	29D	$11,153,900	$8,600,700	$19,754,600	$8,582,200	$6,921,000	$15,503,300

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Output	Multiplier Output	Total Output	Direct Output	Multiplier Output	Total Output
Harrisburg	Capital City Airport	CXY	$27,611,300	$22,462,800	$50,074,000	$26,774,600	$21,810,100	$48,584,700
Hazleton	Hazleton Regional Airport	HZL	$7,830,500	$5,530,400	$13,360,900	$9,011,800	$7,374,500	$16,386,300
Honesdale	Cherry Ridge Airport	N30	$1,127,500	$943,800	$2,071,400	$595,500	$390,600	$986,100
Horsham	Horsham Valley Airways Heliport	N48	$7,500	$8,400	$15,900	$5,000	$5,000	$10,000
Indiana	Indiana Co./Jimmy Stewart Field	IDI	$692,600	$667,700	$1,360,300	$508,900	$357,600	$866,500
Irwin	Inter County Airport	31D	$15,000	$16,800	$31,800	$11,100	$11,100	$22,200
Jeannette	Greensburg-Jeannette Regional Airport	5G8	$17,400	$19,400	$36,800	$50,800	$50,200	$101,000
Jersey Shore	Jersey Shore Airport	P96	$15,000	$16,800	$31,800	$10,000	$10,000	$20,000
Kralltown	Bermudian Valley Airpark	07N	$50,000	$55,900	$105,900	$50,000	$49,800	$99,800
Lebanon	Keller Brothers Airport	08N	$15,000	$16,800	$31,800	$11,000	$11,000	$22,000
Lehighton	Beltzville Airport	14N	$15,100	$16,800	$31,900	$11,100	$10,900	$22,000
Lehighton	Jake Arner Memorial Airport	22N	$4,273,800	$3,631,100	$7,904,900	$3,384,400	$3,092,200	$6,476,600
Lock Haven	William T. Piper Memorial Airport	LHV	$7,056,800	$5,766,800	$12,823,600	$5,511,900	$4,092,300	$9,604,200
Meadville	Port Meadville Airport	GKJ	$3,421,400	$2,801,900	$6,223,300	$2,742,500	$2,256,900	$4,999,400
Mifflintown	Mifflintown Airport	P34	$35,800	$39,200	$74,900	$28,300	$28,000	$56,300
Monongahela	Rostraver Airport	FWQ	$14,027,600	$12,553,300	$26,580,900	$10,709,500	$9,401,400	$20,110,900
Morgantown	Morgantown Airport	O03	$299,500	$334,600	$634,100	$200,700	$199,900	$400,600
Mount Joy/Marietta	Donegal Springs Airpark	N71	$1,820,400	$1,763,900	$3,584,300	$1,715,700	$1,362,500	$3,078,300
Mount Pleasant	Mount Pleasant/Scottdale Airport	P45	$137,100	$153,100	$290,200	$73,600	$17,800	$91,400
Mount Pleasant	W.P.H.S. Heliport	P99	$9,107,800	$9,142,800	$18,250,600	$7,825,200	$7,099,200	$14,924,400
Mount Pocono	Pocono Mountains Municipal Airport	MPO	$5,503,800	$5,022,500	$10,526,200	$3,714,000	$2,390,000	$6,104,100

Appendix C. Detailed Airport Impact Tables

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Output	Multiplier Output	Total Output	Direct Output	Multiplier Output	Total Output
Myerstown	Deck Airport	9D4	$953,200	$960,400	$1,913,600	$853,100	$759,100	$1,612,300
New Castle	New Castle Municipal Airport	UCP	$2,412,900	$1,971,200	$4,384,100	$1,657,400	$1,094,800	$2,752,300
Palmyra	Reigle Field Airport	58N	$495,600	$469,300	$964,900	$488,400	$235,400	$723,900
Perkasie	Pennridge Airport	CKZ	$3,627,500	$3,155,100	$6,782,600	$2,453,500	$2,047,900	$4,501,400
Philadelphia	Northeast Philadelphia Airport	PNE	$516,928,200	$398,237,500	$915,165,600	$20,992,900	$12,014,800	$33,007,800
Philadelphia	Wings Field Airport	LOM	$34,487,600	$21,606,200	$56,093,800	$6,343,900	$5,817,400	$12,161,300
Philadelphia	Penn's Landing Heliport	P72	$8,372,300	$7,345,800	$15,718,100	$489,325,500	$378,631,900	$867,957,400
Philipsburg	Mid-State Airport	PSB	$531,600	$594,000	$1,125,600	$91,700	$91,300	$183,100
Philipsburg	Albert Airport	1N3	$177,200	$198,000	$375,200	$275,200	$274,000	$549,200
Pittsburgh	Allegheny County Airport	AGC	$67,698,700	$57,108,300	$124,807,000	$50,553,700	$39,656,200	$90,209,900
Pittsburgh	Pittsburgh Northeast Airport	9G1	$445,200	$497,400	$942,600	$259,200	$258,100	$517,200
Pittsfield	Brokenstraw Airport	P15	$176,700	$197,400	$374,000	$109,300	$108,900	$218,200
Pottstown	Heritage Field	PTW	$1,229,400	$1,280,400	$2,509,700	$3,373,200	$3,109,700	$6,482,900
Pottstown	Pottstown Municipal Airport	N47	$4,395,400	$4,620,800	$9,016,200	$1,198,800	$929,400	$2,128,200
Pottsville	Schuylkill Co./Joe Zerbey Airport	ZER	$10,686,000	$9,730,400	$20,416,400	$13,240,500	$13,833,600	$27,074,100
Punxsutawney	Punxsutawney Municipal Airport	N35	$390,300	$373,800	$764,100	$353,300	$306,400	$659,800
Quakertown	Quakertown Airport	UKT	$3,022,600	$2,617,800	$5,640,400	$4,256,900	$3,323,600	$7,580,500
Reading	Reading Regional/Carl A. Spaatz Field	RDG	$40,239,300	$32,658,300	$72,897,600	$28,021,600	$24,441,000	$52,462,600
Reedsville	Mifflin County Airport	RVL	$790,500	$707,000	$1,497,500	$705,700	$557,500	$1,263,200
Selinsgrove	Penn Valley Airport	SEG	$5,415,900	$5,289,000	$10,704,900	$3,703,100	$3,075,500	$6,778,700
Shamokin	Northumberland County Airport	N79	$299,000	$320,700	$619,800	$365,800	$353,100	$719,000
Slatington	Slatington Airport	69N	$302,100	$337,300	$639,400	$203,900	$202,900	$406,800

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Output	Multiplier Output	Total Output	Direct Output	Multiplier Output	Total Output
Smoketown	Smoketown Airport	S37	$2,228,700	$2,052,200	$4,280,900	$2,385,000	$1,900,600	$4,285,600
Somerset	Somerset County Airport	2G9	$864,200	$757,900	$1,622,100	$764,100	$593,200	$1,357,200
St Marys	St. Marys Municipal Airport	OYM	$898,200	$891,400	$1,789,600	$682,400	$555,300	$1,237,700
Sterling	Spring Hill Airport	70N	$159,400	$178,100	$337,600	$79,000	$19,000	$98,000
Stewartstown	Shoestring Aviation Airfield	0P2	$7,500	$8,400	$15,900	$5,000	$5,000	$10,000
Sunbury	Sunbury Airport	71N	$235,600	$255,900	$491,500	$104,200	$93,200	$197,300
Sunbury	Sunbury Seaplane Base	H11	$7,500	$8,400	$15,900	$5,000	$5,000	$10,000
Titusville	Titusville Airport	6G1	$308,200	$314,500	$622,700	$427,400	$382,300	$809,700
Toughkenamon	New Garden Flying Field Airport	N57	$5,321,700	$5,079,500	$10,401,200	$2,997,100	$2,276,500	$5,273,600
Towanda	Bradford County Airport	N27	$1,652,300	$1,318,300	$2,970,600	$1,820,700	$1,412,800	$3,233,500
Tower City	Bendigo Airport	74N	$43,300	$42,400	$85,700	$21,200	$20,600	$41,900
Tunkhannock	Skyhaven Airport	76N	$2,329,600	$2,457,100	$4,786,700	$1,428,900	$1,285,900	$2,714,800
Unionville	Ridge Soaring Gliderport	79N	$7,500	$8,400	$15,900	$5,000	$5,000	$10,000
Washington	Washington County Airport	AFJ	$26,786,000	$23,161,500	$49,947,600	$16,910,500	$15,105,600	$32,016,100
Waynesburg	Greene County Airport	WAY	$676,400	$567,800	$1,244,200	$694,700	$514,200	$1,208,800
Wellsboro	Wellsboro Johnston Airport	N38	$246,500	$188,000	$434,500	$311,400	$202,700	$514,200
Wellsville	Kampel Airport	2N5	$15,000	$16,800	$31,800	$12,000	$12,000	$24,000
West Chester	Brandywine Airport	OQN	$4,662,100	$3,769,500	$8,431,600	$3,928,000	$2,781,800	$6,709,800
Wilkes-Barre	Wilkes-Barre Wyoming Valley Airport	WBW	$502,400	$459,300	$961,700	$186,100	$170,500	$356,600
Williamsburg	Cove Valley Airport	6G6	$15,000	$16,800	$31,800	$11,000	$11,000	$22,000
York	York Airport	THV	$6,460,600	$5,199,700	$11,660,300	$6,052,500	$4,391,100	$10,443,700

Appendix C. Detailed Airport Impact Tables

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Output	Multiplier Output	Total Output	Direct Output	Multiplier Output	Total Output
Zelienople	Zelienople Municipal Airport	PJC	$18,951,800	$13,556,200	$32,508,000	$12,234,500	$10,046,000	$22,280,400
		Total	$10,074,238,600	$8,008,600,100	$18,082,838,700	$5,635,238,400	$4,734,655,900	$10,369,894,200

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

Table C-12. Aviation-Related Output Near PIT and PHL

Airport Name	FAA ID	2019 Base Year			2020 Base Year		
		Direct Output	Multiplier Output	Total Output	Direct Output	Multiplier Output	Total Output
Pittsburgh International Airport	PIT	$237,519,000	$253,757,200	$491,276,200	$217,539,500	$227,336,100	$444,875,600
Philadelphia International Airport	PHL	$325,932,800	$342,774,500	$668,707,300	$249,127,300	$257,259,000	$506,386,300
Total		$563,451,800	$596,531,700	$1,159,983,500	$466,666,800	$484,595,100	$951,261,900

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

Table C-13. Commercial Service Visitor-Related Output

Airport Name	FAA ID	2019 Base Year			2020 Base Year		
		Direct Output	Multiplier Output	Total Output	Direct Output	Multiplier Output	Total Output
Lehigh Valley International Airport	ABE	$149,547,300	$132,698,100	$282,245,300	$49,509,300	$45,516,300	$95,025,600
Altoona-Blair County Airport	AOO	$1,016,400	$901,400	$1,917,800	$252,200	$229,900	$482,100
Wilkes-Barre/Scranton Int'l. Airport	AVP	$80,344,900	$71,258,500	$151,603,500	$21,313,400	$19,523,300	$40,836,700
Bradford Regional Airport	BFD	$1,191,400	$1,056,600	$2,248,000	$360,700	$328,300	$689,000
DuBois Regional Airport	DUJ	$1,690,100	$1,499,000	$3,189,100	$468,000	$427,800	$895,800
Erie Intl./Tom Ridge Field	ERI	$28,158,300	$24,973,700	$53,132,100	$7,759,000	$7,054,300	$14,813,300
Williamsport Regional Airport	IPT	$5,392,100	$4,782,700	$10,174,700	$1,319,100	$1,204,800	$2,523,900
John Murtha Johnston-Cambria County Airport	JST	$1,506,500	$1,336,000	$2,842,500	$500,000	$455,900	$955,900
Arnold Palmer Regional Airport	LBE	$58,486,600	$51,880,000	$110,366,600	$15,995,700	$14,621,000	$30,616,800
Lancaster Airport	LNS	$1,614,200	$1,432,300	$3,046,500	$447,000	$409,700	$856,700
Harrisburg International Airport	MDT	$248,096,100	$220,141,500	$468,237,600	$93,154,300	$85,385,900	$178,540,200
Philadelphia International Airport	PHL	$5,525,898,000	$4,902,046,000	$10,427,944,000	$1,581,466,200	$1,458,963,500	$3,040,429,700
Pittsburgh International Airport	PIT	$1,615,947,500	$1,436,144,100	$3,052,091,600	$470,929,400	$434,092,000	$905,021,400
University Park Airport	UNV	$57,328,500	$50,839,800	$108,168,200	$15,296,800	$13,919,300	$29,216,100
Total		$7,776,217,900	$6,900,989,600	$14,677,207,500	$2,258,771,100	$2,082,132,100	$4,340,903,200

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

Table C-14. GA Visitor-Related Output

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Output	Multiplier Output	Total Output	Direct Output	Multiplier Output	Total Output
Commercial Service Airports								
Allentown	Lehigh Valley International Airport	ABE	$4,369,400	$3,873,100	$8,242,500	$2,655,400	$2,441,200	$5,096,600
Altoona	Altoona-Blair County Airport	AOO	$665,400	$589,300	$1,254,700	$465,200	$424,200	$889,400
Bradford	Bradford Regional Airport	BFD	$19,700	$17,400	$37,100	$14,300	$13,100	$27,400
DuBois	DuBois Regional Airport	DUJ	$168,100	$148,900	$317,000	$96,300	$88,100	$184,400
Erie	Erie Intl./Tom Ridge Field	ERI	$1,377,400	$1,219,800	$2,597,200	$501,100	$455,600	$956,700
Harrisburg	Harrisburg International Airport	MDT	$9,788,500	$8,675,000	$18,463,500	$5,090,500	$4,666,000	$9,756,400
Johnstown	John Murtha Johnston-Cambria County Airport	JST	$141,500	$125,400	$266,900	$6,400	$5,800	$12,200
Lancaster	Lancaster Airport	LNS	$5,198,700	$4,607,400	$9,806,100	$3,209,300	$2,941,600	$6,150,900
Latrobe	Arnold Palmer Regional Airport	LBE	$3,791,000	$3,358,900	$7,149,900	$1,305,900	$1,193,600	$2,499,500
Philadelphia	Philadelphia International Airport	PHL	$11,045,300	$9,794,700	$20,840,000	$1,462,200	$1,349,000	$2,811,200
Pittsburgh	Pittsburgh International Airport	PIT	$4,420,400	$3,919,200	$8,339,600	$2,765,200	$2,548,900	$5,314,100
State College	University Park Airport	UNV	$1,464,700	$1,297,000	$2,761,700	$1,012,500	$921,400	$1,933,900
Wilkes-Barre/Scranton	Wilkes-Barre/Scranton Int'l. Airport	AVP	$973,600	$862,500	$1,836,100	$667,700	$611,600	$1,279,300
Williamsport	Williamsport Regional Airport	IPT	$564,800	$500,300	$1,065,100	$176,700	$161,400	$338,100
General Aviation Airports								
Allentown	Allentown Queen City Municipal Airport	XLL	$38,000	$33,700	$71,800	$14,000	$12,800	$26,800
Bally	Butter Valley Golfport	7N8	$8,700	$7,700	$16,400	$4,300	$4,000	$8,200
Beaver Falls	Beaver County Airport	BVI	$677,100	$600,300	$1,277,400	$676,300	$623,400	$1,299,600

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Output	Multiplier Output	Total Output	Direct Output	Multiplier Output	Total Output
Bedford	Bedford County Airport	HMZ	$150,800	$133,600	$284,400	$58,000	$52,900	$111,000
Bellefonte	Bellefonte Airport	N96	$92,800	$82,200	$175,100	$61,900	$56,400	$118,300
Bensalem	Total RF Heliport	00A	$2,300	$2,000	$4,300	$1,700	$1,600	$3,300
Bethel	Grimes Airport	8N1	$7,200	$6,300	$13,500	$5,200	$4,800	$10,000
Bloomsburg	Bloomsburg Municipal Airport	N13	$52,100	$46,200	$98,300	$55,000	$50,300	$105,300
Breezewood	Greater Breezewood Regional	P17	$1,700	$1,500	$3,200	$5,200	$4,800	$10,000
Brogue	Baublitz Commercial Airport	9W8	$5,000	$4,400	$9,400	$3,600	$3,300	$6,900
Butler	Pittsburgh-Butler Regional Airport	BTP	$699,500	$619,700	$1,319,300	$2,200	$2,000	$4,200
Butler	Butler Farm Show Airport	3G9	$4,100	$3,600	$7,700	$1,059,300	$968,500	$2,027,800
Canadensis	Flying Dollar Airport	8N4	$3,200	$2,800	$6,000	$2,300	$2,100	$4,500
Carlisle	Carlisle Airport	N94	$559,000	$495,400	$1,054,400	$181,800	$166,600	$348,400
Centre Hall	Centre Airpark	N16	$300	$300	$600	$200	$200	$300
Centre Hall	Penn's Cave Airport	N74	$4,600	$4,100	$8,800	$2,400	$2,200	$4,700
Chambersburg	Franklin County Regional Airport	N68	$224,000	$198,500	$422,600	$161,000	$147,500	$308,500
Clarion	Clarion County Airport	AXQ	$83,300	$73,800	$157,000	$56,700	$51,800	$108,500
Clearfield	Clearfield-Lawrence Airport	FIG	$143,300	$126,900	$270,100	$50,100	$45,600	$95,600
Coatesville	Chester County G.O. Carlson Airport	MQS	$5,496,900	$4,874,500	$10,371,400	$4,024,200	$3,712,500	$7,736,600
Connellsville	Joseph A. Hardy Connellsville Airport	VVS	$1,073,600	$951,200	$2,024,700	$528,800	$483,300	$1,012,100
Corry	Corry-Lawrence Airport	8G2	$80,300	$71,100	$151,300	$1,900	$1,700	$3,600
Cresco	Rocky Hill Ultralight Airport	48P	$1,100	$1,000	$2,100	$800	$800	$1,600
Danville	Danville Airport	8N8	$23,200	$20,500	$43,700	$13,900	$12,700	$26,500
Dover	Lazy B Ranch Airport	0P8	$1,300	$1,200	$2,500	$1,000	$900	$1,900

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Output	Multiplier Output	Total Output	Direct Output	Multiplier Output	Total Output
Doylestown	Doylestown Airport	DYL	$691,800	$613,500	$1,305,300	$513,100	$473,300	$986,400
East Stroudsburg	Stroudsburg-Pocono Airport	N53	$12,700	$11,300	$24,000	$9,300	$8,500	$17,800
Easton	Braden Airpark	N43	$26,700	$23,700	$50,300	$14,300	$13,200	$27,500
Ebensburg	Ebensburg Airport	9G8	$3,400	$3,100	$6,500	$1,200	$1,100	$2,300
Eighty Four	Bandel Airport	22D	$0	$0	$0	$0	$0	$0
Erie	Thermal-G Gliderport	03G	$1,300	$1,100	$2,400	$700	$600	$1,300
Erwinna	Van Sant Airport	9N1	$16,500	$14,600	$31,100	$12,200	$11,300	$23,500
Essington	Philadelphia Seaplane Base	9N2	$200	$200	$400	$0	$0	$0
Factoryville	Seamans Airport	9N3	$42,400	$37,600	$80,000	$25,100	$23,000	$48,100
Fairfield	Mid Atlantic Soaring Center	W73	$2,700	$2,400	$5,100	$200	$200	$400
Finleyville	Finleyville Airpark	G05	$23,300	$20,700	$44,000	$16,400	$15,000	$31,400
Franklin	Venango Regional Airport	FKL	$636,700	$563,800	$1,200,500	$190,800	$173,500	$364,200
Fredericksburg	Farmers Pride Airport	9N7	$9,400	$8,300	$17,700	$6,700	$6,200	$12,900
Freeport	McVille Airport	6P7	$7,000	$6,200	$13,200	$4,900	$4,500	$9,400
Germansville	Flying M Aerodrome	P91	$31,400	$27,800	$59,200	$22,900	$21,000	$43,900
Gettysburg	Gettysburg Regional Airport	W05	$147,800	$131,000	$278,700	$106,200	$97,300	$203,500
Greenville	Greenville Municipal Airport	4G1	$112,500	$99,600	$212,100	$77,600	$70,600	$148,200
Grove City	Grove City Airport	29D	$198,900	$176,100	$375,000	$143,100	$130,100	$273,100
Harrisburg	Capital City Airport	CXY	$4,574,800	$4,054,400	$8,629,200	$3,909,300	$3,583,300	$7,492,500
Hazleton	Hazleton Regional Airport	HZL	$13,300	$11,700	$25,000	$19,000	$17,400	$36,500
Honesdale	Cherry Ridge Airport	N30	$139,800	$123,900	$263,700	$100,500	$92,000	$192,500
Horsham	Horsham Valley Airways Heliport	N48	$0	$0	$0	$0	$0	$0
Indiana	Indiana Co./Jimmy Stewart Field	IDI	$233,900	$207,200	$441,100	$196,700	$179,900	$376,600

