

# AVIATION ECONOMIC IMPACT STUDY



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# Executive Summary

The Washington State Department of Transportation (WSDOT) Aviation Division, with the support of the Federal Aviation Administration (FAA), has completed a study on the role aviation plays in Washington's economy. The Aviation Economic Impact Study provides a holistic picture of how Washington's public use airports contribute to the economy statewide and at the community level by:

- Measuring the economic and fiscal impacts of each of the state's 135 public use airports.
- Exploring how the aviation system supports economic development and competitiveness at the local and statewide levels.
- Building understanding of how the state's aviation system creates economic value for people and communities across the state.

The primary purpose of this study is to support a broad understanding of the role of the state's aviation system within the state economy among all relevant stakeholders, including demonstrating how the system contributes to the well-being of the state and how individual airports contribute to the well-being of the communities in which they operate. This is also an update of the economic impact analysis work conducted as part of the 2001 Aviation Forecast and Economic Analysis Study and builds on other recent WSDOT planning efforts related to the 2009 Washington Aviation System Plan (WASP) and Recommendations of the Washington State Aviation Planning Council, and the development of the Aviation Information System (AIS).

This study is designed to provide the Aviation Division with an important foundational document and to help the Division become the primary steward and advocate for protecting Washington State's aviation system interests. Achieving the Aviation System Plan policies will require a number of legislative actions, and the demonstrated economic value of the aviation system will be a central part of the rationale for gaining support for these policy steps. This study focuses on economic benefits associated with airports and does not consider potential costs or negative impacts associated with activity on or around airports. These potential costs or negative impacts should also be considered along with economic value when making public policy decisions affecting the aviation system.

## Approach to Economic Analysis

Since airports and aviation services provide a wide range of economic benefits, this study approaches the assessment of economic contribution from three different perspectives to create a more comprehensive picture of aviation's economic value and impact in the state. This broad perspective is necessary to fully appreciate the state policy implications of a healthy and vibrant aviation system.

**Airport-level economic impacts (Airport Perspective).** This is the core of the analysis: identifying the traditional economic impacts—the jobs, wages, output, and spending—of the state’s 135 public use airports. These airport-level impacts address activity that can be directly associated with an airport, namely: businesses operating at the airport and the visitors traveling through the airport. From these direct impacts, multiplier effects are also evaluated, as wages and other spending are re-spent in the local economy. This analysis also includes a fiscal assessment of how these airport businesses and visitors affect local and state tax revenues.

**Industry-level economic impacts (Industry Perspective).** While the airport-level analysis focuses on activity that can be directly attributable to specific airports, the industry-level analysis explores how the presence of airports affects the location and distribution of economic activity in the state. A selected number of state industries are examined in relation to airports.

**User-level economic value (User Perspective).** The broadest measure of economic contribution is the user-level benefits that are derived from access to and use of aviation services in the state. This analysis explores the intrinsic value that users derive from the system by examining a number of aviation-supported services.

### Advisory Committee Overview

As part of the Aviation Economic Impact Study, the WSDOT Aviation Division assembled an Advisory Committee to inform the project’s analyses and products. The Committee was comprised of aviation system users, operators, and beneficiaries, with wide representation from: airport management, local and state government, ports, general aviation pilots and users, businesses, economic development agencies, and other aviation stakeholders. The Committee played an invaluable role as a sounding board to WSDOT Aviation and the consultant team throughout the project.

### Summary of Findings

This study finds that there are significant direct economic and fiscal benefits created by the aviation system in the state and that the system is a core element of the state’s transportation infrastructure, which supports local and state economic prosperity. In addition, the value derived by individuals, communities, and businesses from their access to and use of aviation services far exceeds even the direct job, wage, and output impacts.

As state and local jurisdictions grapple with significant budget challenges, it will be critical that aviation system needs, as well as their potential economic and fiscal impacts, be thoughtfully considered when discussing priorities for public funding.



## Airport Perspective

The analysis estimates the total impact that can be attributed to airport-related activity at the 135 public use airports in Washington State: 248,500 jobs, \$15.3 billion in wages and \$50.9 billion in total economic activity. From a fiscal perspective, more than \$791 million in tax revenue is generated from aviation activities. Over \$548 million goes towards supporting the State of Washington general fund, while cities, special purpose districts, and counties collect approximately \$243 million in tax revenue.