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Output	Multiplier Output	Total Output	Direct Output	Multiplier Output	Total Output
Irwin	Inter County Airport	31D	$100	$100	$100	$0	$0	$100
Jeannette	Greensburg-Jeannette Regional Airport	5G8	$1,200	$1,100	$2,300	$1,000	$900	$2,000
Jersey Shore	Jersey Shore Airport	P96	$600	$500	$1,100	$400	$400	$800
Kralltown	Bermudian Valley Airpark	07N	$18,700	$16,600	$35,200	$13,400	$12,300	$25,700
Lebanon	Keller Brothers Airport	08N	$61,500	$54,500	$116,000	$44,200	$40,500	$84,700
Lehighton	Beltzville Airport	14N	$200	$200	$300	$400	$400	$800
Lehighton	Jake Arner Memorial Airport	22N	$29,900	$26,500	$56,300	$21,600	$19,900	$41,500
Lock Haven	William T. Piper Memorial Airport	LHV	$153,900	$136,300	$290,100	$59,200	$53,900	$113,100
Meadville	Port Meadville Airport	GKJ	$103,600	$91,700	$195,300	$41,400	$37,700	$79,100
Mifflintown	Mifflintown Airport	P34	$8,100	$7,200	$15,400	$3,800	$3,400	$7,200
Monongahela	Rostraver Airport	FWQ	$330,800	$293,100	$623,900	$232,800	$212,800	$445,600
Morgantown	Morgantown Airport	O03	$0	$0	$0	$0	$0	$0
Mount Joy/Marietta	Donegal Springs Airpark	N71	$25,100	$22,200	$47,300	$18,000	$16,500	$34,500
Mount Pleasant	Mount Pleasant/Scottdale Airport	P45	$600	$600	$1,200	$500	$400	$900
Mount Pleasant	W.P.H.S. Heliport	P99	$13,600	$12,000	$25,600	$9,500	$8,700	$18,300
Mount Pocono	Pocono Mountains Municipal Airport	MPO	$868,300	$769,700	$1,638,100	$632,800	$581,800	$1,214,600
Myerstown	Deck Airport	9D4	$161,700	$143,300	$304,900	$131,800	$120,800	$252,600
New Castle	New Castle Municipal Airport	UCP	$729,800	$647,000	$1,376,800	$576,800	$531,700	$1,108,400
Palmyra	Reigle Field Airport	58N	$200	$200	$300	$100	$100	$200
Perkasie	Pennridge Airport	CKZ	$415,100	$368,100	$783,200	$153,900	$142,000	$295,900
Philadelphia	Northeast Philadelphia Airport	PNE	$31,164,700	$27,636,000	$58,800,700	$302,600	$279,100	$581,700
Philadelphia	Wings Field Airport	LOM	$477,800	$423,700	$901,600	$7,900	$7,300	$15,200

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Output	Multiplier Output	Total Output	Direct Output	Multiplier Output	Total Output
Philadelphia	Penn's Landing Heliport	P72	$21,200	$18,800	$40,100	$10,916,800	$10,071,100	$20,987,900
Philipsburg	Mid-State Airport	PSB	$23,200	$20,600	$43,800	$100	$100	$200
Philipsburg	Albert Airport	1N3	$200	$200	$300	$15,500	$14,100	$29,600
Pittsburgh	Allegheny County Airport	AGC	$6,088,200	$5,397,900	$11,486,100	$2,864,000	$2,640,000	$5,504,000
Pittsburgh	Pittsburgh Northeast Airport	9G1	$21,600	$19,200	$40,800	$15,500	$14,300	$29,800
Pittsfield	Brokenstraw Airport	P15	$200	$200	$300	$100	$100	$200
Pottstown	Heritage Field	PTW	$32,100	$28,400	$60,500	$75,000	$69,200	$144,300
Pottstown	Pottstown Municipal Airport	N47	$96,300	$85,400	$181,800	$3,000	$2,700	$5,700
Pottsville	Schuylkill Co./Joe Zerbey Airport	ZER	$638,300	$565,800	$1,204,000	$352,100	$323,700	$675,800
Punxsutawney	Punxsutawney Municipal Airport	N35	$21,900	$19,400	$41,300	$15,400	$14,100	$29,500
Quakertown	Quakertown Airport	UKT	$118,800	$105,300	$224,100	$88,100	$81,300	$169,400
Reading	Reading Regional/ Carl A. Spaatz Field	RDG	$2,696,700	$2,390,400	$5,087,100	$649,600	$597,200	$1,246,800
Reedsville	Mifflin County Airport	RVL	$227,900	$201,900	$429,800	$128,300	$116,800	$245,100
Selinsgrove	Penn Valley Airport	SEG	$173,800	$153,900	$327,700	$122,300	$111,700	$234,000
Shamokin	Northumberland County Airport	N79	$156,400	$138,500	$294,900	$110,100	$100,500	$210,600
Slatington	Slatington Airport	69N	$6,600	$5,900	$12,500	$4,800	$4,400	$9,200
Smoketown	Smoketown Airport	S37	$26,500	$23,500	$50,000	$19,100	$17,500	$36,500
Somerset	Somerset County Airport	2G9	$442,400	$391,800	$834,100	$351,400	$320,400	$671,900
St Marys	St. Marys Municipal Airport	OYM	$169,300	$149,900	$319,100	$99,500	$90,500	$190,000
Sterling	Spring Hill Airport	70N	$12,500	$11,000	$23,500	$9,000	$8,200	$17,200
Stewartstown	Shoestring Aviation Airfield	0P2	$6,600	$5,900	$12,500	$4,700	$4,300	$9,100
Sunbury	Sunbury Airport	71N	$6,200	$5,500	$11,700	$4,400	$4,000	$8,300

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Output	Multiplier Output	Total Output	Direct Output	Multiplier Output	Total Output
Sunbury	Sunbury Seaplane Base	H11	$0	$0	$0	$0	$0	$0
Titusville	Titusville Airport	6G1	$80,000	$70,800	$150,800	$55,200	$50,200	$105,300
Toughkenamon	New Garden Flying Field Airport	N57	$189,600	$168,100	$357,700	$135,400	$124,900	$260,300
Towanda	Bradford County Airport	N27	$1,129,400	$1,000,500	$2,129,900	$795,000	$726,100	$1,521,000
Tower City	Bendigo Airport	74N	$2,400	$2,100	$4,600	$1,700	$1,600	$3,300
Tunkhannock	Skyhaven Airport	76N	$116,500	$103,200	$219,700	$133,900	$122,700	$256,600
Unionville	Ridge Soaring Gliderport	79N	$116,300	$103,000	$219,200	$80,500	$73,300	$153,800
Washington	Washington County Airport	AFJ	$3,457,000	$3,062,900	$6,519,900	$2,189,900	$2,001,700	$4,191,500
Waynesburg	Greene County Airport	WAY	$10,500	$9,300	$19,800	$7,400	$6,800	$14,100
Wellsboro	Wellsboro Johnston Airport	N38	$38,100	$33,700	$71,800	$19,400	$17,800	$37,200
Wellsville	Kampel Airport	2N5	$0	$0	$0	$0	$0	$0
West Chester	Brandywine Airport	OQN	$1,215,600	$1,077,900	$2,293,500	$631,100	$582,200	$1,213,300
Wilkes-Barre	Wilkes-Barre Wyoming Valley Airport	WBW	$163,900	$145,200	$309,000	$77,700	$71,200	$148,900
Williamsburg	Cove Valley Airport	6G6	$300	$300	$500	$100	$100	$200
York	York Airport	THV	$585,700	$519,100	$1,104,800	$147,300	$135,000	$282,300
Zelienople	Zelienople Municipal Airport	PJC	$368,200	$326,400	$694,600	$506,300	$466,700	$973,100
		Total	$113,373,600	$100,502,100	$ 213,875,700	$54,652,500	$50,213,300	$104,865,200

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

Table C-15. Total Airport Output

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Output	Multiplier Output	Total Output	Direct Output	Multiplier Output	Total Output
Commercial Service Airports								
Allentown	Lehigh Valley International Airport	ABE	$331,483,000	$287,421,600	$618,904,600	$190,845,700	$163,960,300	$354,806,000
Altoona	Altoona-Blair County Airport	AOO	$11,949,300	$10,982,700	$22,932,000	$9,525,200	$8,593,000	$18,118,300
Bradford	Bradford Regional Airport	BFD	$7,042,600	$5,642,100	$12,684,700	$5,461,100	$4,539,900	$10,001,000
DuBois	DuBois Regional Airport	DUJ	$19,194,400	$14,278,600	$33,473,000	$16,441,700	$12,531,500	$28,973,100
Erie	Erie Intl./Tom Ridge Field	ERI	$75,092,800	$61,104,100	$136,196,900	$47,644,800	$38,911,700	$86,556,500
Harrisburg	Harrisburg International Airport	MDT	$513,771,800	$443,131,800	$956,903,700	$307,004,400	$275,499,000	$582,503,500
Johnstown	John Murtha Johnston-Cambria County Airport	JST	$53,333,700	$23,033,600	$76,367,300	$47,082,500	$25,566,900	$72,649,400
Lancaster	Lancaster Airport	LNS	$57,305,400	$47,946,800	$105,252,200	$43,666,900	$34,643,100	$78,310,000
Latrobe	Arnold Palmer Regional Airport	LBE	$104,394,400	$99,167,600	$203,562,100	$53,198,300	$48,379,000	$101,577,400
Philadelphia	Philadelphia International Airport	PHL	$12,329,535,400	$10,306,546,400	$22,636,081,900	$4,793,005,100	$4,216,641,400	$9,009,646,400
Pittsburgh	Pittsburgh International Airport	PIT	$3,096,166,400	$2,624,183,400	$5,720,349,700	$1,374,599,100	$1,205,284,100	$2,579,883,200
State College	University Park Airport	UNV	$138,109,200	$104,495,400	$242,604,600	$77,081,000	$56,370,200	$133,451,200
Wilkes-Barre/ Scranton	Wilkes-Barre/ Scranton Int'l. Airport	AVP	$162,668,000	$127,929,400	$290,597,400	$88,968,900	$68,920,000	$157,888,800
Williamsport	Williamsport Regional Airport	IPT	$25,351,800	$20,637,200	$45,989,000	$18,070,000	$14,333,600	$32,403,600
General Aviation Airports								
Allentown	Allentown Queen City Municipal Airport	XLL	$4,574,300	$4,103,300	$8,677,700	$3,606,900	$2,219,800	$5,826,700
Bally	Butter Valley Golfport	7N8	$193,900	$195,000	$388,900	$150,500	$137,400	$287,900

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Output	Multiplier Output	Total Output	Direct Output	Multiplier Output	Total Output
Beaver Falls	Beaver County Airport	BVI	$10,944,300	$9,595,800	$20,540,100	$9,290,900	$6,649,800	$15,940,700
Bedford	Bedford County Airport	HMZ	$4,091,300	$4,336,000	$8,427,300	$2,978,700	$2,874,400	$5,853,100
Bellefonte	Bellefonte Airport	N96	$1,333,300	$1,468,100	$2,801,400	$723,200	$713,300	$1,436,600
Bensalem	Total RF Heliport	00A	$9,800	$10,400	$20,200	$6,700	$6,600	$13,300
Bethel	Grimes Airport	8N1	$236,400	$245,900	$482,300	$176,500	$101,500	$278,000
Bloomsburg	Bloomsburg Municipal Airport	N13	$3,255,500	$3,205,600	$6,461,000	$2,012,100	$1,769,200	$3,781,300
Breezewood	Greater Breezewood Regional	P17	$42,900	$40,400	$83,300	$37,000	$34,100	$71,100
Brogue	Baublitz Commercial Airport	9W8	$213,200	$219,800	$433,100	$210,700	$196,600	$407,300
Butler	Pittsburgh-Butler Regional Airport	BTP	$12,214,900	$11,418,300	$23,633,200	$130,900	$95,400	$226,300
Butler	Butler Farm Show Airport	3G9	$117,300	$97,400	$214,800	$11,244,900	$9,573,900	$20,818,800
Canadensis	Flying Dollar Airport	8N4	$141,900	$157,800	$299,700	$91,700	$23,700	$115,300
Carlisle	Carlisle Airport	N94	$1,871,300	$1,722,300	$3,593,600	$1,453,100	$1,243,700	$2,696,800
Centre Hall	Centre Airpark	N16	$27,000	$27,600	$54,600	$27,700	$26,100	$53,700
Centre Hall	Penn's Cave Airport	N74	$19,600	$20,900	$40,500	$44,400	$41,500	$86,000
Chambersburg	Franklin County Regional Airport	N68	$1,304,400	$1,130,700	$2,435,100	$1,329,000	$1,225,700	$2,554,700
Clarion	Clarion County Airport	AXQ	$3,219,500	$2,612,000	$5,831,500	$2,766,200	$2,333,700	$5,099,900
Clearfield	Clearfield-Lawrence Airport	FIG	$821,800	$571,200	$1,393,100	$518,300	$309,000	$827,200
Coatesville	Chester County G.O. Carlson Airport	MQS	$19,429,800	$19,133,900	$38,563,800	$13,023,900	$11,880,300	$24,904,300
Connellsville	Joseph A. Hardy Connellsville Airport	VVS	$21,487,900	$13,974,300	$35,462,200	$21,483,800	$15,522,200	$37,006,100
Corry	Corry-Lawrence Airport	8G2	$2,467,000	$2,185,700	$4,652,700	$1,672,500	$1,245,000	$2,917,400
Cresco	Rocky Hill Ultralight Airport	48P	$8,600	$9,400	$18,000	$5,800	$5,700	$11,600

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Output	Multiplier Output	Total Output	Direct Output	Multiplier Output	Total Output
Danville	Danville Airport	8N8	$1,418,800	$986,900	$2,405,700	$523,900	$359,600	$883,600
Dover	Lazy B Ranch Airport	0P8	$16,300	$18,000	$34,300	$15,500	$15,300	$30,800
Doylestown	Doylestown Airport	DYL	$11,887,100	$5,578,400	$17,465,500	$6,440,500	$3,119,500	$9,560,000
East Stroudsburg	Stroudsburg-Pocono Airport	N53	$626,700	$542,300	$1,169,000	$463,400	$370,600	$833,900
Easton	Braden Airpark	N43	$1,214,500	$1,300,500	$2,515,000	$955,800	$837,100	$1,792,900
Ebensburg	Ebensburg Airport	9G8	$213,600	$233,600	$447,300	$238,600	$165,000	$403,600
Eighty Four	Bandel Airport	22D	$39,500	$49,400	$88,900	$39,500	$28,600	$68,100
Erie	Thermal-G Gliderport	03G	$11,000	$11,600	$22,600	$7,900	$7,600	$15,600
Erwinna	Van Sant Airport	9N1	$1,623,900	$1,392,500	$3,016,400	$1,155,200	$787,700	$1,942,800
Essington	Philadelphia Seaplane Base	9N2	$7,700	$8,600	$16,300	$5,000	$5,000	$10,000
Factoryville	Seamans Airport	9N3	$518,100	$455,200	$973,300	$515,900	$390,000	$905,900
Fairfield	Mid Atlantic Soaring Center	W73	$136,100	$150,700	$286,800	$134,000	$133,100	$267,100
Finleyville	Finleyville Airpark	G05	$652,800	$521,600	$1,174,400	$565,100	$383,000	$948,100
Franklin	Venango Regional Airport	FKL	$1,919,100	$1,919,000	$3,838,100	$1,445,300	$1,305,800	$2,751,100
Fredericksburg	Farmers Pride Airport	9N7	$247,300	$255,100	$502,400	$234,600	$219,900	$454,500
Freeport	McVille Airport	6P7	$590,800	$624,100	$1,214,800	$405,800	$388,000	$793,800
Germansville	Flying M Aerodrome	P91	$73,100	$74,100	$147,200	$65,400	$63,100	$128,500
Gettysburg	Gettysburg Regional Airport	W05	$954,500	$873,700	$1,828,200	$811,200	$742,600	$1,553,900
Greenville	Greenville Municipal Airport	4G1	$377,600	$378,600	$756,200	$388,300	$363,400	$751,700
Grove City	Grove City Airport	29D	$11,352,800	$8,776,800	$20,129,600	$8,725,300	$7,051,100	$15,776,400
Harrisburg	Capital City Airport	CXY	$32,186,100	$26,517,200	$58,703,300	$30,683,900	$25,393,400	$56,077,300
Hazleton	Hazleton Regional Airport	HZL	$7,843,700	$5,542,200	$13,385,900	$9,030,800	$7,391,900	$16,422,800
Honesdale	Cherry Ridge Airport	N30	$1,267,400	$1,067,700	$2,335,100	$696,000	$482,600	$1,178,500

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Output	Multiplier Output	Total Output	Direct Output	Multiplier Output	Total Output
Horsham	Horsham Valley Airways Heliport	N48	$7,500	$8,400	$15,900	$5,000	$5,000	$10,000
Indiana	Indiana Co./Jimmy Stewart Field	IDI	$926,500	$874,900	$1,801,400	$705,600	$537,500	$1,243,100
Irwin	Inter County Airport	31D	$15,100	$16,800	$31,900	$11,200	$11,100	$22,300
Jeannette	Greensburg-Jeannette Regional Airport	5G8	$18,600	$20,500	$39,100	$51,800	$51,100	$103,000
Jersey Shore	Jersey Shore Airport	P96	$15,600	$17,300	$32,900	$10,400	$10,300	$20,700
Kralltown	Bermudian Valley Airpark	07N	$68,700	$72,400	$141,100	$63,400	$62,100	$125,500
Lebanon	Keller Brothers Airport	08N	$76,500	$71,300	$147,800	$55,200	$51,500	$106,600
Lehighton	Beltzville Airport	14N	$15,300	$17,000	$32,200	$11,500	$11,300	$22,800
Lehighton	Jake Arner Memorial Airport	22N	$4,303,700	$3,657,600	$7,961,300	$3,406,000	$3,112,100	$6,518,200
Lock Haven	William T. Piper Memorial Airport	LHV	$7,210,700	$5,903,000	$13,113,700	$5,571,100	$4,146,200	$9,717,400
Meadville	Port Meadville Airport	GKJ	$3,525,000	$2,893,600	$6,418,600	$2,784,000	$2,294,600	$5,078,500
Mifflintown	Mifflintown Airport	P34	$43,900	$46,400	$90,300	$32,000	$31,400	$63,400
Monongahela	Rostraver Airport	FWQ	$14,358,400	$12,846,400	$27,204,800	$10,942,300	$9,614,200	$20,556,400
Morgantown	Morgantown Airport	O03	$299,500	$334,600	$634,100	$200,700	$199,900	$400,600
Mount Joy/Marietta	Donegal Springs Airpark	N71	$1,845,500	$1,786,100	$3,631,600	$1,733,800	$1,379,000	$3,112,800
Mount Pleasant	Mount Pleasant/Scottdale Airport	P45	$137,700	$153,700	$291,400	$74,100	$18,200	$92,300
Mount Pleasant	W.P.H.S. Heliport	P99	$9,121,400	$9,154,800	$18,276,200	$7,834,700	$7,107,900	$14,942,600
Mount Pocono	Pocono Mountains Municipal Airport	MPO	$6,372,100	$5,792,200	$12,164,300	$4,346,800	$2,971,800	$7,318,700
Myerstown	Deck Airport	9D4	$1,114,900	$1,103,700	$2,218,500	$984,900	$880,000	$1,864,900
New Castle	New Castle Municipal Airport	UCP	$3,142,700	$2,618,200	$5,760,900	$2,234,200	$1,626,500	$3,860,700
Palmyra	Reigle Field Airport	58N	$495,800	$469,500	$965,200	$488,600	$235,500	$724,100

Appendix C. Detailed Airport Impact Tables

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Output	Multiplier Output	Total Output	Direct Output	Multiplier Output	Total Output
Perkasie	Pennridge Airport	CKZ	$4,042,600	$3,523,200	$7,565,800	$2,607,400	$2,189,900	$4,797,300
Philadelphia	Northeast Philadelphia Airport	PNE	$548,092,900	$425,873,500	$973,966,300	$21,295,500	$12,294,000	$33,589,500
Philadelphia	Wings Field Airport	LOM	$34,965,400	$22,030,000	$56,995,400	$6,351,800	$5,824,700	$12,176,500
Philadelphia	Penn's Landing Heliport	P72	$8,393,500	$7,364,600	$15,758,100	$500,242,300	$388,703,000	$888,945,300
Philipsburg	Mid-State Airport	PSB	$554,800	$614,500	$1,169,400	$91,800	$91,400	$183,300
Philipsburg	Albert Airport	1N3	$177,400	$198,100	$375,500	$290,700	$288,100	$578,800
Pittsburgh	Allegheny County Airport	AGC	$73,786,900	$62,506,200	$136,293,100	$53,417,700	$42,296,200	$95,713,900
Pittsburgh	Pittsburgh Northeast Airport	9G1	$466,800	$516,600	$983,400	$274,600	$272,400	$547,000
Pittsfield	Brokenstraw Airport	P15	$176,800	$197,500	$374,300	$109,500	$109,000	$218,500
Pottstown	Heritage Field	PTW	$1,261,400	$1,308,800	$2,570,200	$3,448,300	$3,178,900	$6,627,200
Pottstown	Pottstown Municipal Airport	N47	$4,491,700	$4,706,200	$9,197,900	$1,201,800	$932,100	$2,133,900
Pottsville	Schuylkill Co./Joe Zerbey Airport	ZER	$11,324,200	$10,296,200	$21,620,400	$13,592,600	$14,157,400	$27,750,000
Punxsutawney	Punxsutawney Municipal Airport	N35	$412,200	$393,200	$805,400	$368,800	$320,500	$689,300
Quakertown	Quakertown Airport	UKT	$3,141,400	$2,723,200	$5,864,500	$4,345,000	$3,404,900	$7,749,900
Reading	Reading Regional/ Carl A. Spaatz Field	RDG	$42,936,000	$35,048,700	$77,984,700	$28,671,200	$25,038,200	$53,709,400
Reedsville	Mifflin County Airport	RVL	$1,018,500	$908,900	$1,927,400	$834,000	$674,300	$1,508,300
Selinsgrove	Penn Valley Airport	SEG	$5,589,600	$5,442,900	$11,032,500	$3,825,400	$3,187,200	$7,012,700
Shamokin	Northumberland County Airport	N79	$455,400	$459,300	$914,700	$475,900	$453,700	$929,600
Slatington	Slatington Airport	69N	$308,700	$343,200	$651,900	$208,700	$207,400	$416,100
Smoketown	Smoketown Airport	S37	$2,255,200	$2,075,800	$4,330,900	$2,404,100	$1,918,100	$4,322,100
Somerset	Somerset County Airport	2G9	$1,306,500	$1,149,700	$2,456,300	$1,115,500	$913,600	$2,029,100
St Marys	St. Marys Municipal Airport	OYM	$1,067,400	$1,041,300	$2,108,700	$781,900	$645,900	$1,427,800

Associated City	Airport Name	FAA ID	2019 Base Year			2020 Base Year		
			Direct Output	Multiplier Output	Total Output	Direct Output	Multiplier Output	Total Output
Sterling	Spring Hill Airport	70N	$171,900	$189,200	$361,100	$87,900	$27,200	$115,200
Stewartstown	Shoestring Aviation Airfield	0P2	$14,100	$14,200	$28,300	$9,700	$9,300	$19,100
Sunbury	Sunbury Airport	71N	$241,800	$261,400	$503,200	$108,500	$97,100	$205,700
Sunbury	Sunbury Seaplane Base	H11	$7,500	$8,400	$15,900	$5,000	$5,000	$10,000
Titusville	Titusville Airport	6G1	$388,200	$385,300	$773,500	$482,600	$432,400	$915,000
Toughkenamon	New Garden Flying Field Airport	N57	$5,511,300	$5,247,600	$10,758,900	$3,132,500	$2,401,400	$5,533,900
Towanda	Bradford County Airport	N27	$2,781,700	$2,318,800	$5,100,500	$2,615,700	$2,138,900	$4,754,600
Tower City	Bendigo Airport	74N	$45,700	$44,600	$90,300	$23,000	$22,200	$45,200
Tunkhannock	Skyhaven Airport	76N	$2,446,100	$2,560,400	$5,006,500	$1,562,800	$1,408,600	$2,971,400
Unionville	Ridge Soaring Gliderport	79N	$123,800	$111,300	$235,100	$85,500	$78,300	$163,800
Washington	Washington County Airport	AFJ	$30,243,000	$26,224,400	$56,467,400	$19,100,400	$17,107,300	$36,207,700
Waynesburg	Greene County Airport	WAY	$686,900	$577,100	$1,264,000	$702,100	$520,900	$1,223,000
Wellsboro	Wellsboro Johnston Airport	N38	$284,600	$221,700	$506,300	$330,900	$220,500	$551,400
Wellsville	Kampel Airport	2N5	$15,000	$16,800	$31,800	$12,000	$12,000	$24,000
West Chester	Brandywine Airport	OQN	$5,877,700	$4,847,400	$10,725,100	$4,559,100	$3,364,000	$7,923,100
Wilkes-Barre	Wilkes-Barre Wyoming Valley Airport	WBW	$666,300	$604,400	$1,270,700	$263,900	$241,700	$505,600
Williamsburg	Cove Valley Airport	6G6	$15,300	$17,000	$32,300	$11,100	$11,100	$22,200
York	York Airport	THV	$7,046,200	$5,718,800	$12,765,100	$6,199,800	$4,526,100	$10,725,900
Zelienople	Zelienople Municipal Airport	PJC	$19,320,000	$13,882,600	$33,202,600	$12,740,800	$10,512,700	$23,253,500
		Total	$17,963,830,100	$15,010,091,618	$32,973,921,700	$7,948,662,100	$6,867,000,800	$14,815,662,900

Note: Totals may not sum due to rounding. Sources: Calculations using IMPLAN, 2019, 2020; Kimley-Horn, 2022

Note: Totals do not include impacts related to off-airport businesses near PHL and PIT. Aviation-related output near PIT and PHL can be found in Table C-12

Appendix D. Real-Life Stories

As noted in the Introduction, airports provide a variety of unique benefits to their surrounding communities by supporting and facilitating numerous activities, industries, and services. From providing a critical link to the medical system through air ambulance services to training the next generation of aviators through aviation education programs, airports serve a critical role in their local communities above and beyond the quantifiable economic contribution that they make to Commonwealth. To document some of the ways in which airports support the quality of life for Pennsylvanians, a series of real-life stories are included in this appendix. These narratives tell the story of different aviation users, stakeholders, and benefits that the general public may not inherently recognize.

Pennsylvania Builds Upon Its Rich History in the Aerospace Industry

The modern aerospace industry has deep roots in the Philadelphia Metropolitan Statistical Area (MSA), owing to its geographical location in the Mid-Atlantic Region. During World War II and the subsequent economic expansion, the MSA flourished in the military and defense sector due to its strong port and its proximity to the Nation's Capital. Helicopters and associated parts are manufactured for both military and civilian customers by several large companies, most notably Boeing Rotorcraft Systems, Lockheed Martin, and Leonardo Helicopters US. Boeing's Ridley Park site alone employed over 4,600 workers as of 2020.[1] The Philadelphia MSA and surrounding region have a unique density of rotorcraft companies that also provide a robust aftermarket supplier base, many repair facilities, and training opportunities. The following story highlights one of Pennsylvania's largest aerospace companies, which operates at Northeast Philadelphia Airport (PNE).

Leonardo Helicopters US Is Training the World from the Northeast Philadelphia Airport (PNE)

Leonardo Helicopters US is an Italian-owned aerospace and defense company that not only designs, produces, and maintains a wide selection of rotorcraft, but also trains and certifies pilots and technicians. Their full range of services is provided at their sprawling campus at PNE. While many U.S. companies are relocating manufacturing out of the country, Leonardo Helicopters US is committed to maintaining and expanding operations in Philadelphia, recently making an $80 million investment to build a training facility on their campus.

Leonardo operates a state-of-the-art Training Academy at PNE. This Training Academy, one of four globally and the sole location in the western hemisphere, trains and certifies pilots and technicians from numerous nations. The Training Academy utilizes three full-flight motion simulators, employing augmented reality and artificial intelligence. Leonardo takes pride in supporting and training customers who save lives, including emergency medical services (EMS), fire, search and rescue, police, and military personnel from around the world.

PNE has been home to Leonardo Helicopters US for over 40 years and employs over 900 full-time and contract workers. The company credits PNE with being a proactive partner in its operation. Michael Cooper, Manager of External Relations for Leonardo stated "[PNE is] a big contributor to our success in production and after-market support in North and Central America. The agility PNE gives us to test our aircraft to ensure quality, host demonstration flights for prospective customers, and train experienced pilots, all at the very same site we manufacture, engineer, and manage all other operations, is unique to our industry in the U.S. Without this critical piece of infrastructure, we really could not otherwise effectively operate in this city or region." PNE is integral to helping the company develop and test the AW609, the world's first commercial tiltrotor, which has the potential to revolutionize civilian aviation.

Economically, Leonardo provides considerable revenue generation for the City of Philadelphia and the surrounding region. The company brings in people the world over for multi-week trainings at its Training Academy, providing a massive boost via hotel stays, restaurant visits, travel, and more. Leonardo also provides charitable donations, giving directly to veterans' organizations, the EMS community, and local schools.

Photo Courtesy of Leonardo Helicopters US

Photo Courtesy of Leonardo Helicopters US

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[1] Burkholder, Sophie (2020). Boeing's Ridley Park plant receives $265M contract from Pentagon for 9 Chinook helicopters. The Philadelphia Inquirer. https://www.inquirer.com/business/boeing-20200804.html

Air Ambulances Provide Critical Care to Pennsylvanians in Need

Air ambulances are used to quickly transport patients in life-threatening situations. Air ambulance services have grown significantly in recent decades, owing potentially to an aging population, a decline in the number of emergency departments in existing hospitals, and changes to rural health care delivery.[1] Air ambulance services can exist independently, in association with hospitals, and/or in association with airports. Seventy percent of Pennsylvania's airports reported at least occasional medical transportation flights, which include air ambulance activity.[2] Committed to providing quality emergency care, hospital networks within the Commonwealth have coordinated with local airports to provide air ambulance services. As the need for air ambulance services continues to rise, these partnerships will be crucial for ensuring Pennsylvanians and residents in surrounding states continue to get the medical care they need, when they need it. The following stories highlight two of Pennsylvania's air ambulance providers.

UPMC STAT MedEvac – Center for Emergency Medicine (CEM) of Western Pennsylvania Provides Critical Care Air Transportation Service

The Center for Emergency Medicine of Western Pennsylvania (CEM) is a business unit of UPMC. UPMC is dedicated to improving emergency medicine and pre-hospital care. CEM consists of several divisions focusing on transport, education, and research. Each division works to improve emergency medicine and reduce morbidity and mortality rates within their service areas which cover most of western Pennsylvania and certain surrounding states.

STAT MedEvac is a critical care transport system and is the clinical arm of the CEM. Since beginning operations in 1984, STAT MedEvac has been committed to providing service to critical care patients, averaging over 9,000 critical patient transports each year. STAT MedEvac operates 18 helicopter bases, including 13 in Pennsylvania alone. Seven of these bases are located at Pennsylvania airports, with the remaining six bases located at hospitals or standalone sites. CEM President James Houser noted STAT MedEvac services provide jobs to local communities, as well as revenue to the airports utilized as base sites.

Photo Courtesy of STAT MedEvac

Mr. Houser notes that "STAT MedEvac provides comfort to the community by offering critical care services. STAT MedEvac employees also live within these communities and are actively engaged with the community, working with providers, patients, and local emergency responders." Air ambulance services are something most people do not think about until they need them. By staffing sites 24/7, air medical transportation is available to patients around the clock.

Lehigh Valley Health Network (LVHN) MedEvac Provides Critical Care Air and Ground Transportation in Northeast Pennsylvania

LVHN MedEvac is based in Pennsylvania's Lehigh Valley and began operations in 1981. LVHN MedEvac is only the second medical program in the state to provide air medical transportation services and the first to provide service to northeastern Pennsylvania. LVHN MedEvac services also support patients from surrounding states such as Massachusetts, New York, New Jersey, and Ohio.

LVHN MedEvac operates four helicopters and one ambulance 24 hours a day, seven days a week. Air ambulance services are typically utilized for critically ill patient transports from hospital to hospital or from an incident scene to the appropriate hospital. Base Manager for LVHN MedEvac #4, Mark Walck explained, "Base #4 is located at the Hazleton Regional Airport and provides air transportation services to the local community. We operate 24/7 and utilize the airport not only as our base but as a resource to help our operations."

Photo Courtesy of LVHN MedEvac Base #4

Walck continued, "Without this service, there would be unnecessary pain and suffering." Walck also emphasized the time savings realized by air medical transport, noting that trips that may "take an hour by ground transportation can be cut down to 18 minutes by helicopter." From Hazleton Regional Airport, MedEvac Base #4 has been known to travel to New York City, Philadelphia, Danville, and Wilkes-Barre to provide service to patients.

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[1] National Association of Insurance Commissioners (NAIC), "Air Ambulances" https://content.naic.org/cipr_topics/topic_air_ambulances.htm

[2] Pennsylvania Department of Transportation, Bureau of Aviation, Aviation Economic Impact Study findings from Airport Managers Survey

Activities for the Community offered by Pennsylvania's Airports

Pennsylvania has one of the most advanced aviation systems in the country, and the Commonwealth's airports support businesses, tourism, and education. While encouraging economic development and facilitating travel, Pennsylvania's airports also support community engagement and community service in their local regions. Whether hosting events or fundraisers themselves, or being home to a community service-oriented club or organization, Pennsylvania's airports help foster a sense of community and goodwill. Numerous airports within the Commonwealth reported community engagement activities on a daily or weekly basis. The following stories highlight two of many community service activities associated with Pennsylvania's airports.

Future Aviators Summer Camp at New Garden Flying Field (N57)

Created and hosted by New Garden Flying Field , the Future Aviators Summer Camp is a day-camp program for children ages seven to 15. This camp is intended to ignite excitement for aviation in the next generation of aviators. The program includes a week of hands-on aviation and science projects, activities, museum and airport tours, and other aviation experiences.

N57 Airport Manager Jon Martin says "Future Aviators Summer Camp is my favorite time of year. The airport becomes full of youth and energy." The program provides opportunities for campers to eventually become future camp counselors, airport employees, and pilots. Mr. Martin notes there have been several former campers who have entered the aviation field as pilots for the U.S. military, corporate pilots, hangar tenants, and more, adding that, "The camp is a great public relations tool for the airport because it raises awareness about the facility and career opportunities that are available."

Since its inception, the camp has held 1,600 discovery flights for campers with participation growing every year. Mr. Martin stated that, "There were about 185 campers at our most recent camp. We've had people travel from all over the country and even had some campers participate from abroad." Additionally, local schools participate in an extended version of the camp by bringing students to the airport one day a week for the program.

When asked what he'd like the public to know about the program and its support of aviation, Mr. Martin replied "I would like to get the message out to the community that there is a local airport. The airport has value to the community beyond a monetary benefit. It is committed to promoting aviation and providing young community members the ability to learn about the industry."

EAA Chapter 518 & Soaring Events at Mifflin County Airport (RVL)

The Mifflin County Airport is committed to encouraging general aviation and air commerce, enhancing economic development, and promoting prosperity in the area. The airport also hosts Experimental Aircraft Association (EAA) Chapter 518, a group of aviation enthusiasts, aircraft builders, and pilots who work together to serve the local aviation community.

EAA Chapter 518 hosts monthly fly-in breakfasts at RVL. Local community members are encouraged to participate in the breakfasts in hopes of boosting interest and awareness of aviation and the airport. RVL Chairwoman Beth Reifsnyder discussed the fly-ins: "On a good weather day, the fly-in breakfast events attract 75 to 80 aircraft, and total attendance reaches close to 300 participants…many community members frequent the monthly breakfasts, and most will drive to the airport and stay to watch the airplanes take off." Committed to working with the community, EAA Chapter 518 utilizes fundraising efforts to offset the cost of ground school for community members. Ms. Reifsnyder explained, "EAA Chapter 518 is always looking for new members…they are very involved in working with private clubs and groups to help the community understand the benefits of the airport."

EAA Chapter 518 and airport officials have teamed up with the local Juniata River Valley Chamber of Commerce and Visitors Bureau to help promote the airport and the unique events that are hosted there throughout the year. Among those events is the popular Mifflin County Soaring Association's glider events. Ms. Reifsnyder explained, "The glider events are a pay-to-participate event that is a weeklong competition. Participants utilize non-motorized aircraft to navigate a specific route with participants gaining points for different locations along the route." The airport assists this event by shutting down runway operations for several hours each day as the gliders are assisted in launching. Local community members are encouraged by the Juniata River Valley Chamber of Commerce and Visitors Bureau and the Mifflin County Airport to visit the airport during these events.

Mifflin County Soaring Event - Photo Courtesy of RVL Facebook Page

Aviation Education Ensures that Pennsylvania's Next Generation of Aviation Professionals is Ready for Work

The United States is facing a shortage of workers in all facets of the aviation industry, including pilots, aircraft mechanics, air traffic controllers, and airport professionals. Industry experts agree that one way to counter this shortage is by "reverse networking," or promoting aviation careers in high schools, trade schools, and colleges.[1] Pennsylvania provides a variety of aviation education programs, many affiliated with the Commonwealth's airports, supporting all aviation careers and spurring a love of aviation in the next generation. Pennsylvania's aviation educational programs promote and support those interested in the industry while assisting students as they advance their aviation careers. The following stories highlight two of many educational opportunities in Pennsylvania, including a unique high school curriculum and a college program focused on aviation.

AOPA STEM Curriculum – Wellsboro High School Soaring In Aviation

Located in rural north-central Pennsylvania, Wellsboro High School is home to approximately 400 students. Since 2017, the school has offered a four-year elective program using the Aircraft Owners and Pilots Association (AOPA) science, technology, engineering, and math (STEM) curriculum, with each course spanning 36 weeks for one credit each. In coordination with Wellsboro-Johnson Airport (N38), Wellsboro High School administers the program to support their students' career ambitions by exploring the areas of flying, aerospace engineering, and unmanned aircraft systems (UAS). The AOPA STEM Curriculum has attracted the interest of 20 students since it first began and is designed for students to begin in 9th grade and continue through their senior year. The program also piqued the interest of now instructor Francis Novak. Mr. Novak said after previously working in a neighboring school district, he decided to apply at Wellsboro High School when he saw the Aviation Curriculum. "The program seemed like an exciting opportunity to not only help the students but also to educate myself in aviation as well." A unique feature of the program is the relationship with N38, which provides an opportunity for students to engage in flight simulator activities during their sessions at the airport in addition to the five simulators located at the high school. Students also have coordinated with the airport to begin flight training as their education advances throughout the course. Additionally, students may volunteer at the airport for fly-in breakfasts throughout the year, which provide excellent opportunities to network with those passionate about their field.