Of the 135 airports analyzed in this study, the top four account for 91% of total jobs and 95% of total output attributable to individual airport activity. These are Snohomish County Paine Field, Sea-Tac International, Boeing Field, and Renton Municipal. Except for Sea-Tac, these are large Boeing employment centers.

While a very large share of the impacts are attributed to only a few facilities, the entire aviation system is important to the state and local economies for several reasons:

- The network of airports extends commerce and economic opportunity throughout the state.
- While some individual airport impacts are relatively small on a statewide basis, they are nonetheless meaningful to their communities at a local level.
- Airports make important economic contributions besides impacts associated with jobs, wages, and output.

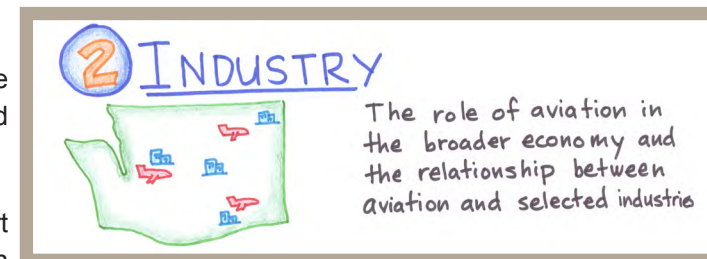
This last point is precisely the reason the overall approach to this study considers three distinct, but related, perspectives on economic contribution. For many airports, particularly the smaller ones, the most important contributions do not come in the form of jobs, wages, and output. Rather, their contribution comes from how the facilities and services support economic activity in the communities they serve and how individual users derive benefits from having access to aviation services.

## Industry Perspective

The aviation system plays an integral role in supporting industry and economic activity throughout the state. The Industry Perspective explores the relationship between aviation and specific industries and highlights the ways in which economic activity and aviation are intertwined.

Over 97% of state Gross Business Income (GBI) is generated by businesses within ten miles of an airport and 70% of GBI is generated within five miles of an airport. These statistics reinforce the point that aviation facilities are fundamental infrastructure that extend commerce and economic opportunity throughout the state.

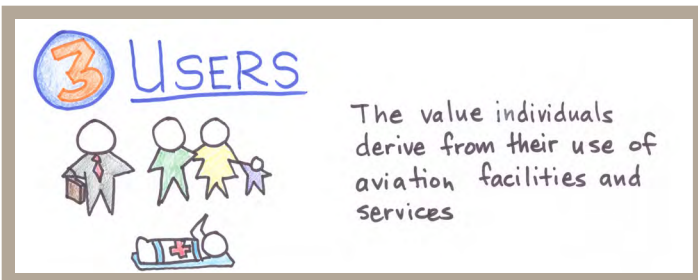
When you look broadly at industry location patterns, a number of industries cluster around airports, but it



is difficult to determine how important airport proximity is among the many factors that influence business location decisions. The one industry that is heavily concentrated near airports is Aerospace, in particular aircraft manufacturing. However, even this industry has a wide network of suppliers that depend on aviation, but do not necessarily locate in the immediate vicinity of airports.

Around different classes of airports, clustering of activity varies by industry and subsector. Thirty-six percent of state GBI is located within five miles of airports with scheduled commercial service. When all airport classes are considered, the percentage climbs to 70%. This is a reflection of the ways in which non-commercial airports play different roles in their communities and are often very important to the local economy.

Overall, airports support industry in a variety of ways and connect communities to commerce and economic opportunities that flow throughout the larger aviation system. The industries supported by aviation are not always clustered immediately around airports. The economic impact analysis presented in the Airport Perspective section is limited to activity occurring on airports and therefore only captures a portion of the benefits that aviation provides to industries and the communities in which they are located. It is important to keep the larger industry perspective in mind when considering the value aviation provides to the state economy.



### User Perspective

The User Perspective provides a discussion of the value derived by individual users of the state's airports and aviation services. Additionally, value accrues to non-users (in the event that they might one day need to use aviation services) and communities (particularly from services that protect property and save lives). While inherently difficult to measure, the value of aviation services must be seen in more than just a measure of gross business income or the number of jobs at particular airports.