Aviation Maintenance Technology & Aviation Electronics Technology – Pittsburgh Institute of Aeronautics (PIA) Prepares a Unique Workforce for Success

The aviation industry has seen an increased demand for skilled workers over the last 15 years, with demand expected to increase even further through 2038. Recent reports from the Boeing Pilot & Technician Outlook, North America (2020-2039) state that approximately 192,000 new technicians will be needed by 2039. Set to address this need, Pittsburgh Institute of Aeronautics (PIA) is committed to preparing the next generation of aviation maintenance and aviation electronics technicians to enter the workforce. Since 1929, PIA has provided quality education programs to those who wish to enter a career in aviation maintenance technology. The institute consists of PIA's Main Campus at the Allegheny County Airport (AGC), with three additional branch campuses located in Hagerstown, Maryland, Myrtle Beach, South Carolina, and Youngstown, Ohio. All branch campuses offer diploma or certificate programs in Aviation Maintenance Technology, while the main campus also offers Associate in Specialized Technology (AST) degrees in Aviation Maintenance and Aviation Electronics Technology.

There are currently 291 students enrolled at the main campus. Suzanne Markle, President and CEO of PIA, said "We are the country's best-kept secret. We are preparing the workforce to enter fields that provide great opportunities for advancement, while also assisting graduating students with employment opportunities. There has been a strong demand for positions in aviation maintenance and electronics technology over the last 15 years. The last career fair we hosted at the main campus location welcomed 39 employers for a graduating class of 33 students."

The main campus is heavily involved with the community, as it not only provides higher education opportunities to students who live and work in the area but also provides career opportunities to local community members. PIA is AGC's largest tenant with 65 employees and nearly 300 students. Almost all students attending the main campus live and work in the Allegheny County area.

Photo Courtesy of Pittsburgh Institute of Aeronautics

Photo Courtesy of Pittsburgh Institute of Aeronautics

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[1] National Business Aviation Association (NBAA), "Addressing Business Aviation's Personnel Shortage," https://nbaa.org/professional-development/workforce-initiatives/addressing-business-aviations-personnel-shortage/

Emergency and Disaster Response Take Flight from Pennsylvania's Airports

Airports are a crucial component of emergency management and disaster response. The Federal Emergency Management Agency (FEMA) outlines four phases of emergency management: Mitigation, Preparedness, Responses and Recovery. The Response phase occurs in the immediate aftermath of an emergency or disaster. As responses to these events are necessarily immediate, it is imperative that emergency managers are prepared for and able to engage in response efforts without delay. Committed to assisting local, regional, state, and federal response efforts, Pennsylvania's airports provide aviation support and storage for task forces and Civil Air Patrol (CAP) squadrons throughout the state. The following stories highlight two of many Pennsylvania airports with roles in emergency and disaster response.

Allegheny County Airport (AGC) Supports Nation's Civil Air Patrol

The CAP is a United States Air Force Auxiliary founded in 1941 to mobilize the nation's civilian aviation resources for national defense service. Since its inception, CAP has evolved into a public service organization that continues to carry out emergency service missions when needed.

In Pennsylvania, there are 44 active squadrons, 23 of which meet at airports across the state. Pennsylvania Wing Commander, Colonel Kevin Berry, and Allegheny County Squadron Commander, Uri Shatten, spoke about Squadron 602, located at the Allegheny County Airport. Squadron 602 is comprised of 50 members representing both cadets and senior members. The squadron primarily serves Allegheny County but will also respond to surrounding states for emergency services. Cadets and senior members can be "called out" for search and rescue missions to assist local responders for missing persons or downed aircraft. They can also be requested to assist larger missions involving FEMA, the National Guard, and additional U.S. military entities for natural disaster and recovery efforts. Col. Berry said, "Aviation allows emergency response to many locations much faster than it typically would be using other methods of transportation. Aerial views and imagery can be extremely unique and helpful in emergency situations."

Locally, Squadron 602 engages with the community and the local airports by providing education in aerospace, safety briefings and trainings to local pilots, and engages with schools in the area to promote interest in cadet programs. Col. Berry said, "One of the most rewarding parts of aviation is to get young people excited and interested in aviation and to see their interest continue to grow over the years."

The CAP has 11 dedicated aircraft in Pennsylvania that perform search and rescue efforts. Recently, CAP has been advancing in the use of Unmanned Aircraft Systems (UAS), utilizing drones to capture aerial views and imagery for emergency events. As volunteers, bases, and planes are distributed throughout Pennsylvania, CAP can be in the air performing response efforts within two hours from the initial call for assistance. Last year, CAP assisted in saving 141 lives nationwide.

Arnold Palmer Regional Airport (LBE) Plays Its Part in Emergency Response Task Force

Committed to emergency and disaster response, the Westmoreland County Airport Authority spearheaded efforts to create and maintain a regional emergency and disaster storage center at the Arnold Palmer Regional Airport's Public Safety Building to support emergency operations. The facility is unique, as it provides an operations center away from the disaster scene and potential risks, which allows for more efficient planning and staging of equipment.

Region 13 Task Force coordinates with local, county, state, and federal organizations to provide emergency and disaster response to 13 counties within southwestern Pennsylvania. Completed in 2014, LBE's Public Safety Building is home to consolidated storage for Region 13 Task Force equipment, Mutual Aid Ambulance Service, and a backup 911 center. Airport Manager Gabe Monzo explained that the region has wide-ranging equipment for use during large-scale emergencies. Additionally, the facility provides Transportation Security Administration (TSA) training and medical storage, and most recently, COVID-19 related medical equipment and personal protective equipment (PPE).

"By having this facility at the airport, it tethers aviation and medical response capabilities together. Whereas a lot of medical equipment could be stalled by using ground transportation, the airport allows for equipment to be flown and utilized quickly," stated Mr. Monzo.

Photo Courtesy of Westmoreland County Airport Authority

Essential Air Service Guarantees Smaller Pennsylvania Communities Have Access to the National Air Transportation System

The United States Department of Transportation (USDOT) implemented Essential Air Service (EAS) to address concerns that communities with lower traffic levels could potentially lose access to the national air transportation system if commercial carriers were to transition their operations solely to larger and more profitable markets after the 1978 Airline Deregulation Act passed. With EAS in place, the USDOT subsidizes a minimum number of guaranteed round trips for eligible communities to connect passengers to major hub sites, where they can access flights to almost anywhere in the world. The USDOT currently subsidizes commuter and certified air carriers that provide service to approximately 115 communities in the lower 48 states, including two airports in Pennsylvania. The following stories highlight two airports providing EAS service to some of Pennsylvania's smaller communities.

John Murtha Johnstown – Cambria County Airport (JST) Provides EAS in Southwestern Pennsylvania

The John Murtha Johnstown – Cambria County Airport offers convenient services that are different than many large airports. At JST, passengers can expect free parking and short, quick Transportation Security Administration (TSA) lines, while still offering non-stop jet service. This allows passengers to arrive at JST closer to their flight departure time and enjoy hassle-free flights. SkyWest Airlines, flying under the United Express banner, provides EAS air carrier service at JST. SkyWest offers one daily non-stop jet flight to both Chicago O'Hare International Airport (ORD) and Washington Dulles International Airport (IAD). Cory Cree, JST Airport Manager, noted "The Essential Air Services provided by SkyWest Airlines at JST provides businesses with the ability to travel to the Chicago and Washington, D.C. areas from an airport that is located less than 10 minutes from the local business community in the City of Johnstown." With EAS at JST, business and leisure travelers in the region benefit from reduced travel times and greater access to reach locations across the globe. Mr. Cree added, "We want JST to be viewed as an asset to the community by providing free parking, short TSA lines, and convenient daily non-stop jet services to ORD and IAD."

Lancaster Airport (LNS) – From Southeast Pennsylvania to Anywhere in the World

Lancaster Airport is served by Southern Airways Express which provides EAS air carrier service at LNS. From Monday to Friday, Southern Airways Express offers two daily flights to Pittsburgh International Airport (PIT) and three daily flights to IAD. On weekends, one flight is offered to PIT each day, and one Saturday and two Sunday flights are offered to IAD. LNS also offers a weekly flight to Nantucket Memorial Airport (ACK), and during the football season, special flights to University Park Airport (UNV). Ed Foster, Airport Director at LNS, and Cheryl Martin, Finance Administrator at LNS, highlighted that "The EAS offered at LNS provides passengers access to nearly anywhere in the world from a rural area, with free parking and hassle-free flying. We have agreements with American [Airlines], Alaskan [Airlines], and United Airlines, so connecting to international destinations is a breeze." Beyond access to international destinations, EAS at LNS impacts the airport and local community by providing jobs, increasing fuel sales, collecting payroll taxes, and generating additional business in the local community. Ed and Cheryl remarked "Without LNS and the EAS service it provides, people would have to travel much further by vehicle for other means to fly. In general, LNS provides great connectivity for a rural area to larger cities and major transportation hubs."

Photo Courtesy of Cambria County Airport (JST)

Photo Courtesy of Lancaster Airport (LNS)

Pennsylvania's Airports Work to Preserve Our Nation's Rich History

As one of the 13 original colonies, Pennsylvania's history runs deep. The state is home to many historically significant monuments, such as Independence Hall and the Liberty Bell, as well as several airports and businesses that were key to the growth of aviation. In fact, the Taylor Cub and the iconic J-3 Piper Cub were first designed and manufactured in Pennsylvania by Taylorcraft Aircraft and Piper Aircraft, respectively. The L-4 Piper Cub, a J-3 Cub that sported a drab olive paint job for camouflage, was used extensively in World War II (WWII) as well as the Korean War for reconnaissance, supplies transport, artillery spotting, and medical evacuation. The history of aviation, as well as the historic sites located within the state, generate interest not only from those in the aviation community but people from all walks of life. The following stories highlight airport and aviation's role in the Commonwealth's history.

Joseph A. Hardy Connellsville Airport (VVS) is a Historical Landmark

Joseph A. Hardy Connellsville Airport, located in the center of Fayette County, first opened in 1938 and was used heavily during WWII as a military airbase for fighter pilot training, as well as maintaining and repairing military aircraft for active service. John "Bud" Neckerauer, VVS Airport Manager, commented about the historical aspects of the airport: "One of the terminal buildings is named after Florence Shutsy-Reynolds, who was the first female pilot to get her license at Connellsville. Although placing second in her written exams for a pilot scholarship, she was pressured to give it up to one of the male students because only five scholarships were available. She refused and after receiving her license, ended up being one of the first women to fly military aircraft for the Women's Airforce Service Pilots in WWII." The main hangar served as a base for military flight operations until the war ended. After the war, Taylorcraft Aircraft used the main hangar to maintain and build aircraft. Mr. Neckerauer also provided the history of the airport after the war. "In the 1960s, the airport held sportscar races which were very popular events in the community. The Shelby Cobra, one of the fastest cars of its time, was tested in secret at the airport prior to its inaugural race. VVS works to preserve and promote the history of the airport. The main terminal building today is the original hangar building constructed for the U.S. military, which due to its historic significance, was restored in 2005 instead of being torn down and rebuilt." VVS also hosts historical fly-ins and school tours.

Reading Regional Airport (RDG) Honors the History of Aviation

Reading Regional Airport hosts the Mid-Atlantic Air Museum's annual WWII Weekend. The "Gathering of the Warbirds" is one of the largest events in the world of this type and commemorates the history of aviation by highlighting historic vehicles, aircraft, and reenactments. There are even opportunities for visitors to ride in historic WWII aircraft. The Mid-Atlantic Air Museum is the proud owner of the extremely rare Northrop P-61 Black Widow (only four remain in the world) and visitors come from all over the world to see it. 2021 was the 30th anniversary of WWII Weekend. The event also features a flea market where vendors sell all types of WWII memorabilia, including uniforms, 1940s fashion items, and more. The event truly takes attendees back in time and features a vehicle parade of both military and civilian vehicles, a 1940s fashion show, a radio show, and stage performances by tribute acts of 1940s-era stars such as Abbott and Costello, Frank Sinatra, Billie Holiday, Duke Ellington, and other cultural icons. The 2021 show hosted 40 encampments/reenactments, 80 aircraft, and 200 military vehicles. Terry P. Sroka, RDG Airport Manager, offered his insight regarding the airport's history: "RDG has had many roles since 1939, from a military base...to home to the Reading Aviation Service and the second largest aviation and maintenance airshow in the world, to a commuter airport, and now to a general aviation airport with numerous corporate operators using the facility. The airport strives to provide a safe facility and continues to promote the history of Pennsylvania aviation by supporting the widely popular WWII Weekend events held in partnership with the Mid-Atlantic Air Museum."

Mid-Atlantic Air Museum's World War II Weekend

Photo Courtesy of Reading Regional Airport (RDG)

Pennsylvania's High-Quality Maintenance and Repair Services Keep Aircraft Safe, Reliable, and in the Air

High-quality and easily accessible aircraft maintenance is critical to the safety, security, and efficiency of aircraft. Pennsylvania's airports serve as a base for many businesses that provide aircraft maintenance, repair, refinishing, and refueling services that keep aircraft flying safe and looking sharp. Aircraft owners and operators are required to keep up with routine maintenance in order to meet federal requirements and continue flying. Aircraft maintenance businesses provide a wide range of services from historic aircraft restoration, to large operations servicing commercial jets and airliners. Pennsylvania is home to a highly skilled and specialized workforce of technicians and engineers that are employed at these businesses, providing aircraft owners the services they need. This workforce and associated businesses are supported by Act 52 passed by the General Assembly of the Commonwealth of Pennsylvania in 2013 which made the sale of aircraft parts and components and aircraft services exempt from state sales tax. This has allowed this segment of the aviation industry to be highly competitive with surrounding states, many of which also provide tax exemptions. The following stories highlight two of Pennsylvania's many aircraft maintenance and repair businesses.

Donegal Springs Airport (N71) – Smart Avionics Keeps Aircraft Modern

Smart Avionics is an aircraft maintenance company located at the Donegal Springs Airport. Smart Avionics offers comprehensive avionics installation, inspection, and troubleshooting and repair services. They specialize in installing modern avionics in aircraft, including communications, navigation, electrical systems, intercoms, autopilots, and wiring. Smart Avionics also completes routine and regulated inspection work for aircraft to fly under instrument flight rules and offers job shadowing opportunities for high school students and others interested in a career in avionics. Benjamin Travis, who runs Smart Avionics, stated "Our business is centrally located and brings in people from central Pennsylvania, northern Maryland, New Jersey, western and southern New York, and all over the country. We help the airport by generating fuel sales and stimulate the local economy by providing skilled jobs and generating traffic to local businesses and sightseeing destinations, such as Amish country or Hershey." In 2020, Smart Avionics employed five full-time employees and one part-time employee.

Since 2003, Smart Avionics has offered unique avionics support that most small community airports do not offer, which drives business to N71 from other local airports. Mr. Travis also noted, "Pennsylvania's aviation community is tight-knit and supportive, so we have a good relationship with other local airports, and we willingly trade technical information to ensure our customers get high-quality service and can make well-informed decisions." The most rewarding aspects of working in avionics for the team at Smart Avionics include seeing an aircraft flying again after the completion of a major installation, being able to work with new technology, and helping pilots advance in their flying careers because of the services the business provides.

Washington County Airport (AFJ) – Friend Air Care Provides Unique Services to Pennsylvania's Aviation Community

Since 1992, Friend Air Care has been inspecting and repairing private, corporate, and airline turbine and jet aircraft at the Washington County Airport. Oliver Poppenberg, manager of Friend Air Care, spoke about the services they provide. "We are unique in that we work on the Piper Cheyenne series of planes, as well as Cessna Citations and Beech King Aircraft. Customers tell us that we are one of the best places in the world that works on Cheyennes. We have customers from all over the world, including aircraft from Canada, Mexico, Brazil, and Israel. Our business supports the airport with 20 local employees, and we regularly subcontract work to other local companies that specialize in paintwork, tool and die, and non-destructive testing, which bolsters the local economy." In addition to customers that fly in, Friend Air Care has regular customers based at the airport including an air ambulance company and a charter service. Additionally, Friend Air Care serves Allegheny County and the greater Pittsburgh area with remote services and completes avionics work in partnership with Garmin as a Garmin dealer. Mr. Poppenberg noted that "Working in aviation is rewarding. We make a big difference in people's lives by ensuring air ambulance and charter services can deliver donor organs, medications, and other medical services."

Custom Grumman Cougar Panel: Photo Courtesy of Smart Avionics

Friend AirCare Facility: Photo Courtesy of Friend AirCare

Pennsylvania's Airports Support Military Activity Across the Commonwealth and Beyond

Military operations are vital to the safety and security of the United States. While the various branches of the U.S. military operate independently, many aviation operations co-locate with airports where their activities can exist harmoniously. The military may share airport facilities and services with civilian operations at a joint-use airport, or they may have their own private facilities at a dedicated air base. Pennsylvania airports have long supported military operations in the Commonwealth by providing access to their facilities which are conveniently and strategically located to assist with operations across the Atlantic Ocean. The following story highlights one such military operation at Pittsburgh International Airport (PIT).

Pittsburgh International Airport (PIT) Hosts Air National Guard's 171st Air Refueling Wing

Located on Pittsburgh International Airport's property, the 171st Air Refueling Wing (ARW) is an Air National Guard unit that provides air refueling to U.S. Department of Defense (DOD) and North Atlantic Treaty Organization (NATO) aircraft. The ARW is the only Super Tanker Wing in the Air National Guard, home to 16 KC-135 Strato Tankers. Located near the east coast, the 171st can provide an "air bridge" over the Atlantic Ocean, providing refueling services to aircraft that do not have the range to get over the ocean without refueling. The secondary mission of the unit "…is cargo and passenger transportation. In performing this secondary mission, our tankers are continuously called upon to airlift cargo and passengers worldwide. It is not unusual for several of our aircraft to be deployed simultaneously to various locations around the globe performing real-world missions (refueling and airlift). The wing is proud to support two Geographically Separated Units (GSUs), the 258th Air Traffic Control Squadron in Johnstown, Pennsylvania and the 146th Weather Flight, a Special Operations Command unit." [1]

Senior Master Sergeant (SMSgt) Shawn Monk spoke about the ARW and the support it provides the local community. "The ARW supports the local and regional community by providing homeland defense 24/7. Guardsmen are prepared to respond to events like local natural disasters. Recently guardsmen from the ARW assisted in the safe decontamination of a Beaver County nursing home and have provided security for national-level events like the presidential inauguration. In addition to that, every year the ARW participates in the innovative readiness training program where our guardsmen in the Civil Engineer Squadron assist communities in building facilities and providing services helping to develop stronger partnerships in the community while providing real-world civil engineer training for the Guardsmen."

The ARW's location at PIT provides a prime site for operation. The airport supports the ARW by providing emergency and maintenance services and the ARW recognizes PIT as a vital resource and partner to accomplish their military missions. The ARW supports the local and regional community by providing tours, participating in speaking engagements, and taking part in air shows to engage with community members and support airport operations. Additionally, the ARW offers significant economic contributions by providing employment opportunities and hosting drill weekends that typically bring in over 1,200 employees each month, stimulating the local economy.

Photo Courtesy of U.S. Air National Guard

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[1] https://www.171arw.ang.af.mil/About-Us/

Pennsylvania's Airports Provide a Gateway to Countless Tourist Attractions

Pennsylvania is home to a wide variety of tourist attractions, including an abundance of historical sites, museums, monuments, resorts, family vacation spots, and theme parks. Pennsylvania also has thousands of acres of public lands and waters for visitors to enjoy outdoor recreation opportunities such as hiking, biking, skiing, kayaking, hunting, fishing, or simply spending a leisurely day outside in the vast beauty of Pennsylvania's woods. Visitors flock from all over the United States and beyond to experience all that Pennsylvania has to offer. Pennsylvania's airports play a critical role in promoting and supporting tourism. Regardless of where a visitor may want to go, there is an airport in Pennsylvania close by to provide fast and convenient transportation and access to tourist attractions throughout the state. The following stories highlight how two of Pennsylvania's airports support tourism in the Commonwealth.

Somerset County Airport (2G9) Supports a Monument to American Bravery

On September 11, 2001, the U.S. was attacked when four airliners were hijacked by terrorists to target significant locations on American ground. Due to the heroic and selfless actions of 40 passengers and crew members aboard Flight 93, the terrorists' attack on the U.S. Capitol was prevented, and the plane crashed in an open field next to a wooded area in Stonycreek Township, Somerset County, Pennsylvania. A memorial, consisting of their names engraved on eight-foot-high white marble panels, was constructed on-site to commemorate the bravery of the passengers and crew. Tourists go to the visitor and memorial plazas, then walk the curving walkway and 40 Memorial Graves that circle around the crash site and eventually wind down through the wetlands. Dave Wright, Somerset County Airport Manager, spoke to the airport's support of tourism to the Flight 93 Memorial and other attractions in the area. "Somerset County Airport is the closest airport to the Flight 93 Memorial commemorating the heroic and selfless actions of those that prevented the terrorist-hijacked aircraft from reaching its intended target. The memorial attracts roughly 600,000 visitors each year, and we provide a convenient way to fly in and visit the crash site. Other than the Flight 93 Memorial, we are also close to the Nine for Nine Memorial for the nine miners that were trapped underground in the Quecreek Mine in Somerset. Our area also has opportunities for many outdoor activities. Some of the most popular destinations are Seven Springs and Hidden Valley ski resorts." The airport supports the local community by providing a public use facility and a crew car that provides access to businesses and attractions in the surrounding area.

University Park Airport (UNV) Welcomes Tourists to Penn State Football Games and More

University Park Airport is owned and operated by The Pennsylvania State University (PSU or Penn State) and includes a fixed-base operation (FBO) known as the Penn State Aviation Center. The Centre County Airport Authority operates the terminal building. While the airport attracts its share of Penn State football fans, the area is not limited to team sports. Bryan Rodgers, C.M., UNV Airport Director, offered: "UNV has four airlines in operation, including Allegiant, American, Delta, and United. Allegiant serves two destinations in Florida, and the others serve multiple airline hubs which provide a key travel service for PSU, State College, and central Pennsylvania. The airport posted a record 193,534 passenger enplanements in 2019. On the FBO side, the biggest attraction is Penn State home football games. During football season, State College becomes known as the third largest city in Pennsylvania." Beaver Stadium has the capacity to seat 106,572 people and is the second largest football stadium in the country. Fans come to tailgate and experience the overall event and comradery that surrounds PSU Nittany Lions games. Other sports tournaments are also becoming more popular in the area, and facilities are being developed to host other athletic events. At times, the airport reaches its maximum capacity with all of the traffic for Penn State football games. Mr. Rodgers added, "Happy Valley Adventure Bureau is the regional tourism entity that advertises other aspects of tourism and outdoor opportunities [in the area]. People also come to the area to hike, camp, mountain bike, and notably, fish in our world-class trout streams. There are several outfitters and guiding services that offer five-star accommodations such as Spruce Creek Lodge. For the less outdoor inclined, there are micro-breweries, wineries, and restaurants as well. UNV serves as a gateway to the local community and all it has to offer."

Photo Courtesy of Somerset County Airport (2G9)

Photo Courtesy of University Park Airport (UNV)

Appendix E. Uncrewed Aircraft Systems (UAS) Case Studies

Uncrewed Aircraft Systems (UAS, or drones) are a rapidly growing segment of the aviation industry. UAS are defined as a powered aircraft and all of the associated support equipment, control station, data links, telemetry, communications, and navigation equipment necessary to operate it.[23] UAS are operated remotely with no pilot on board. According to the FAA, there are nearly 900,000 drones registered in the U.S., including over 300,000 drones used for commercial purposes. Nationally, there are over 250,000 remote pilots certified, with approximately 7,000 (or 3% of the total) in Pennsylvania.[24] Despite the prominence of registered drones and certified pilots, the emergence of UAS in the aviation industry is still new and development, application, and capabilities are still evolving.

The economic impact of UAS across all related industries within the Commonwealth has not yet been assessed and is not included in the scope of the 2022 PA AEIS. However, in order to assess the prominence of UAS in Pennsylvania's largest industries and to understand the impact of UAS in the Commonwealth, a qualitative assessment of UAS across multiple industries was undertaken. This qualitative assessment is meant to better understand the reach of UAS across traditional industries, as well as how UAS have spawned new industries focused solely on this technology. To gather this information, outreach to businesses across more than 20 industries was conducted via nearly 30 interviews with key staff in partnership with the Pennsylvania Drone Association. The case studies included in this appendix were developed based on this outreach.

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[23] "What is UAS?" Center for Unmanned Aircraft Systems in Public Safety. https://www.uaspublicsafety.org/what-is-uas/.
[24] "UAS by the Numbers." Federal Aviation Administration. https://www.faa.gov/uas/resources/by_the_numbers/.

UAS AND AGRICULTURE
CASE STUDY

Agriculture is a prominent industry within Pennsylvania.[1] With over 53,000 farms that cover over 7,200,000 acres of land, farmers are embracing Uncrewed Aircraft Systems (UAS, or drone) technology to improve their business through bettering their farming method. This case study documents one Pennsylvania business, Swift Aeroseed, that is using UAS to aid farming operations across the Commonwealth.

UAS Enable Ingenuity in Agriculture

Currently operating under a Ben Franklin Research and Development Grant, Swift Aeroseed is a Pennsylvania-based agricultural drone service company that specializes in cover crops and ecological services. Cover crops are a conservation practice; a living crop is layered over soil to enhance health and fertilization of soil, improve water quality, and reduce harmful weeds.

Swift Aeroseed's drones are designed to carry over 100 pounds of seed and to seed 30 acres of cover crops an hour.[2] According to the US Census of Agriculture, the average Pennsylvania farm is 137 acres in size. Therefore, these drones can cover an average farm in just under five hours. After an expected Federal Aviation Administration (FAA) approval, Swift Aeroseed will test their drone design using five southern Pennsylvania farms from York, Adams, Lancaster, Perry, and Cumberland counties. According to a Swift Aeroseed representative, the ecological benefit of drone usage and cover crops includes reduced nitrogen, phosphorus, and sediment in local water and streams, along with carbon sequestration. Investments in this company, like the Ben Franklin grant, promote ingenuity in finding ecological and cost-based agricultural solutions.

Using UAS Results in Cost Savings for Pennsylvania's Farmers

Although cover crops are beneficial, they do have some disadvantages. Chief among these are costs, which is a main reason why farmers have previously strayed away from using cover crops.. Methods to lay cover crops have historically been expensive or inefficient and rely on the use of drill tractors and airplanes. The tractor method has several disadvantages. Tractors and ground seeders cannot operate in wet conditions. Therefore, farmers utilizing this method must be very specific about when to seed to avoid wet conditions. Additionally, many common tractors do not have the ability to seed within a current crop (this method is referred to as "over-seeding"). As a result, cash crops must be harvested before the cover crop is placed. By waiting for harvest, a farmer's late-cover crop may not effectively protect the soil. Other methods include using airplanes or inter-seeder planters, which are both expensive.

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[1] https://www.nass.usda.gov/AgCensus/

[2] https://cnp.benfranklin.org/finalists-in-ben-franklins-50000-big-idea-contest-announced/

Using drones for cover crops has several advantages. Drones can seed at any time of the year over a standing crop, do not disrupt the harvesting of cash crops, and can be operated even if the ground conditions are wet. Ultimately, drone usage is cheaper and more effective than previous forms of technology and can save the average farmer top-soil costs. According to a Swift Aeroseed representative, "By not choosing cover crops, farmers lose $45 to $60 an acre in topsoil; this loss in topsoil only adds to fertilization costs."

Swift Aeroseed works to educate farm owners on Pennsylvania's multitude of cost-share programs. Cover crops are considered a conservation practice, and with the help of these cost-share programs, ensure low out-of-pocket costs for Swift Aeroseed's services. According to their spokesperson, Swift Aeroseed's goal is to connect these farmers so that the benefit of UAS technology is fully accessible to any agricultural business.

Conclusion

The previous costs and methodology of laying cover crops resulted in loss of revenue and income for Pennsylvania's farmers. UAS technology and Swift Aeroseed work to mitigate poor soil quality and loss of soil through easily accessible and inexpensive cover cropping techniques. After full FAA approval, Swift Aeroseed's drones and innovation will usher in a new, more beneficial farming technique. This ingenuity supports a booming future for both drone technology and agriculture applications.

UAS AND COMPONENT MANUFACTURING
CASE STUDY

Component manufacturing services produce a desired piece of a greater whole in the Uncrewed Aircraft System (UAS, or drone) industry. For example, components of drones include propellers, motors, and cameras. These components can boost performance, reduce costs, and enable new vehicle construction. This case study highlights one Pennsylvania-based company providing this service, IQ Motion Control.

Advanced Motor Technology is Produced in Pennsylvania

IQ Motion Control is a Philadelphia-based company that provides premium motors and controllers to commercial and defense drone companies. As vehicles are getting more sophisticated, they're demanding higher-end motor control and performance. IQ Motion Control fills this need by providing ultra-efficient, responsive, and robust motors and controllers for aerial propulsion systems. Their hardware consists of an integrated motor and control with an embedded position sensor. The position sensor allows the motor controller to know exactly where the motor is in its rotation, and with that information, IQ's software can optimize the motor's performance. This technology is typically found on high-end, expensive industrial machinery, whereas drones usually use sensorless solutions. IQ Motion Control is selling its product to drone companies that specialize in aerial data collection, surveillance, and delivery.

One of IQ Motion Control's biggest customers, Flyability, is located in Switzerland and has achieved great benefit through superior motor control. Flyability is in the business of indoor inspection of high-value assets. It is difficult for drones to fly inside as any collision can permanently damage a vehicle. Flyability, however, has created a drone with a carbon-fiber cage to protect the vehicle when it inevitably collides with an obstacle. Flyability utilizes IQ Motion Control's motors because they have the ability to reverse instantly. This feature allows Flyability's drone to recover effortlessly from collisions and in certain cases, prevents the vehicle from crashing to the ground.

Growth is in the Future for Pennsylvania's Component Manufacturing Companies

So far, IQ Motion Control has raised $1.3 million in funding; $1 million of this investment has been derived from Pennsylvania companies and individuals. According to a spokesperson, "All motor designs and software development are stemmed out of Philadelphia." IQ Motion Control has 10 primarily Pennsylvania-based employees and are continuing to push their products forward through research and development. Next year they expect their employment to double, and by 2024, the company expects to expand to thirty employees. IQ's goal is to open a manufacturing facility as the demand for their motors increases. The total motor output for IQ Motion Control is currently 5,000; by this time next year, that number is expected to reach 10,000.

Conclusion

As demand for specialized, high-quality drone equipment increases alongside a general increase in UAS use, drone component manufacturers will be critical to fill the need. These businesses are expected to see sustained growth as UAS technology and innovation continue to advance rapidly. Customers like Flyability will continue to benefit from advanced component manufacturing which will enhance their own continued operation.

UAS AND CONSERVATION
CASE STUDY

Uncrewed Aircraft Systems (UAS, or drone) technologies have adapted to tackle important issues such as methane detection, surveying wildlife to support anti-poaching and anti-wildlife trafficking efforts, and enforcing reductions in human interference in the natural world. UAS technology has been integrated into the conservation world to survey wildlife and land, as well as monitor areas of conservation. This case study examines how one Pennsylvania-based company, Remote Intelligence, is using its drone technologies in conservation efforts.

Conservation Has Found a Home in Pennsylvania

Remote Intelligence is a Pennsylvania-based company that provides intelligence consultation and solutions, focused on UAS. Such services include 3-D mapping, aerial inspection services, video inspection services, aerial surveying, emergency support services, system designing, training, and sales. Remote Intelligence began in 2013 and has so far invested over a million dollars in the UAS industry and by hiring Pennsylvania-based pilots, with more investment to come. At one time, there is anywhere between eight and 15 Pennsylvania-based pilots employed at the firm.

Although Remote Intelligence is stationed in Pennsylvania, its operations are national and international. For instance, a recent contract had them flying drones over the Pentagon in Arlington, Virginia for a deer density study. Remote Intelligence's clients include Shell, RE/MAX, the Alaska Department of Fish and Game, Dominion Energy, and RTI International.

Remote Intelligence technology specializes in fully integrated, geo-rectified, 3D-modeled mapping for applications in the energy and environmental industries. The company also focuses on wildlife conservation through its nighttime thermal surveys for animal counts. Other conservation efforts for Remote Intelligence include water leak detection, LiDAR surveying, and wind turbine inspection. As a spokesperson for Remote Intelligence stated, "Drone technology is another tool in the toolbox of ensuring conservation."

Drones Provide Safer, Faster Data for Conservation

The founders of Remote Intelligence discovered the applications and benefits of drone technology through their separate wildlife consulting company, Wildlife Specialists. Two of the greatest benefits the founders found in using UAS for conservation efforts are safety and efficiency of application. Before drones, surveying wildlife required "boots on the ground." Teams would physically walk over immensely large areas of land to survey. Not only does this method take considerable time and effort, but it can also be dangerous. Many of the regions surveyed are remote, have hazardous terrain, and present wildlife threats such as snake and tick bites. Remote Intelligence technology allows less human exposure to the dangerous points of conservation. Human interaction with the land then becomes targeted and safer due to drone technology.

Remote Intelligence collects data that is precise, faster, and safer. These data can also be historically used to back up projects in the oil and gas industry. Recently, Remote Intelligence surveyed and mapped a 200-mile-long Pennsylvania pipeline in just 60 hours of flight time. Instead of having one investigator take photos, teams can analyze the geo-referenced, high-quality imaging for any potential problems or hazards.

Conclusion

UAS involvement in conservation efforts demonstrates the far-reaching benefits of drone technology. With a Pennsylvania-based company at the forefront of this industry, UAS technological advancements have supported environmental improvements. Remote Intelligence offers a wide variety of mitigation efforts and expects further growth within the Commonwealth and from its new Alaska-based office.

UAS AND CONSTRUCTION
CASE STUDY

Uncrewed Aircraft Systems (UAS, or drones) are being used throughout Pennsylvania to increase efficiency, safety, and success in a multitude of industries. This opportunity has not been overlooked in the construction industry. High-speed aerial imaging precision, scanning capabilities, and infrared, geo-locating, and thermal sensors provide immeasurable opportunities and the promise of increased profits for the construction industry. Not only can drones monitor worker activity and safety areas, but they are also serving as a basis for pre- and post-operation analysis. Drone technology is laying the foundation for the future of construction practices. This case study highlights two Pennsylvania-based construction businesses using UAS, Precise Visual Technologies and Mowery Construction.

Drone Technology is Revolutionizing the Construction Industry

Precise Visual Technologies is a traditional engineering firm that has been in business since 1989. This company specializes in AEC (Architecture, Engineering, and Construction) and conducts business in the public, governmental, and private sectors. Operating out of Northeast Pennsylvania, Lehigh Valley, and Pittsburgh, Precise Visual Technologies adapted drone technology in 2016 and has since invested over $100,000 in equipment, pilots, and training. The drones flown capture large amounts of data primarily for construction monitoring. These drones fly over construction sites to monitor changes, ensure structural stability, and update aerial imaging in remote areas. Precise Visual Technologies has eight Pennsylvania-based Federal Aviation Administration (FAA) Part 107 pilots. Recently, a team of pilots flew drones over a shopping center construction site. In 45 minutes, an aerial map of the entire site was completed. Without drone technology, this task would have taken three to four days. According to a Precise Visual Technologies spokesperson, "With a drone, you have everything. You have the whole construction site captured town to a tenth or half of a tenth of a foot in under an hour. You can continuously pull from this data as the construction proceeds."

Mowery Construction is a Pennsylvania-based general contractor that has been around for nearly 100 years. Specializing in building construction, Mowery finishes anywhere from 20 to 30 projects a year and has an annual revenue stream of $200 million. About three years ago, Mowery implemented drone technology as simply a way to track progress on projects. However, drones quickly expanded from just aerial imaging to recording, preplanning, assisting in 3-D planning of building projects, thermal imaging, and topography. The sub-contractors of Mowery even use drones to keep track of digging and removal of dirt. According to a Mowery representative, now one out of every eight employees at Mowery Construction has their drone pilot license. Many of these pilots have undergone flight school to increase their skill and accuracy. Before drone technology was implemented, Mowery had aerial pictures (through airplanes) for one out of every 10 projects. Now, more than 90 percent of projects utilize aerial imaging. According to a Mowery spokesperson, "We're a leader in construction in this region, I think, because of our use of drone technology."

UAS is Promoting Booming Construction Businesses

For Precise Visual Technologies, the two main benefits of adding drone technology are safety and client expansion. Before UAS, Precise Visual Technologies would send surveyors out to construction sites. Surveyors were often working in high-risk areas, such as along roadsides. Now, drone data collection is accessible from the office rather than in the field. Also, according to a spokesperson, drones have provoked new, diverse clients: "90 percent of the jobs we do with drone technology we wouldn't have been able to do before. It has been a large driver of our revenue stream and the capability of the jobs we can do […] the different types of clients coming to us is the greatest benefit." Overall, Precise Visual Technologies has equated success and higher revenues to their utilization of drone technology.

According to Mowery Construction, their previous method of imaging could only be done with airplanes. These planes would fly over construction sites for $1,000 a flight. Planes allow for some aerial imaging but were incapable of providing valuable information such as imaging of subsurface conditions, analysis of the orientation of the building, and utility and foundation imaging. Drones allow for little to no hazard, more accurate imaging, and cost approximately $1,000 for the drone equipment. These drones are expected to last 12 years. A Mowery representative emphasized that the drone paid for itself after one job. Not only this, but client satisfaction has increased due to drone technology. As a Mowery representative stated, "Client demand and satisfaction, along with cost savings, has increased profit and our revenue."

Conclusion

Both construction companies existed before the emergence of drone technologies and both have reported rapid increases in revenue, jobs, and clients due to their adoption of UAS. For Precise Visual Technologies, their clientele has expanded beyond the scope of their original services. For Mowery, client satisfaction, overall cost, and profit are directly tied to their UAS usage. Both companies also reported that UAS have simplified their method of collecting data; though the methodology is simple, this data is immensely more accurate and versatile. Pre-construction, construction, and post-construction are constantly being analyzed, leaving little room for error. These successful businesses are expected to continuously find new, cost-saving, efficient, and safe uses for drone technology.

UAS AND DEPARTMENT OF DEFENSE
CASE STUDY

According to the Department of Defense, "The primary purpose of the Department of Defense (DOD) domestic aviation operations is to support Homeland Defense (HD) and Defense Support of Civilian Authorities (DSCA) operations, and military training and exercises."[1] The DOD utilizes Uncrewed Aircraft Systems (UAS, or drone) technology to train and carry out potential international missions. This case study highlights one Pennsylvania-based business supporting DOD operations, Navmar Applied Sciences Corporation.

A Pennsylvania-Based Company Supports the DOD

Navmar Applied Sciences Corporation (NASC), founded in 1977, is a Service-Disabled Veteran Owned Small Business (SDVOSB), currently employing 206 employees. They are headquartered in Warminster, Pennsylvania and manufacture aircraft in Johnstown, Pennsylvania. Additionally, they have locations in six other states. NASC has provided innovative solutions for the DOD, federal research institutions, academic institutions, and various industries within the commercial sector. NASC areas of expertise include UAS design, development, manufacturing, and flight services, including UAS testing and evaluation, intelligence, surveillance and reconnaissance, hardware and software integration, testing and flight demonstration, payload integration and testing, and UAS flight training for all UAS classes of aircraft (Group 1 – Group 5). NASC flight service personnel include mission commanders, pilots, payload operators, flight instructors, and maintenance technicians - all employed in Pennsylvania.

NASC designs and manufactures multiple UAS platforms in the Group 3 through Group 5 category weighing between 300 and 1,800 pounds. NASC also designs, develops, and manufactures UAS ground control stations and additional mission support equipment. NASC provides around-the-clock cybersecurity, network management, and expertise in a broad range of product design, engineering, rapid prototyping, production, and manufacturing services. NASC also specializes in advanced acoustic research services in support of the Naval Air Systems Command, the Naval Air Warfare Center Aircraft Division, the Office of Naval Research, the Office of Naval Intelligence, the Naval Research Laboratory, the Naval Undersea Warfare Center, Naval Surface Warfare Center Dahlgren Division, the National Security Agency, the National Aeronautics and Space Administration, and other U.S. government organizations.