Communities, particularly those in rural or remote areas, benefit from aviation services and activities in many ways that aren't captured in either the Airport or Industry Perspectives. One example of these services is aviation-supported firefighting activities, which protect private property from destruction wrought by wildfires. Preventing losses to private property supports the tax base of entire communities. It also protects natural resources that have both industrial uses (e.g. timber for logging) and recreational uses (e.g. hiking in State parks). In addition to this example, the value users derive from 17 broad aviation services, such as medical evacuation, search and rescue, and air cargo services, are described in the User Perspective section.

Considering economic impacts as the sole measure of value of the aviation system in Washington State neglects the very real benefits users experience from aviation services and activities. What the User

Perspective demonstrates is that a great deal of value, above and beyond the number of jobs and gross business income, is created throughout Washington's aviation system and especially in the smaller airports that make up the majority of the 135 public use airports in the state.

## Advisory Committee Perspectives on Report Findings

During the discussion of study findings at Advisory Committee meetings and through the broader stakeholder outreach effort, a number of perspectives were offered on how this report and its findings can be used. The list below captures these observations and provides suggestions that the WSDOT Aviation Division and other policymakers can use to inform development of policies to support the aviation system and state and local economies.

### State Legislation

- Legislation is key to helping protect, preserve, and grow the system, and this study provides a useful base for discussion of airport issues at the state level.
- The study can serve as a mechanism to bring different aviation-related interests together to respond to state-level budget and policy issues affecting airports.

### Airport Capacity

- The study provides the state with the ability to look at the economic implications for expanding capacity and maximizing our current inventory of aviation facilities.
- The FAA and the state are currently working to help prepare airports for the acquisition and implementation of NextGen technology, which will increase capacity and safety, as well as reduce emissions and noise. Given the value of airport capacity, WASP policies place a high priority on efforts to enhance existing capacity through improvements in technology.

### Land Use/Accessibility/Mobility

- Land use around airports was a critical issue in the WASP. This study provides a better understanding of the broader statewide value of airport facilities and should be used in policy discussions about improving compatible land use as well as preserving and enhancing facilities.
- While this study does not specifically speak to the role of aviation in a broader transportation system, there is clearly a need to ensure that all of the state's transportation modes work effectively together to maximize the overall effectiveness of the statewide transportation system.
- Along these lines, during a presentation of preliminary findings to the Washington State Transportation Commission, a policy question was raised about whether the State has an interest in undertaking initiatives to improve or expand commercial air service to communities in Washington state. Specifically, commission members were interested in how to leverage federal grant opportunities to improve or expand air service to non-metropolitan communities.
- A significant share of aviation system economic contributions are from mobility and connectivity for both people and freight.

**Rural Airports**

- Aviation infrastructure will be a critical element to rural economic development efforts. This study underscores the importance of aviation facilities and services in these parts of the state.
- The study identifies a critical economic value of smaller facilities, namely access to life-saving medical air transport and other critical services such as fire fighting that protect life and property in smaller rural areas.

**Impact of Costs**

- Although this study focuses on the benefits of aviation, it is important to note that airports are expensive to build and to maintain. Sometimes the best way to grow means understanding the best ways to prioritize needs and leverage existing assets.
- Another aspect of costs that should be included in policy discussions is that many of the broad economic benefits come at some localized cost, often in terms of noise and traffic impacts.

**Job Growth**

- Regional airport facilities are a significant contributor to the state's economy and measures need to be taken to maintain and improve facilities at regional airports so these facilities can continue to support job growth.

**Diversity**

- One of the real strengths of the system statewide is the diverse nature of Washington's aviation system, which helps connect communities, spread economic opportunity, and provide essential public and commercial services.



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# Introduction and Overview

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- Exploring how the aviation system supports economic development and competitiveness at the local and statewide levels.
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This study is designed to provide the Aviation Division with an important foundational document and to help the Division become the primary steward and advocate for protecting Washington State's aviation system interests. Achieving the Aviation System Plan policies will require a number of legislative actions, and the demonstrated economic value of the aviation system will be a central part of the rationale for gaining support for these policy steps. This study focuses on economic benefits associated with airports and does not consider potential costs or negative impacts associated with activity on or around airports. These potential costs or negative impacts should also be considered along with economic value when making public policy decisions affecting the aviation system.

## THE ROLE OF TRANSPORTATION IN BUILDING COMPETITIVE ADVANTAGE

The transportation system plays an important role in fostering economic vitality and competitiveness in regional and global markets. Washington's key clusters are a source of employment, job growth, innovation, and entrepreneurship. These industries have infrastructure and workforce needs that rely on an efficient, connected transportation system. Employers make location decisions based on a number of factors, many related to transportation, such as the ability to move goods quickly and reliably, access to airports, and transit options and commute times for employees.

Washington Transportation Plan 2030, WSTC, Page 21.

### Washington State Aviation System

Airports provide essential connections to the nation’s aviation system, commerce network, and emergency services. The state’s aviation system includes 135 public use airports located in 36 of its 39 counties. Together, these airports are an economic engine for the state and integral to the transportation system.

There are significant differences in the size, role, and characteristics of the state’s airports, particularly between small local airports and regional or commercial airports. These differences offer an opportunity to explore how different types of facilities and services generate both direct economic impacts as well as support broader economic opportunity throughout the state.

### State Airport Classifications

During the development of the Aviation System Plan, WSDOT created an airport classification system that identifies six distinct types of airports: (1) commercial service; (2) regional service; (3) community service; (4) local service; (5) rural essential; and (6) seaplane base.

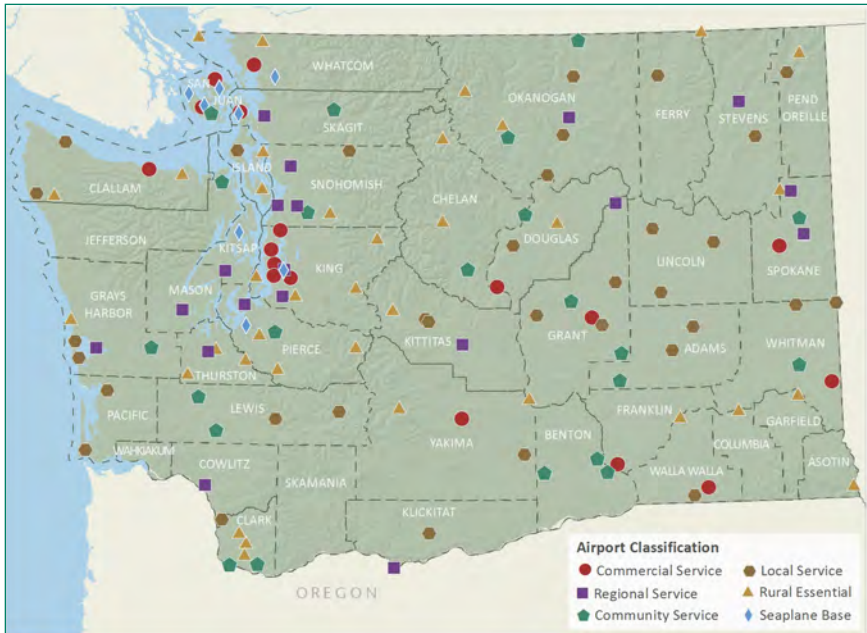
Each class of airport serves a different function in the broader aviation system, from the large commercial and regional service facilities to the smaller community, local, rural, and non-commercial seaplane bases.

A key element of this effort is to explore the degree to which economic contributions of airports vary by

these classifications and how the characteristics of airports may influence the quantity, location and distribution of economic activity around the state.

Although each class of airport serves a different function it is important to recognize that the aviation network is an interconnected system. Smaller community airports feed into major commercial hubs and vice versa. The aviation network is strongest when all components of the system are supported adequately.

### Washington Public Use Airports



### State Airport Classifications

Classification	Description	# Airports	Example Airports
<b>Commercial Service</b>	Accommodates at least 2,500 scheduled passenger boardings per year for at least three years.	16	• Bellingham International • Sea-Tac International • Spokane International
<b>Regional Service</b>	Serves large or multiple communities; all NPIAS Relievers; 40 based aircraft and 4,000-foot long runway, with exceptions.	19	• Olympia Regional • Renton Municipal • Paine Field
<b>Community Service</b>	Serves a community; at least 20 based aircraft; paved runway.	22	• Lopez Island • Thun Field • Richland
<b>Local Service</b>	Serves a community; fewer than 20 based aircraft; paved runway.	33	• Cle Elum Municipal • Davenport Municipal • Port of Ilwaco
<b>Rural Essential</b>	Other land-based airports, including residential airparks.	37	• Camano Island Airfield • Sequim Valley • Vashon Municipal
<b>Seaplane Bases</b>	Identified by FAA as a seaplane base, unless it is a commercial service airport.	8	• Friday Harbor SPB • Poulsbo SPB • Rosario SPB

## The Role of Aviation in the Economy

The aviation system is a fundamental component of a modern economy providing basic transportation infrastructure that links communities and businesses across the globe. The importance of aviation infrastructure will only increase as global commerce and trade continue to grow.