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[1] https://dod.defense.gov/UAS/

UAS Promoted Growth for Important Work

NASC's addition of a full-service UAS line of business stimulated unprecedented expansion of the business. NASC personnel tasked with UAS engineering, manufacturing, and downrange flight services grew the company from 150 to 750 personnel in five years, with the majority of these personnel serving under government contracts in remote areas of operation outside the continental U.S. NASC's total investment for UAS, including facilities, manufacturing technologies, personnel, and training is in excess of $50 million, most of which has been spent inside Pennsylvania. At their highest points, NASC UAS sectors alone employed 100 people within the state and another 600 forward deployed for various missions. When asked about the greatest benefit UAS has brought to the business, a senior NASC representative noted, "UAS has provided more high tech jobs and career opportunities so that our employees could support worldwide operations and programs for many new customers inside and outside of the U.S." This expanded customer base included, among others, utility, power and agricultural companies, law enforcement agencies, and public transportation agencies.

Conclusion

Navmar Applied Sciences Corporation has greatly benefited from adopting drone technology and manufacturing as one of its core business lines, resulting in extreme employee, revenue, and client growth. With the expansion in the UAS market, alongside new advancements in the UAS field, NASC has been able to significantly improve its original UAS products, as well as develop new ones to meet the many needs of their existing and new customers. Many of these successes are the direct result of NASC's Pennsylvania-based employees and operations.

UAS AND DRONE SOLUTION PROVIDERS
CASE STUDY

Drone solution companies offer a variety of aid to third-party businesses looking to adopt Uncrewed Aircraft Systems (UAS, or drone) technology in everyday proceedings. Drone-based solutions often specialize in the physical equipment itself, whether that be through selling, maintaining, or loading software and data to aid consumers with minimal knowledge of this innovative technology. Drone solutions cover every industry under the UAS umbrella. This case study highlights two Pennsylvania companies that promote drone advancement and productivity within third-party organizations, ConnexiCore and Tracer Drones Technologies.

Drone Companies are Offering Solutions and Aid Within Pennsylvania

ConnexiCore™ is a Milford, Pennsylvania-based UAS drone services and solutions provider. Their core business approach stems from managing the entire project process for their clients, from piloting the drones, analyzing the data, extracting insights, and delivering measurable and actionable tasks to supporting smarter decision making. ConnexiCore specializes in providing aerial drone data collection, image and video analytics, 3D modeling, video telepresence, and aerial mapping for a variety of industries. ConnexiCore has created a workflow for easier customer consumption.[1] Pilots have even conducted confined space inspections of sinkholes in crawlspaces using confined space drones. Recently, ConnexiCore has been using drones to provide large-scale structural inspections such as façade inspections for aging skyscrapers. ConnexiCore began in Pennsylvania in 2015 with the belief that drones were workforce multipliers, or so-called "tools in the toolbox" that could enhance multiple industries throughout the Commonwealth. Through this belief, ConnexiCore received an initial Ben Franklin Technology investment of $100,000 on top of an initial $500,000 investment made by its founders to expand their business. After a few short years, ConnexiCore has grown from four Federal Aviation Administration (FAA)-certified pilots to a pilot contractor network of over 1,200 and growing.

Tracer Drones Technologies is a drone sales and service organization working out of Lehigh Valley, Pennsylvania, that provides drone solutions to multiple industries such as agriculture, construction, and mining. Tracer Drones has also found a particular niche in the law, security, and fire world. This company specializes in aiding law enforcement, fire departments, non-governmental businesses, and security companies to conduct investigations, gather evidence, aid search and rescue initiatives, survey land, and patrol high-security areas through UAS surveillance and imaging. Tracer Drones uses UAS to service the public interest and public good and Tracer Drones aims to utilize their resources to influence companies to take the leap into adopting beneficial UAS technologies in everyday work. In addition to this, Tracer Drone provides maintenance services and repairs to protect drones already owned by third parties.[2] By offering their drone solutions, Tracer Drones educates organizations on the immense benefits of adopting and maintaining drone technologies. This company only expects growth in the future as businesses continuously adopt UAS technology and need the support in doing so.

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[1] https://connexicore.com/

[2] https://www.tracerdrone.com/pages/service-repairs

There are a Multitude of Drivers Behind Drone Solution Companies

According to ConnexiCore, benefits of utilizing their services include cost savings, safety, and time reduction. For large-scale structural inspections, ConnexiCore scans every inch to inspect for anomalies. If anomalies go undetected, buildings can be severely compromised, adding increased cost and potential safety risks. To aid in time saving initiatives, ConnexiCore did a study for the City of Redding, Pennsylvania for a construction management company. In just two weeks, drone technology granted this construction company with a detailed map of every single parking spot in the city saving surveillance teams time, money, and reducing human interaction with unsafe conditions. ConnexiCore depicted everything from double-parked positioning to traffic blocks. Through its services, ConnexiCore ensures safety, efficiency, and a highly detailed product. According to a ConnexiCore spokesperson, "The biggest benefit for me personally, is the privilege of timing. We were able to leverage the technology to help people when the world was changing and there were a lot of on-the-job accidents and hazards. We help reduce such hazards while also offering a high-quality, beneficial service."

Tracer Drones highlights that their services aid in the reduction of costs and an increase in time savings for third-party agencies not equipped with UAS technology. For instance, before drone technologies, helicopters would be used for aerial surveillance in search of missing persons. Helicopters are extremely costly and purchasing one would come at a significant price to police and fire stations. However, drones are much more affordable and can be used for the same type of task. Agencies can afford multiple drones for the price of one helicopter to ensure that all investigations are fully equipped with aerial technology. Drones are also expected to last over a decade with minimal upkeep. Not only is UAS technology aiding in public safety, but also costs for businesses and government programs. Companies like Tracer Drones provide alternative solutions to allow maximum usage, safety, and affordability. As an example, a spokesperson of Tracer Drones describes the education of drones' benefits in multiple industries results in the adaptation of UAS technology: "I have found that every industry that we talk to, when you sit down and say, 'What are your pain points,' it usually comes down to time and money. When I discuss how drones have saved time and money in the past, eyes light up, and people start to get excited."

Conclusion

Drone solutions companies are influencing businesses in Pennsylvania and beyond in the adoption of UAS technology. ConnexiCore and Tracer Drone both report growth since their initial founding, and both companies expect a continuous need for solution providers. Such solution providers ensure UAS equipment maintenance, drone services, education, and sales of drone technology. It is expected that drone solutions providers remain a prominent member of Pennsylvania's UAS industry.

UAS AND EDUCATION
CASE STUDY

It is imperative that higher education institutions in Pennsylvania remain on the cutting edge of scientific and technological advancements to ensure Pennsylvania's students have opportunities to get hands-on experience in the technologies that will shape the future. One of the ways institutions are doing this is through the study and application of Uncrewed Aircraft Systems (UAS, or drones) into their curriculum. This includes supporting UAS-related research, providing opportunities for UAS pilot certification, and developing solutions for UAS advancement. This case study details how UAS application and research have been integrated into higher education institutions in Pennsylvania based on insight shared by a professor and director of the Center for Applied Environmental and Geospatial Technology (the Center) at Harrisburg University (HU) and by reviewing publicly available information on UAS programs at other higher education institutions in Pennsylvania.

New Research Opportunities Through UAS Advancement

As is evident in the work produced by the Center at HU, having UAS vehicles and the ability to operate them as part of a higher education institution brings about a variety of new and exciting research opportunities that would otherwise not be available. These opportunities include both external opportunities paid for by private grants and internal opportunities with research being funded by the university. UAS-related research grants give universities the opportunity to develop novel applications of the technology that may not be used elsewhere and be recognized for their contributions to advancing UAS application. These new research opportunities aren't just local, but global, and include research on mammal counts in national parks in Argentina, deploying multi-spectral sensors to conduct early-crop disease monitoring in Columbia, vegetation classification in Grand Cayman, and more. These UAS applications raise the profile of the university and increase the output of important research attributed to the institution.

Higher education institutions in Pennsylvania are not only applying UAS technology to their research, but they are actively working on advancing and optimizing the performance of UAS technology, as is evident in the work of the AirLab at the Robotics Institute at Carnegie Mellon University. The AirLab's mission is to advance state-of-the-art aerial autonomy, with recent research including advancing methods for object encoding, increasing energy productivity of first/last mile goods movement, developing lifelong loop closure detection, and more. AirLab is supported by a team of scientists, post-doctorate students, Ph.D. candidates, master's and undergraduate students, technicians, engineers, and interns. The AirLab is incredibly productive as is evident in their abundant research and presence at conferences. Most recently the AirLab had five papers accepted into the 2021 Institute of Electrical and Electronics Engineers (IEEE) International Conference on Robotics and Automation (ICRA) that took place in Xi'an, China.[1]

UAS is Key for Student Recruitment and Engagement

Having a UAS or drone program has proven attractive to students that have an interest in cutting-edge technology. The HU representative estimated that more than half of the students in the Geospatial Technology program came to the University with a specific interest in UAS and learning how to use the technology,

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[1] http://theairlab.org/

which is important as students in the program are required to conduct applied research during their time at the University. Students are given hands-on opportunities to participate in UAS-related research, particularly under research projects funded by the University. HU has a policy that at least two students must be on a research team for internally funded projects, creating opportunities for numerous students to participate. The Center at HU has seen increased student engagement with UAS advancements and applications, evidenced by the jump in attendance when the former "Geographic Informational System (GIS) Camp" was replaced with a "Drone Camp."

Standard operations at the Center prior to UAS inclusion were academics focused, teaching about geospatial technology, as opposed to the current program actually applying geospatial technology in a practical manner. HU is able to certify students, faculty, and staff in commercial drone operations through the University's Federal Aviation Administration (FAA) Part 107 certification program and now HU has the ability to collect their own data to use in the classroom. This leads to hands-on activities using real-world data collected by HU compared to relying on sample data associated with purchased textbooks.

Interdisciplinary Coordination

There are four certified remote pilots that support UAS needs at HU. While these pilots are affiliated with the Center and the Geospatial Technology program, staff from a variety of departments have sought out or been involved in UAS-related work. Faculty and staff from the forensics, environmental science, interactive media, and biology departments, as well as other graduate researchers, have expressed an interest in, inquired after, or received assistance from the Geospatial Technology program and the Center's UAS team to conduct various work. The level of interdisciplinary coordination will only continue to grow as different departments learn more about how drones can be used to benefit their programs or provide additional teaching opportunities.

Interdisciplinary efforts to advance UAS practices are also evident at Pennsylvania State University (Penn State) where an interdisciplinary UAS club has been established. The UAS club prototypes, designs, and builds autonomous drones, and gives students the opportunity to solve technical problems and learn by engineering systems for autonomous aircraft. The UAS club is involved in three subsystems of UAS advancements: the aeromechanical subsystem that focuses on designing and building the aircraft; the software subsystem that is responsible for designing and implementing various software components; and the electrical subsystem that designs and manages the electrical layout of the various digital components of UAS operations. The club is composed of aeromechanical, software, and electrical engineering students, and is overseen by three faculty advisors whose backgrounds are in aerospace engineering, computer science and engineering, and mechanical engineering. [2]

[2] https://uas.engr.psu.edu/

Conclusion

Higher education institutions in Pennsylvania are utilizing UAS technology for applied research opportunities and working to continually advance UAS capabilities through research and design efforts. These UAS application and advancement opportunities are not only attracting students from around the globe, but are also encouraging interdisciplinary coordination and increasing the recognition and profile of Pennsylvania's higher education institutions in the UAS industry. UAS applications are the future for many industries and Pennsylvania higher education institutions are preparing students to make great contributions to the advancement and application of this technology.

UAS AND ENGINEERING
CASE STUDY

Businesses are realizing numerous efficiencies and new scopes of work with the introduction of Uncrewed Aircraft Systems (UAS, or drones) to support their traditional business practices. One of the industry sectors benefiting from UAS is engineering, which also often includes surveying and mapping. This type of work often requires extensive data collection and inspection of existing and new construction that can be facilitated by the use of UAS. The U.S. Department of Transportation recently noted that "Traditional surveying methods were often very dangerous…UAS can be used to collect data where it is dangerous or extremely difficult for a person to access…by utilizing UAS, we are able to collect high-quality survey data and minimize the time surveyors spend in dangerous situations."

Pennsylvania's businesses are taking note of this expanding industry and the opportunities offered through this evolving technology. Whether saving time and money, protecting the safety of staff, or retaining and attracting business, Pennsylvania's engineering firms have found that UAS has enhanced their existing business practices and may open the door for further innovation. This case study details the findings and insights from two engineering firms headquartered in Pennsylvania, Rettew and Michael Baker International, Inc. (MBI)

Pennsylvania's Businesses Are Investing in and Growing With UAS

Rettew is a mid-sized engineering company headquartered in Lancaster, Pennsylvania. Rettew has over 300 employees across 10 offices, with the majority of their employees based in Pennsylvania. Sixteen of Rettew's employees are directly involved with their UAS program, which began five years ago and primarily supports Rettew's existing services. All of Rettew's UAS staff were trained and developed in-house, and a recent recommitment to growing their UAS program means that additional staff will likely become UAS pilots to support their program's needs.

MBI is an engineering firm based in Pittsburgh with over 3,000 employees spread across nearly 100 offices in the U.S. As an MBI representative noted, "MBI has been using UAS since 2016 when it was initially adopted for bridge inspections. The firm is now up to 34 pilots and 32 drones spread throughout its offices. Since MBI has around 100 offices, this means that about a third of its offices have UAS." MBI has seen increased use of drones within the firm since the initial days where they were used solely for bridge inspections. The MBI representative described UAS as a "tool in the toolbox…that enhances [existing] services."

Both firms emphasized that employee retention and growth were a key part of their UAS strategies, and that existing employees have expressed interest in participating in UAS growth at their firms.

UAS Saves Time and Money and Enhances Services

Time and budget savings are the primary benefits that UAS affords engineering firms. Both Rettew and MBI reported conducting almost all of their UAS operations in-house. The one exception is LiDAR operations, which both firms contract out. The MBI representative reported that the use of UAS has reduced the time required for bridge tasks by 25 to 75 percent and reduced the time needed for surveying and mapping tasks by about 30 percent. The Rettew representative noted that prior to UAS implementation, a survey site could take five days to complete, whereas with UAS it now takes about half a day. He noted other advantages, including the ability to process a site in any weather at any time, allowing for the data development to be conducted in the office soon after.

In addition to time and cost savings, both firms recognize the value-added benefits that UAS can provide for traditional work efforts. For instance, the Rettew representative noted that "Drones have had a value for presentations when trying to win new client work. While Rettew hasn't been hired solely because of drones, we are able to get visuals that make our presentations more engaging." The MBI representative listed several benefits that UAS has added to existing business practices and deliverables within the firm, including "For mapping/surveying and surface data collection, UAS are more efficient than grid surveys and elevation data is more robust. For construction, [MBI] is able to collect real data from UAS."

Conclusion

Pennsylvania's engineering firms have benefitted greatly from the adoption of UAS into their regular business practices. Rettew and MBI are two engineering firms with deep roots in Pennsylvania whose businesses are continuing to grow and attribute some of the growth to the use of UAS. Both firms noted a continued investment in UAS in terms of training staff and purchasing equipment. Both firms were excited about the opportunities that UAS affords, including collecting additional and more accurate data, time and cost savings, scheduling advantages, and the opportunities for enhanced deliverables to impress clients and win more work.

UAS AND GOVERNMENT
CASE STUDY

Government agencies are in a unique position when it comes to the widespread adoption of Uncrewed Aircraft Systems (UAS, or drones). Federal and state governments are responsible for regulating the use of drones, with the Federal Aviation Administration (FAA) responsible for regulating airspace and all aircraft operations, including drones. State governments are responsible for enforcing federal regulations and enacting any state-specific statutes that may protect the unique circumstances of that state. However, government agencies also benefit from the use of drones to conduct government work. For instance, PennDOT recently updated their UAS Policy document, which states that "PennDOT supports and will advance the deployment of UAS by PennDOT personnel and contractors to improve the quality, speed, safety, and cost-effectiveness of PennDOT's work and recognizes the potential for UAS utilization to advance road surveys, geotechnical investigations, traffic modeling, bridge inspections, and other PennDOT projects."[1] In other words, governmental agencies both are responsible for regulating drones and use drones in the normal course of doing government business.

Government agencies play one of the most important roles in the increased development of the UAS industry. This case study outlines the role of PennDOT's Bureau of Aviation (BOA) in UAS regulation, development, and use.

Pennsylvania is Focused on Regulation for Safe and Efficient Drone Use

When it comes to integrating UAS into the Commonwealth, Pennsylvania's focus has consistently been on safety. Multiple efforts have been conducted and others are underway to set up a governance structure to achieve this goal. The Director of the BOA stated that the development of the department's UAS Policy document began as early as 2017 when discussions surrounding UAS and safety started to happen on a statewide level. "For the most part, [UAS governance] resides in the state's aeronautics or aviation department. Pennsylvania's state government created a UAS Task Force…which is in the process of developing a plan to integrate UAS into the Commonwealth," he noted. There are multiple committees on this Task Force, with some notable ones being safety, economic development, and urban air mobility (UAM). This Task Force will hopefully ultimately result in the creation of a UAS Program Center within PennDOT, where UAS governance and use within the Commonwealth will be centralized and where Pennsylvania can provide assistance to other Commonwealth agencies, local governments, and other states.

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[1] PennDOT, Unmanned Aircraft System (UAS) Policy, https://www.paconstructors.org/wp-content/uploads/2019/06/PennDOT-UAS-Policy-Ver-1.0Apr2019.pdf

Government Work is Safer, Faster, and More Efficient With Drones

PennDOT BOA is currently and is expected to remain responsible for UAS regulation at the statewide level. This includes UAS usage in the course of doing government business. The PennDOT BOA Director noted that "BOA developed the policy document for drone operations, specifically for [PennDOT] employees to be pilots… [an exam was also developed] for PennDOT employees, and if they pass they can operate drones on behalf of PennDOT." While no one in the department is currently fully dedicated to UAS, PennDOT has 14 employees and 76 contract employees that are certified to fly drones on behalf of PennDOT. The PennDOT BOA Director added that UAS are currently used primarily for construction, design, survey, and evaluation of landslides, and bridge inspections.

PennDOT also has one drone coordinator per District who is responsible for coordinating UAS activities with remote pilots and an individual in charge of the operation. There are typically two employees deployed for each UAS mission, a pilot, and a mission assistant. PennDOT has realized about a 20 percent reduction in costs due to conducting routine department work with drones instead of traditional methods. Not only does UAS provide safety and time savings but provides enhancements to public participation. The PennDOT BOA Director noted that drones are used in developing "renderings of future projects that can be shared with the public to showcase what [PennDOT] projects look like…the public sees a value in that."

Conclusion

UAS has touched every facet of the aviation industry, including government oversight and implementation of government duties. As the FAA continues to regulate drones to maintain the safety of the airspace while also encouraging their development, state governments must both enforce federal regulations while developing their own state policies. PennDOT BOA has a large role in ensuring drones are integrated into the Commonwealth in a safe and efficient manner. At the same time, PennDOT and its consultants are realizing the time, cost, and safety benefits of using drones to complete government work.

UAS AND INSURANCE
CASE STUDY

As the benefits of Uncrewed Aircraft Systems (UAS, or drone) technologies are becoming more recognized, drones are being readily integrated into multiple industries. Recently, insurance companies have begun utilizing drone technology capabilities through complex imaging, on-site measurements, damage detection, 3-D models, and in-depth data collection of claims. This case study details one Pennsylvania insurance company using UAS to improve its operation.

UAS are Revolutionizing Pennsylvania's Insurance Industry

In Pennsylvania, one large insurance company has taken the successful leap to include UAS technology in insurance operations. According to the company, they are using drones to get clear and detailed images of property damage in difficult-to-access areas, enabling their claims staff to focus on taking care of their customers with personal service.