Airbus, in its Global Market Forecast for 2011-2030, expects air traffic to double in the next 20 years, and estimates that more than 25,000 new jetliners will be necessary to fulfill this increased demand.

Specific industries will continue to use aviation services in different ways, but the need itself will remain regardless of how they use them. Reasons why air travel will continue to be important to the modern economy include:

- **Face-to-face interaction.** While the increased connectivity afforded by email and the Internet is frequently cited as a factor reducing the demand for corporate travel, the need for face-to-face interaction remains strong for business to get done. Aviation facilitates these face-to-face interactions, and a recent survey by the Global Business Travel Association shows that corporate travel is increasing rather than decreasing.
- **Getting products to market.** As economies continue to globalize, aviation will be increasingly crucial in getting various

products to their end markets, be it Rainier cherries to Japan or Amazon's myriad products to consumers' homes.

- **Tourism.** As incomes rise throughout the world, more and more individuals will begin to travel for leisure, much of it facilitated by air transportation.

## Economic Value at the State and Local Level

This study aims to provide a better understanding of the ways in which airports support economic growth and opportunity at the state and local level:

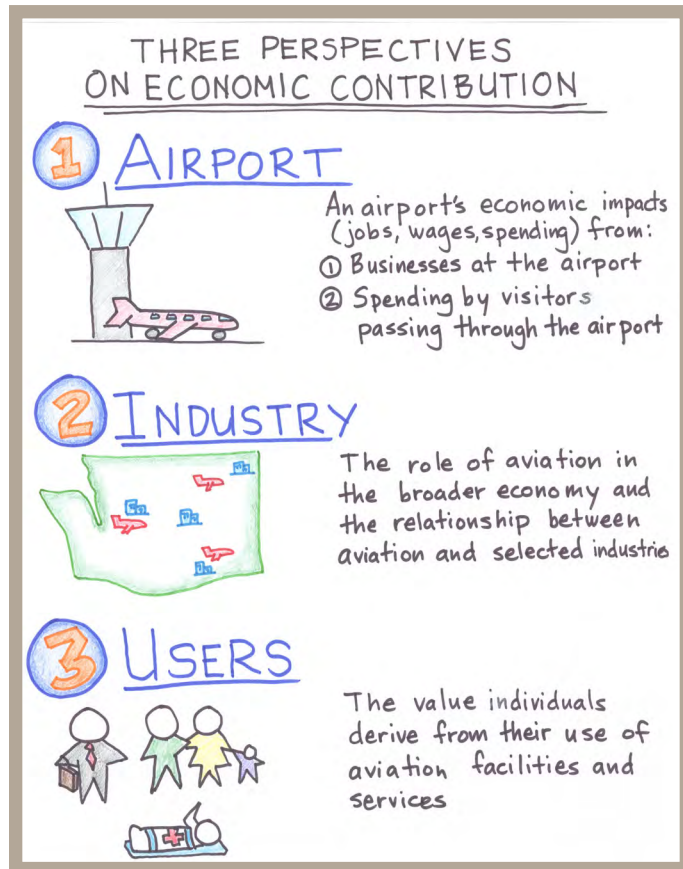
- **Airports create jobs, wages, output, and spending.** Not only do airports support aviation-related businesses, they support all kinds of businesses in direct and indirect ways. In addition, vendors that supply aviation businesses and employees that spend their wages in the community create additional economic activity. More broadly, access to an airport makes a community a more desirable place to locate and grow a business. Airports can play an important role in supporting economic development and growth in rural communities by providing a valuable link to the larger aviation network.
- **Airports create value to the people and communities they serve.** Passenger service allows personal connections and the exchange of ideas; air cargo and freight drives down the costs of goods and services. In some cases, the value of a single trip is

tremendous: the critically-ill child from Omak flying to Seattle to receive life-saving care or the business executive flying to China to land a multi-million dollar deal.

## Unique Role of Aerospace in Washington

The growing role of aviation in the modern economy is particularly relevant to Washington State because of its vibrant aerospace industry cluster anchored by the Boeing company. Boeing is one of the largest aircraft manufacturers in the world and its presence in Washington has made the state a global hub for aerospace activity. As air travel grows throughout the world, the need for Boeing's range of aircraft products (as well as the various Washington-based suppliers of parts for aircraft manufacturing) will grow as well.





## Approach to Economic Analysis

Since airports and aviation services provide a wide range of economic benefits, this study approaches the assessment of economic contribution from three different perspectives to create a more comprehensive picture of aviation's economic value and impact in the state. This broad perspective is necessary to fully appreciate the state policy implications of a healthy and vibrant aviation sector.

**Airport-level economic impacts.** This is the core of the analysis: identifying the traditional economic impacts—the jobs, wages, output, and spending—of the state's 135 public use airports. These airport-level impacts address activity that can be directly associated with an airport, namely: businesses operating at the airport and the visitors traveling through the airport. From these direct impacts, multiplier effects are also evaluated, as wages and other spending are re-spent in the local economy. This analysis also includes a fiscal assessment of how these airport businesses and visitors affect local and state tax revenues.

**Industry-level economic impacts.** While the airport-level analysis focuses on activity that can be directly attributable to specific airports, the industry-level analysis explores how the presence of airports affects the location and distribution of economic activity in the state. A selected number of state industries are examined in relation to airports.

**User-level economic value.** The broadest measure of economic contribution is the user-

level benefits that are derived from access to and use of aviation services in the state. This analysis explores the intrinsic value that users derive from the system by examining a number of aviation-supported services.

It is important to note that there is overlap between some of the economic contributions discussed in each of the three perspectives. For example, a portion of the business activity reported in the industry-level analysis is also being captured in the airport-level economic impact analysis. Users of this report should consider the three perspectives separately and avoid combining quantitative findings between them.

Also, since a major objective of this effort is to develop airport-level economic impact estimates for all public use airports, it was necessary to focus on a replicable evaluation method that could be applied broadly. As such it was not possible to do in-depth studies of each facility, though the study team worked closely with airport managers to review preliminary results and collect feedback.

### Adjustments to 2001 Approach

In 2001, a key element of the analysis was based on individual airport surveys that collected employment and business activity data. The study team found that responses to the open-ended survey were limited, required significant follow-up, and led to inconsistencies across the various airports. In an effort to address some of the challenges experienced in 2001, there were two foundational principles that guided the analytic work for this study:

- **Data-driven analyses.** To ensure consistency and objectivity, the analyses of economic contributions were based on independent data sets at the state and federal levels. Data sources included the Washington Department of Revenue, WSDOT Aviation Division, and the Federal Aviation Administration, among others.
- **Thorough review process.** Review and feedback was a critical part of the analytic process. WSDOT and the consultant team developed review processes throughout the project to obtain feedback from key stakeholders on preliminary analytic findings. This included airport-level review related to each individual airport's economic impact assessment and an Advisory Committee engagement process to provide overall feedback and direction on the analysis and draft findings.

## TECHNOLOGY TOOLS

In previous studies, the results of the economic analysis reflected a snapshot in time of the estimated economic impacts of aviation. A significant objective of this effort was to develop tools that would provide WSDOT with the ability to incrementally update airport profiles and evaluate the economic implications of changes in airport conditions.

- **Integration with Aviation's Existing Database.** An economic impact database will be developed and integrated with the WSDOT Aviation Airport Information System. This database will form the information base for a web-based calculator.
- **Airport Profiles.** WSDOT will have the ability to update the airport profiles developed for each of the 135 public use airports as information in the Aviation Information System is updated.
- **Online Calculator Tool.** An on-line economic calculator will provide a consistent approach to estimating order-of-magnitude economic implications associated with changes in airport conditions.

## Advisory Committee Overview

As part of the Aviation Economic Impact Study, WSDOT Aviation Division assembled an Advisory Committee to inform the project's analyses and products. The Committee was comprised of aviation system users, operators, and beneficiaries, with wide representation from airport management, local and state government, ports, general aviation pilots and users, businesses on airport property, economic development agencies, and other aviation stakeholders.

The Committee played an invaluable role as a sounding board to WSDOT Aviation and the consultant team throughout the project. This included:

- Reviewing and providing input into the project's data collection, economic analyses, and findings.
- Sharing perspectives and expertise in areas including but not limited to: the state's aviation system, airport operations, use of the airports, and economic development.
- Providing advice on how best to present and communicate project findings.