This company is among the first insurance companies to not only insure personally owned drones but to also use drones to assist in property damage claims. They have received permission from the Federal Aviation Administration (FAA) to use drones commercially. Currently, they utilize small drones (less than 55lbs) to perform structural inspections for risk control and claim adjustments. The company has already invested an estimated $150,000 in UAS and has upwards of 50 FAA-licensed pilots and 2,300 claims employees based in Pennsylvania.

The first claim for which they used drone technology was to examine a roof after ice damage. The aerial images taken were then compared to the claim adjuster's original photos for clarity and certainty. This example demonstrates the simple improvements being made through drone technology. Precise, aerial imaging grasps the full picture of the damage benefiting both the customers and the claim adjusters.

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[1] https://www.erieinsurance.com/news-room/press-releases/2015/drone

Drones Increase Safety and Efficiency of Inspections

The greatest benefits UAS have provided to this insurer are safety and efficiency of inspections. For example, prior to UAS, employee inspections of roofs were conducted using large ladders or ropes, and some roofs were too dangerous for adjusters to inspect. However, drones are now used to help adjusters survey potential damage without putting themselves in danger. Drone technology has aided in reducing the risk of workers being placed in dangerous settings that could lead to further damage. While the use of UAS has improved safety, it has not reduced the company's overall workload. Instead, the incorporation of UAS reduces the time the workload takes. UAS technology adds efficiency to collecting claim data by cutting the time taken in half to gather more detailed information. The data gathered is then digitized and added to existing information for the entire claims process. It is important to note that drone technology does not result in jobs being lost or work being replaced. Rather, jobs and work are being added to improve the overall quality of inspections. In the previous roof example, drones did not replace the claim adjuster's job, drones were used to add information (including initial collection that may otherwise have been impossible or unsafe for a human to collect) or certify information already gathered by the claim adjuster. The efficiency offered by drone technology is not only useful to the insurance provider, but also to the individual filing a claim.

Conclusion

Through the adoption of UAS into their everyday business practices, insurance agencies like Erie Insurance are operating more safely and efficiently to provide quality, timely service to their customers. No longer do employees have to enter dangerous conditions in order to complete their tasks. Now, drones are able to complete dangerous tasks and leave employees free to concentrate on customer service and other aspects of the business. UAS are not replacing jobs, but rather creating more opportunities for work.

UAS AND MINING
CASE STUDY

Uncrewed Aircraft Systems (UAS, or drones) in Pennsylvania are being used to assist in surveillance, monitoring, and aerial imaging now more than ever. However, one of the most notable and fascinating ways they are being used is not above our heads, but rather, below our feet. UAS technology is advancing and revolutionizing the way precious stones, metals, and more are being mined.

Since 1775, Pennsylvania miners have descended into the dark to face unknown hazardous environments. Today, UAS, along with spatial and mapping computations, can be deployed to explore the most complex, dark, and dangerous environments.[1] Whereas safety teams and miners historically have risked surveying these underground environments on foot before beginning work, drones can now map out entire mining systems with precise 3-D imaging in just four to eight hours. This case study highlights one Pennsylvania-based company using UAS to advance mining operations, Exyn.

Interest is Growing for Using UAS in the Mining Industry

Exyn Technologies is a Philadelphia-based company that formed out of the University of Pennsylvania's General Robotics, Automation, Sensing & Perception (GRASP) Lab in 2014. With over 100 employees, Exyn has doubled in size within the last year, and within the next year is expected to double in size again. Currently, Exyn has conducted business on every continent except Antarctica and has invested millions into hiring Pennsylvania employees and students. Partners of Exyn include Optron in South Africa, NSS Canada, C.R. Kennedy company in Australia, World Class Mining in Mexico, Sandvik in Finland, and many more.

Exyn is an international UAS business that provides drone hardware and software for UAS. Their technology includes the ExynAero drone, which launches at the press of a button and navigates pilot-free through an entire stope of a mine in a single flight, and the Exyn AI drone, which is immune to GPS loss and is regarded as the highest-level aerial autonomy reached within the industry (Level 4A autonomy). This company's technology is crucial for the mining industry as, "Oftentimes the information [needed] is beyond the line of sight, and out of communication range."

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[1] Exyn Technologies, https://www.exyn.com/

UAS Enhances Safety and Efficiency in the Mining Industry

Exyn's pilot-free drones and portable ground systems deliver precise 3-D maps, sensor data, and georeferenced models to the mining industry. Generating more precise data allows personnel and rescue teams to have better visibility and understanding of the environment without descending miles into unseen terrain. No longer do teams need to map out mines by foot; a drone can complete this task in just a few short hours. Using drone technology, mapping of mines is done quicker and safer than ever; as a Exyn representative stated, "We're keeping personnel and rescue teams out of dangerous environments— we're saving lives."

Conclusion

Exyn is a thriving Pennsylvania-based business that specializes in the immensely difficult: safer mining. This company's advancements in technology are only beginning, and the use of UAS for mining activity is only growing. By producing drones that can intelligently navigate and dynamically adapt to complex environments in real-time, Exyn furthering a revolution in autonomous robotics.

UAS AND MULTIMEDIA
CASE STUDY

Multimedia is an industry that specializes in the production and publication of media-based information, including text materials, photographs and still images, audio files, video presentations, and animation.[1] Uncrewed Aircraft Systems (UAS, or drone) technology is incorporated within every element of the media industry. Drones have been utilized to access higher-quality visual aids to share precise, appealing information to the general public. Pennsylvania companies are at the forefront of the integration between multimedia and drones. This case study examines Kaze Aerial and CBS 21, two multimedia broadcasting companies that use drone technology to produce high-quality visual information sharing.

Pennsylvania's Multimedia Companies Have Seen Huge Successes

Kaze Aerial (Kaze) was one of the early adopters of drone technology and started using UAS in 2011. Kaze, a Philadelphia, Pennsylvania-based company, is a broadcast and media company that specializes in utilizing UAS photography and video. Kaze is owned by three individuals and hires drone pilot contractors for specific jobs.[2] Each job typically requires two to seven licensed pilots to carry out. The company is quickly approaching $1M in gross revenue and has invested over $700,000 in the UAS industry. In 2020, the company grew by 115 percent; in 2021, they grew by 276 percent.

Kaze has expanded to provide services for the highest level of sports broadcasting and commercial operations. Kaze works with notable platforms including CBS Sports, ESPN, Fox Sports, PGA Champs, and the Masters in Augusta. They work in both the private and public sectors in highly exclusive venues. Due to these venue types, Kaze has applied for waivers of operation at the local, state, and federal levels to fly their aerial imaging drones. Kaze was third in the United States, after CNN, to be granted permission by the Federal Aviation Administration (FAA) to fly over people (FAA Part 107.39 waiver). According to the Kaze spokesperson, "Our business is entirely built on UAS technology."

CBS 21 is a local news broadcasting station in Harrisburg, Pennsylvania that began using UAS technology in 2016. CBS 21's parent company, the Sinclair group, utilizes drone technology in about 45 different stations with 120 certified pilots across the United States. CBS 21 has two drone pilots and five visual observers and expects this number to increase as viewer interaction with UAS technology increases. Contextual information through aerial imaging has increased viewer satisfaction and engagement which has added to the growth of the station.

In total, CBS 21 has invested about $60,000 in UAS technology and plans on expanding this technology further. Drone pilots are beta testing single-person flights to increase efficiency. In Harrisburg alone, CBS 21 has flown over 3,200 flights since program implementation.

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[1] https://smallbusiness.chron.com/5-components-multimedia-28279.html

[2] http://kazeaerial.com/https://smallbusiness.chron.com/5-components-multimedia-28279.html

UAS Technology Provides Numerous Innovations

According to Kaze, drone technology has enhanced sports broadcasting and allowed famous courses and venues to be seen by fans like they've never been seen before. In sports like golf, shooting coverage is heightened as aerial views can cover the entire course. Imaging is then posted on social platforms that promote fan support and fan interaction. The Kaze spokesperson noted, "Drones offer a return on investment because they are sensational. They create a sensation of the game, of the venue." Ultimately, UAS imaging benefits the venues as they serve to market the game and the venue in a new and intriguing way. In terms of operation, drones are cost-effective. Instead of blimps and helicopters, which can cost thousands to tens of thousands of dollars per flight, drones serve as substantially less costly alternatives.

CBS 21 utilizes drone technology to not only enhance services already being provided, but also to offer additional services for news coverage, high-quality aerial footage, and context to their stories. For example, stories surrounding landmarks, buildings, and construction zones can use UAS to zoom immediately from the reporter to the area of interest to give viewers contextual evidence of the news story. Overall, the product delivered to the audience is enhanced. Aerial imaging offers perspectives and views that engage and infatuate viewers. According to a CBS 21 spokesperson, "Drone videos keep our clients happy, and we try to get footage every day. UAS, overall, has really enhanced our product." In examples like natural disasters, drones allow broadcasters to gain better insight for more informed coverage of areas too dangerous to reach on foot. Recently, CBS 21 covered flooding in the region and used UAS footage to educate viewers on safety precautions and dangerous areas.

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[3] http://kazeaerial.com/ https://local21news.com/

Conclusion

Kaze Aerial and CBS 21 specialize in very different forms of media broadcasting but have both found benefit in the utilization of drone technology. Both companies use UAS to engage viewers and tell a better story of the event being recorded. Both companies expect a continuous and growing use of drone technology in the future and have significantly changed the way they do business due to UAS emergence.

UAS AND OIL AND GAS
CASE STUDY

One of the primary benefits of using Uncrewed Aircraft Systems (UAS, or drones) in everyday business practices is their aerial imaging and data capabilities. These capabilities are useful to a variety of industries and businesses and have far-reaching implications. Continuous data collection influences businesses' decision-making related to investment, safety, and construction of assets. Drones have replaced traditional surveying methods to provide more data in a fraction of the time. This case study highlights one Pennsylvania company using UAS to collect and process asset data for the oil and gas industry, Eyebot Aerial Solutions (Eyebot).

Advances in Data Collection Aid Pennsylvania's Oil and Gas Industry

Eyebot was founded in 2018 in Pittsburgh, three years after the Federal Aviation Administration (FAA) allowed commercial drone operations. Eyebot currently employs 11 full-time local staff and has $350,000 in physical assets. Eyebot focuses its data collection work in the oil and gas, engineering, and chemical industries. Eyebot uses UAS to collect and process 3-D data to help decision-making processes around critical assets in infrastructure, heavy industry, and construction for large oil and gas companies. These 3-D models create a digital representation of the interior and exterior of critical assets and reduce field time by 90 percent and costs by 50 percent. Eyebot also delivers data such as surveys, photogrammetry, LiDAR, and topographical surveying, developing engineering datasets that coincide with software applications already owned and used by their clients. According to Eyebot, "Our extensive expertise working with industry-leading software allows us to engineer secure, efficient workflows that snap seamlessly into their existing operations."

For the last three and a half years, Eyebot has collected data for Pennsylvania Chemical's petrochemical facility. Every data sample that emerged from the ground is collected through drone observation. These data are then delivered in 2-D and 3-D products. Eyebot also worked for Pennsylvania Chemical to deliver confined space inspections, ground-based laser scans, mobile mapping systems, and terrestrial laser scanning.

Data allows for improvements in everyday operations

According to an Eyebot spokesperson, this data collection makes people's jobs easier without replacing actual paychecks: "We don't replace the inspector, we just replace the ladder." Increases in data collection correlates to increased safety, efficiency, and accuracy of a product. Safety is a key theme that Eyebot highlights.

For example, by developing a 3-D model of a dam's face, these data are made accessible to any of the stakeholders that are in charge of the decision-making process around that dam. A person conducting work or inspection could simply follow a link and click on any point along the face of that dam to pull up source imagery. This source imagery displays any potential danger and can be referenced to understand how to conduct work safer, faster, easier, and more efficiently. Additionally, as the Eyebot spokesperson noted, "keeping people safer isn't something that you can place a dollar value on."

Conclusion

Eyebot is a company that is directly tied to the emergence of drone technology. Clients have reported experiencing the positive implications of shorter field time and decreased costs. Eyebot does not replace inspection jobs but rather works with examiners to ensure that they have all the tools available to them to come to the most accurate and informed conclusion. The data and software utilized by drone technologies are crucial tools in ensuring safety, efficiency, and accuracy of tasks. Human error and risk associated with in-person inspections and surveying of oil and gas companies' infrastructure and assets are mitigated through this data collection.

UAS AND PUBLIC SAFETY
CASE STUDY

Public safety refers to the protection of the general public's welfare. Uncrewed Aircraft Systems (UAS, or drones) are being deployed across Pennsylvania to maintain and enhance the social and public good. This includes search and rescue missions, monitoring large venues and parks, and surveying potentially dangerous areas. This case study focuses on Unmanned Response, a Pennsylvania-based UAS company that focuses solely on the integration of UAS into public safety operations.

Pennsylvania's UAS Industry Specializes in Public Safety

Unmanned Response specializes in providing drone services for search and rescue, situational awareness, intel, surveillance, and recon (ISR), public relations, recruitment, and more. The company has a wide range of clients, including community organizations, infrastructure companies, insurance companies, educational institutions, and institutions in the criminal justice system. Unmanned Response's founders believe that "Drone technology and increasing education of this technology is crucial for ensuring public safety and maintaining the public good."

Unmanned Response began as the Community Resource Corporation, which was not a primarily UAS-based company. Early on in Community Resource Corporation's beginning, the founder utilized remote control hobby helicopters to execute a particularly difficult high-altitude business endeavor and discovered the efficiency, safety, and accuracy of using UAS for business operations. Founded in 2013 and based in Pittsburgh, Unmanned Response currently operates about 15 drones, with access to another 30 to 40 from outside organizations. All drones used are under 55 pounds and are equipped to perform public safety-oriented tasks, such as search and rescue, surveillance and recon, and aid in foot pursuits. All drone operations are in-house, and most, if not all, of the company's 22 employees have experience as first responders, whether that be as former police officers, emergency medical technicians (EMTs), or firefighters. Unmanned Response has an estimated total of $150,000 invested in UAS.

Unmanned Response Educates Public Safety Organizations

Through their experience with public safety-related drone operations, Unmanned Response is able to educate other agencies that are aiming to incorporate UAS into their business operations. For instance, Unmanned Response recently completed drone piloting prep tests with Cranberry Township Police and Fire Departments. Further, Unmanned Response employees have taught the integration of public safety and UAS technology at Pierpont University, West Virginia University, California University, and the Community College of Beaver

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[1] https://www.unmannedresponse.com/

County. Lessons cover the usefulness of drone technology for multiple public safety situations, including how to use drones for crime scene investigation and documentation.

According to an Unmanned Response representative, the company has acquired expertise in locating clandestine (or unknown/unrecorded) grave sites, working on cold cases, and analyzing homicide scenes. The implementation of drone imaging technology in crime scene investigations ensures the preservation of the physical evidence on the scene. In cooperation with local law enforcement agencies, Unmanned Response has flown drones over crime scenes before the police have even examined them to not only survey and analyze but to ensure the integrity of the scene. A variety of UAS sensors and imaging technologies are advancing crime scene analysis. Such technology can also be used to document fires, reconstruct car crashes, and follow and apprehend armed suspects.

Conclusion

Companies like Unmanned Response are fueling best practice programs and initiatives with drone response education and UAS-based aid. Unmanned Response is serving local entities, like first responders and private companies by providing numerous services, including surveillance and imaging of potentially hazardous areas. This ultimately helps to protect public safety and ensure that trained specialists are available and prepared when needed.

UAS AND REAL ESTATE
CASE STUDY

The real estate industry is diverse and divided into types including residential, commercial, industrial, and land. Residential agents specialize in selling homes and apartments while commercial and industrial agents operate in sales for businesses. Uncrewed Aircraft Systems (UAS, or drone) technology is utilized by the real estate industry to provide new, unique perspectives of properties for clients. UAS technology provides all sectors of the industry with overhead imaging to capture the entire home, storefront, manufacturing facility, land, and surrounding areas. This detailed imaging, including potential 360-degree panoramas and videos, provides buyers with additional context to make the most informed decision when buying property. This case study details how one Pennsylvania real estate business is utilizing UAS applications, 360 Aerial Tours.

A Pennsylvania-Based Real Estate Business Provides Innovation in the Industry

360 Tour Designs began in 2009 in Mechanicsburg, Pennsylvania as a real estate photography company. In 2012, the company integrated drone aerial imaging into its business model. Before drone pilot licensing was easily accessible, 360 Tour Designs worked directly with the Federal Aviation Administration (FAA) to petition for the approval to incorporate and fly drones for their company. In 2015, 360 Tour Designs grew into a franchise and established a presence in other states. 360 Tour Designs estimates a total investment of $7,000 per year in UAS technology. The company is equipped with seven Phantom 4 drones which weigh about three to four pounds and offer high air stability for optimal imaging despite wind speeds. The company also has six certified Pennsylvania-based pilots who undergo a three-month, intensive training to maintain 360 Drone Designs' 100 percent safety record.

As 60 to 70 percent of buyers today look at homes online, 360 Tour Designs aids realtors and business owners in selling themselves and their properties.[1] With over 400 flight hours logged, 360 Tour Designs' aerial imaging offers innovative marketing methods to match realtor with buyer. This aerial imaging goes above and beyond to inform potential buyers of property characteristics. For imaging of large areas of land, editors can take a tax map and overlay the property lines. For residential areas, 360 Tour Designs' drones give buyers a bird's eye view of areas around the location such as neighboring properties, stores, and bodies of water. According to a company spokesperson, "What is most important is to have buyers be interested in visiting the property. Our imaging informs and entices potential buyers and sells properties." 360 Tour Designs of Pennsylvania estimates providing services for five to seven properties a day based on their record in October and November 2021.

[1] https://web.360tourdesigns.com/

Growth Through UAS Incorporation

360 Tour Designs opened its second location in 2015 and since has franchised and grown into fifteen different locations across the United States. Current 360 Tour Design locations include Portland, Oregon; Salt Lake City, Utah; Indianapolis, Indiana; Houston, Texas, and more. 360 Tour Designs estimates a 300 percent increase in revenue growth since 2015. Drone technology continuously aids revenue streams through client interest, client growth, and retention. According to a company spokesperson, "Without drone technology, I'm quite sure we wouldn't be where we are today as a leader in our industry."

Not only has the company grown nationally, but the Pennsylvania headquarters expects continuous growth within the state. Growth is not only expected through increased client interest in the real estate sector but by 2022, this company expects to add thermal imaging qualities to each drone to expand into other industries such as forensics. 360 Tour Designs expects to add one to two pilots a year due to continuous real estate growth and this number is expected to double when thermal imaging is successfully equipped in their UAS technology.

Conclusion

Drones incorporated in the real estate industry offer realtors with new, innovative marketing methods, and offer buyers full, detailed information on properties. UAS utilization is expected to continue to grow within the industry as client interest expands. Businesses such as 360 Tour Designs that are adapting drones into their business model are benefitting greatly from their increased ability to satisfy their customers. As business opportunities and clientele continue to expand, UAS advancement and use within the Pennsylvania real estate industry is expected to also grow.

UAS AND SERVICE PROVIDERS
CASE STUDY

As the Uncrewed Aircraft Systems (UAS, or drones) industry grows exponentially, UAS-centered companies are needed to provide multitudes of services to third parties. Drone service providing companies can be likened to an umbrella that specializes in the versatility, adaptability, and advancement of drones and drone technology. Services include aerial inspection, utility aid, survey and mapping support, data management, safety/security support, equipment maintenance, purchasing advice, and even delivery. This case study highlights two companies that serve as drone service providers in Pennsylvania: Argos Unmanned Aerial Solutions and Drone Base.

UAS Service Providers Flourishing in Pennsylvania

Argos Unmanned Aerial Solutions is a service-disabled veteran-owned drone service providing company that started in Pennsylvania in 2015. Argos' primary market is to service the operations of drones or use their own fleet of drones as a service within the region, specializing in utilities and surveys for large industrial and infrastructure companies. Locally in Pennsylvania, and regionally in New York, New Jersey, Delaware, and Maryland, Argos focuses on survey mapping work. Nationally, they offer utility inspection support services. Argos has flown over 3,800 flights and has invested over $250,000 in UAS technology. Comprised of three business partners and six Federal Aviation Administration (FAA) Part 107 pilots, this company is a part of a larger ecosystem of drone-related services; Argos also partners with other UAS companies. Argos will fly their drones to capture data and then hire another company to process and return the data to their client, creating a mutually beneficial relationship.

Headquartered in California, Drone Base employs over 80,000 registered drone pilots; 10,000 of these pilots are located in Pennsylvania. Drone Base is primarily involved in the AEC (Agriculture, Engineering, and Construction) industry and delivers intelligent aerial imaging for high-value infrastructure. This includes anything from a wind turbine, to solar panels, to roofing projects.[1] Utilizing drone technology, Drone Base provides aerial data and analysis to companies to identify anomalies. These data serve as a constant pipeline to observe the condition of companies' assets (both energy-producing assets and material assets). Data analysis from drones reduces the risk of damage or disruptions that can ultimately harm businesses in the long run. A partner of Drone Base is Lindy Paving, a company that paves 60 to 70 percent of Pennsylvania's roadways. Drone Base's pilots analyze the progression of these paving projects to discover both safety areas when building the roadways and the most geographically feasible routes by tracking topography.

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[1] https://dronebase.com/

Drone Service Providers Provide Numerous Benefits

Before UAS technology, inspections of transmission towers that are currently provided by Argos were executed through two methods. These methods included climbing the tower with a rope or hanging out of a helicopter. For surveying, a typical job for Argos is over a hundred acres. Before drone technology, this area was walked on foot, taking weeks to months to complete. In both niches, Argos has implemented drone technology to ensure efficiency, safety, speed, and accuracy. Inspections are completed with humans on the ground; month-long surveying only takes half a day. Pilots are able to manually control multi-rotor drones in the most extreme locations.[2] Safety, efficiency, and accuracy are selling points that continue to provide constant revenue, and flights, for Argos.

According to a spokesperson for Drone Base, "Our ultimate goal is to help our customers recover revenue through anomaly identification and reduce risk of damage." Aerial imaging during the construction phase improves decision making and provides more insight into the project as a whole. Additionally, it increases the safety and efficiency of inspections. For instance, Drone Base inspects roofs for residential and commercial properties. This work is done quickly and efficiently with drones while also reducing the risk of injuries associated with using ladders and working at tall heights, as is used during a traditional inspection. Human risk is decreased, time is saved, and accuracy is increased, ultimately resulting in increased revenues for companies who utilize Drone Base technologies.

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[2] https://www.argosuas.com/

Conclusion

Both Argos and Drone Base have reported rapid expansion in the last few years. Both companies are benefitting multitudes of companies with their services. Their services provide the safety, efficiency, and accuracy needed to reduce loss and increase revenue. Customers of these drone service providers report high satisfaction and desire to continue the mutually beneficial relationships; both companies reported continuous new client interest. As Argos is a Pennsylvania-based company, and Drone Base employs 10,000 Pennsylvania-based employees, the future of Pennsylvania's drone service industry is strong and is expected to continue to see notable growth.

UAS AND STANDARDIZATION
CASE STUDY

Industry standards refer to voluntary agreed-upon practices, values, and safety precautions that establish requirements per industry. For example, in the Uncrewed Aircraft Systems (UAS, or drone) industry, one standard includes "minimum requirements for an Unmanned Aircraft Flight Manual (UFM) for a …UAS designed, manufactured, and operated in the light UAS category as defined by a Civil Aviation Authority (CAA)."[1] Standards are important to maintain a high level of professionalism, safety, and product integrity for consumer and business use. This case study details ASTM International, a Pennsylvania-based international organization that develops safety and performance standards, including those for UAS.

Pennsylvania is the Headquarters for an International Organization

ASTM International (ASTM) is headquartered in West Conshohocken, Pennsylvania, with the headquarters alone employing over 200 employees. In addition to its headquarters, ASTM International has offices in Washington, D.C. and around the world including Belgium, Canada, China, and Peru. ASTM is a voluntary consensus standards organization, formed in 1898, with over 12,900 standards and more than 145 technical committees that represent over 90 industry sectors including concrete, additive manufacturing, and commercial spaceflight. These technical committees are made up of 32,000 volunteer members who come from more than 140 countries around the world and serve as the technical experts who develop standards. With five specific aerospace sectors, the F38 Committee on Uncrewed Aircraft Systems (started in 2003 as a Memorandum of Understanding with the Federal Aviation Administration [FAA]), includes three subcommittees: the airworthiness subcommittee (F38.01), the flight operations subcommittee (F38.02), and the subcommittee on personnel training, qualification, and certification (F38.03).

Current Pennsylvania companies involved in the ASTM F38 committee include Near Earth Autonomy (profiled in the UAM/UTM Case Study), Asylon, One Sky (profiled in the UAM/UTM Case Study), Sullivan Aviation, Piasecki Aircraft Corporation, and Icarus Aerospace.

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[1] https://www.astm.org/f2908-18.html

Standardization is Helping the UAS Industry Grow

There are currently 520 members within the F38 committee. Through this main committee and its three subcommittees, standards are developed for UAS technology, minimum safety, performance, flight proficiency requirements, quality assurance, methods for monitoring and maintaining continued operational safety, and processes for identifying, reporting, and remedying safety-of-flight issues. ASTM International is industry-driven, meaning that any individual or company, including manufacturers, consumers, and general interest individuals within the UAS industry, can propose standards to the F38 committee. All ASTM standards follow ASTM's consensus-driven approach, meaning everyone has a voice in the process. Currently, the F38 committee has 27 approved standards. These standards are often used as a basis for law, regulation, or a means of compliance to show that a platform, system, or service can operate safely within the national airspace. A current initiative of ASTM is the Remote ID and Tracking Standard. This standard is expected to appease the growing demand for better identification and tracking for drones.[2]

[2] https://www.astm.org/get-involved/technical-committees/committee-f38/subcommittee-f38

Conclusion

ASTM International is a renowned global standards organization that relies on the needs and recommendations of individuals and companies. ASTM employs hundreds of Pennsylvania-based staff to drive this international initiative. Involvement in the UAS standardization process is open to all individuals. ASTM continuously works to ensure that UAS standards are necessary and beneficial to the public. Current Pennsylvania organizations are part of F38, and ASTM International expects more involvement as drone businesses continue to grow and flourish in the Commonwealth.

PADRONE ASSOCIATION | pennsylvania DEPARTMENT OF TRANSPORTATION

UAS AND TELECOMMUNICATION
CASE STUDY

Telecommunication is the long-distance transmission of information using technology such as wire and radio. This information is sent over a network and can be in the form of text, data, imaging, and more. As Uncrewed Aircraft Systems (UAS, or drones) have become a prominent method for aerial imaging, companies are discovering the possible synergy between telecommunication and drone technology. This case study highlights a Pennsylvania-based company, Rajant Corporation, combining drone technology, radio technology, and mesh technology to ensure connection and communication in even the most extreme environments.

A Pennsylvania-Based Firm is Revolutionizing Mesh Technology

Rajant, based in Malvern, Pennsylvania, is a 150-employee company specializing in wireless networks which provide fully mobile broadband connectivity that is self-optimizing and self-healing to move and evolve with application demands. This connectivity is fully distributed and maintains many connections simultaneously, affirming that connecting to a network is constantly possible.

For the last 20 years, Rajant has specialized in enabling connectivity in remote places. Deep into underground mines, across congested ports, and across vast agricultural expanses are a few examples of Rajant's missions. A spokesperson stated that Rajant is "a company in the vehicular communications world." Simple techniques of affixing a Rajant radio node allow trucks and other industrial equipment to have perpetual, moving networks in non-connected areas.

From its beginning, Rajant has worked with the military, utilizing its architecture for defense communication projects. Rajant has carried those successes into industrial and commercial markets. This Pennsylvania-based company has expanded to service national, military, and international interests over the last 20 years.

UAS is Helping the Mesh Technology Field Grow

Recently, Rajant has intertwined drone technology and mesh technology to demonstrate the power of connectivity. Utilizing radio technology, Rajant can deploy multiple drones, referred to as "swarms" or "large-fleet operations," interconnected to communicate with each other to accomplish a common goal. A single person controls the entire fleet of drones and the onboard cameras. In Greece, Rajant used its mesh technology and underwater drones to map parts of the ocean. For the military, Rajant places a radio node on every drone (over 100 drones in total) to survey potentially dangerous areas before soldier engagement. In both examples, connectivity was attained in areas with little to no network enabling inter-communication and data collection through multiple drones.

Rajant also demonstrates how one singular drone can improve connectivity between people and areas. During concerts, the Fourth of July, and other major events in Pennsylvania, Rajant has used drones to mimic a cell tower to provide additional bandwidth. A ground generator powers a cable up to the drone to feed longer air time. In large groups, where cellular connectivity dwindles, drones give the height needed to cover the greater geography of users.

Another application of mesh technology includes connecting miners operating deep underground or tunneling through mountains. Real-time connectivity for safety and productivity is mission critical. Often these miners are working with explosive material, and a lack of communication between teams can be hazardous. Rajant will place a drone on top of the mountain to connect miners below with no infrastructure required. The drone acts as part of the network to feed data to the central command.

Conclusion

In the last few years since the company began implementing UAS technology, Rajant has already experienced high positive revenue due to its mesh and drone integration. Rajant attributes much of this revenue to the ability for drones to communicate with each other to finish a given task. As demand for Rajant's technology grows and as new clients continue to adopt this drone methodology, Rajant's UAS operations have become a crucial aspect of its business and partnerships. Rajant expects future growth as their UAS operations and capabilities increase.

UAS AND TRAINING
CASE STUDY

Interest in owning and flying Uncrewed Aircraft Systems (UAS, or drones) is increasing as UAS technology advances and UAS are made readily available. Whether that interest be for a hobby or a career, training opportunities and programs are necessary to ensure that operators and pilots can fly their drones safely while complying with airspace rules and regulations. This case study profiles a Philadelphia-based company that provides UAS training, Master Your Drone.[1]

UAS Hobbyists Find New Passions

Master Your Drone, a Philadelphia-based drone school, provides experienced teachers and safe environments to explore UAS. The company has already invested over $100,000 in UAS technology to teach precision and confidence to drone students. Lessons include drone flight operations, visual observer training, Federal Aviation Administration (FAA) rules, weather, regulations training, hands-on drone flight exposure, obstacle courses, applications and drone insurance recommendations, and drone job skills training. According to the CEO of Master Your Drone, "We get people as young as 11. Parents are looking for something different, something exciting to do with their kids. What I love about drones is that they're not competitive. You can just have fun. I just want people to fly, fly, fly, and be inspired." Master Your Drones works with a wide variety of people, from young adults looking to find a passion, to retirees looking for a new hobby. The main goal is to teach responsible and safe drone usage. A team of eight instructors teaches a 30-point skill set to each student. For every instructor, there are two students and there is a 10-person limit for every class. First, students are taken through drone simulators, then to an indoor course to master remote control, and finally outside to learn aerial and video photography. Master Your Drone typically provides drones to beginning students so as to not exclude those who want to learn but who do not have their own personal drone yet.

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[1] https://masteryourdrone.com/

Master Your Drone is Training the Next Generation of Commercial Operators

Although Master Your Drone offers a variety of packages for different interests, the drone master class is targeted to those looking to become a certified FAA Part 107 pilot and integrate into the pilot network within Pennsylvania. Instructors provide a step-by-step course in airspace regulation and the segments of Part 107 needed to acquire certification. In the last four years, Master Your Drone instructors trained over 200 Part 107 pilots, with the highest percentage of these being trained just within the last year, showing a growing interest in this field.

Many students are serious about workforce development and aspire to a second career. Master Your Drone students also include those from companies looking to integrate UAS into their day-to-day operations. The Chester Water Authority, for example, has hired Master Your Drone instructors to aid in situational awareness during drone flights. Instructors at Master Your Drone recognize their role in providing opportunities within an entirely new job market. As the CEO stated, "What we bring to the marketplace and to our students is inspiration, positivity, encouragement. We bring a future to people that are looking for something new, something different, or that are looking to pivot and venture into a new market."

Conclusion

As UAS continue to proliferate, companies like Master Your Drone that offer training are critically important to educate and provide experience to new users of UAS. Master Your Drone has reported the greatest increase in customers within the last year, even with the challenges of COVID-19. Recreational and commercial users alike can learn safe and responsible drone operation while pursuing FAA certification if desired. Companies and hobbyists are benefitting from the experience and hands-on training offered by Master Your Drone.

URBAN AIR MOBILITY AND UAS TRAFFIC MANAGEMENT
CASE STUDY

The continued development of Uncrewed Aircraft Systems (UAS, or drones), means that UAS are being adapted into every facet of life, from hobbyist flyers to commercial implementations. One of the most exciting growth markets in UAS is Urban Air Mobility (UAM), considered part of the broader context of Advanced Air Mobility (AAM) which reflects the overall transformative nature of air-related technology. Per the Federal Aviation Administration (FAA), UAM envisions a safe and efficient aviation transportation system that will use highly automated aircraft to operate and transport passengers or cargo at lower altitudes within urban and suburban areas. UAM will be composed of an ecosystem that considers the evolution and safety of the aircraft, the framework for operation, and more.[1] Relatedly, unmanned aircraft system traffic management (UTM) is a "traffic management" ecosystem for uncontrolled operations that is separate from, but complementary to, the FAA's Air Traffic Management (ATM) system.[2] UTM is primarily employed for beyond visual line-of-sight operations, meaning its implementation will go hand-in-hand with the adoption of UAM.

The UAM/UTM industry, while still new, is a significant piece of the larger UAS industry. This case study details the findings and insights from two of Pennsylvania's leading businesses in the UAM/UTM industry, OneSky and Near Earth Autonomy.

UAM/UTM is One of Pennsylvania's Most Rapidly Growing Aviation-Related Industries

Both OneSky and Near Earth Autonomy are less than 10 years old and evolved from other businesses or endeavors. OneSky, which develops airspace assessment, operations, and traffic management solutions for the aviation industry, evolved from a company that sold similar software technology to defense and intelligence companies.[3] OneSky has 20 total employees, with 12 located in Pennsylvania, and anticipates that their firm will continue growing as UAS becomes more integrated into the fabric of the aviation network. As a OneSky representative stated, "UTM is the prerequisite to the safe integration of airspace. OneSky provides digital infrastructure to its operator(s) and enables additional safety…States are now realizing that the statewide implementation of this infrastructure will help the industry and their economies grow."

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[1] Federal Aviation Administration, "Urban Air Mobility and Advanced Air Mobility," https://www.faa.gov/uas/advanced_operations/urban_air_mobility/

[2] Federal Aviation Administration, "Unmanned Aircraft System Traffic Management (UTM)," https://www.faa.gov/uas/research_development/traffic_management/

[3] OneSky, https://www.onesky.xyz/

Near Earth Autonomy was founded in 2012 and has grown to nearly 100 people, with headquarters in Pittsburgh. The firm is working towards a future where autonomous flight is commonplace and safe. Their work enables a range of uncrewed aircraft to operate across multiple applications.[4] Near Earth Autonomy has recently begun to increase the scale of its operations and has gotten traction internationally. The Near Earth Autonomy CEO noted that "there are 5,000 high-tech jobs in Pittsburgh alone [including nearly all of those at Near Earth Autonomy] and the firm is attracting businesses from Europe. If business continues to grow as it is, Near Earth Autonomy will be hiring even more people in these high-value jobs."

New Developments Are Just On the Horizon

OneSky is optimistic that UTM, while currently in its infancy, will continue to grow along with the expansion of the UAS industry. In particular, most UAS operations are currently within visual line-of-sight but a OneSky representative noted that beyond visual line-of-sight operations are anticipated to increase as regulations change and are fully implemented. Beyond visual line-of-sight operations generally have a higher return on investment and provide more responsive, persistent, and reliable data. Further, beyond visual line-of-sight operations are able to rely more heavily on an integrated UTM system, increasing safety for all aviation users.

The Near Earth Autonomy CEO noted that Pennsylvania has a large aerospace industry and he anticipates that UAM/UTM will be a significant segment of that industry in the years to come. However, being able to test beyond visual line-of-sight operations within a drone corridor, such as the one located in Virginia, would help these operations grow even faster.

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[4] Near Earth Autonomy, https://www.nearearth.aero/about-us

Conclusion

UAM/UTM is an exciting advancement within the UAS industry, and two thriving businesses in this field are located in Pennsylvania. OneSky and Near Earth Autonomy provide software solutions that enable the safe integration of airspace and encourage safe and secure autonomous flight. Both firms reported that they are growing—hiring more people, expanding in their field, and bringing business into the state. With recent developments in the aviation industry, including changing regulations surrounding beyond visual line-of-sight operations, both see bright futures ahead.

UAS AND UTILITIES
CASE STUDY

Uncrewed Aircraft Systems (UAS, or drones) are revolutionizing industries across the board. The utility industry is a prime example of this advancement. Utility companies are responsible for generating, transmitting, and distributing energy. At every step of this process, infrastructure must be frequently inspected and maintained in order to distribute energy safely, efficiently, and quickly. Many utility companies have begun using drones for the inspection process, as they afford numerous benefits that cannot be achieved through traditional inspections alone. This case study details how drones have been used in the utility inspection process by one utility company, Exelon Clearsight.

Gaining Experience in an Evolving Industry

Exelon Clearsight operates for Exelon Corporation, one of the nation's largest utility providers. Exelon Clearsight is based in Pennsylvania and employs 65 staff; 40 of these employees are on the operations team and are all trained UAS pilots. Exelon Clearsight has gained immeasurable experience in UAS, whose everchanging rules and regulations can make it difficult to reliably add UAS to regular business practices. An Exelon Clearsight representative noted "Exelon Clearsight very frequently applies [for a Federal Aviation Administration (FAA) waiver or exemption for drone operations], as we need to operate in restricted airspace." The waiver process may prevent some companies from accepting certain assignments or from operating at peak efficiency. However, Exelon Clearsight has experience with the waiver process, noting that "Approximately five percent of all [our] labor time [is spent] on waivers across the company…Approximately 80 percent of Exelon Clearsight's missions include clearing restricted airspace."

Exelon Clearsight optimizes drone usage for the tasks most typical to their operations and operates only small, commercially available, FAA-standard drones. While the Exelon Clearsight representative noted that he believes the UAS industry as a whole is headed towards using larger, heavier drones, these are not useful to the company's current operations.

Drones Increase Safety and Efficiency in Utility Inspections

As with other types of inspections, utility inspections may pose a risk to the inspector. The Exelon Clearsight representative noted that while 95 percent of utility inspections are still traditionally completed (i.e., without drone assistance), he expects that in just a few years this percentage will shrink to five. This is because UAS increase not only the safety but the efficiency and accuracy of utility inspections. As the representative noted, "Traditional inspections are purely visual. An inspector may be walking along a dangerous right-of-way, or hanging out of a helicopter, or going into a confined space in order to inspect facilities. There is a huge safety and speed improvement with UAS. Drones can go into almost any environment, even if that environment would be unsafe or otherwise hazardous to humans." In order to increase these safety benefits, among other reasons, Exelon Clearsight conducts the majority of its operations in-house. A typical drone operator may not be able to operate safely around electrical infrastructure, which Exelon Clearsight pilots are specifically trained to do.

Drone inspections also increase the detail and quality of data collected when compared to traditional inspections. Drones collect data digitally from the start, whereas traditional inspections are typically handwritten and then transcribed. This digital data is more accurate, more detailed, and of higher quality. Finally, conducting inspections with drone assistance decreases the time spent on a typical task. The Exelon Clearsight representative noted "To take an example, consider inspecting distribution poles. A UAS team can inspect 100 poles in a day. A visual team can inspect 40 poles. Moreover, if the visual team were to try to inspect more poles in a day, there would be a notable quality cut."

Conclusion

Utility companies are utilizing UAS to conduct routine inspections with great success. Exelon Clearsight was founded to capitalize on the numerous advantages afforded by drone inspections. These benefits include increased accuracy, heightened safety, and a reduction in time and cost. Over time, it is estimated that utility production will become more reliable and safer not only for utility companies, but for customers as well.