Committee members participated in four meetings during the period of the study: two in Seattle, and one each in Wenatchee and Spokane. Advisory Committee members are listed in Appendix H.

## Stakeholder Interviews

In addition to the input from the Advisory Committee, a number of stakeholder interviews were conducted to augment the analysis on several tasks and provide deeper understanding

of the relationship between aviation and the economy.

Interviews were conducted with: airport managers representing a mix of airport sizes, functions and geographic distribution; fixed-based operators; commercial airlines; cargo-related businesses; and service providers such as medical evacuation and tissue/blood transport, among others. Broadly, the interviews were designed to shed light on the following:

### How the System Works

- How aviation stakeholders (businesses, FBOs, airport managers) make decisions about where to locate operations and which services to provide.
- Other facility operations and local considerations.

### Economic Implications

- How aviation relates to the economy and what the economic connections are.
- What aspects of aviation activity and airport business operations generate the most benefits.

### Policy Implications

- The linkages between Washington Aviation System Plan recommendations and the findings in this study.
- What factors matter most for aviation stakeholders and how local and state policy decisions affect aviation interests.
- Airport challenges and needs, including financing/funding considerations.
- How airport managers would like to use economic impact results.

# Airport Perspective

The airport-level economic impact analysis examines how each airport contributes to its local economy. Economic impacts are the jobs, wages, output (the value of all goods and services produced), and spending that can be directly and indirectly attributed to each of the 135 public use airports in the state. This analysis also includes fiscal impacts, which are the tax revenues generated by activity at the airport.

This is the study's core piece of analysis and is the traditional basis for FAA-supported economic impact analyses at the state level. The goal is to estimate the economic impact resulting from the presence of each airport. This means identifying the level of economic activity that can be reasonably attributed to the presence of an airport and then estimating how that activity generates additional impacts as it ripples through the local economy.

The graphic to the right depicts the analytic approach to the airport-level analysis. The key point is that there are two principal sources of direct economic activity estimated for each airport, which are then used to estimate total economic and fiscal impacts.

The first source of impacts is the activity associated with **aviation-dependent businesses located on the airport footprint**, including airport operations themselves. These businesses are identified and the level of business activity and number of jobs are estimated to determine the total direct impact associated with on-site activity.

The second source of impacts is **spending associated with visitors passing through each airport**. The total number of visitors is estimated based on both commercial services (scheduled airline and air taxi services) and general aviation operations. For each visitor, an average visitor spending value is estimated to provide an overall estimate of total visitor spending for each airport. It is important to note that the total visitor spending estimates are attributed to the airports where visitors are arriving, but that the location of the spending is likely to reach beyond the local area where the airport is located.



**NON-AVIATION-DEPENDENT BUSINESSES**

The impact analysis only includes businesses that rely on the airport for their operations and would likely move if the airport ceased operations. Other non-aviation-dependent businesses are excluded. For example, a residential home builder with an office located in an industrial park on airport property is excluded from impact calculations because this business is not dependent on the airport and would continue operations if the airport weren't there.



## AIRPORT FOOTPRINTS

Establishing airport geographic footprints is an important first step in determining economic activity tied to airports. These boundaries allow for the application of a consistent methodology in identifying businesses located on airports.

In addition to properties directly owned or leased by an airport, the study also included properties adjacent to the airport with direct access and physical connections to airport facilities. This second type of property is known as a through-the-fence (TTF) connection. There are two main types of TTF connections:

- **Airport-Linked Businesses.** These are businesses with physical links to airports used for business operations. For example, the Boeing facility next to Renton Airport is included in the footprint definition (map below).
- **Rural Airparks.** These are private homes with hangers and often direct connections to airport-owned property and facilities.

We recognize there are some aviation-dependent businesses located off the airport footprint. This limitation is addressed further in the Industry Perspective section.



## Key Terms and Concepts

Economic impacts start with expenditures. Expenditures within an economy are passed from hand to hand, creating more economic activity than just the original transaction. This is called a multiplier effect: one dollar spent within the community can become more than one dollar of economic activity when passed along several times. Conversely, if a portion of that money is sent out of the region, one dollar spent can be less than one dollar of economic activity in the area.

**Direct Impacts.** Direct impacts are not, as many people might think, the amount of money initially spent on a purchase. Instead, they are the amount of that initial purchase that will remain within the local economy. As an example, when a visitor pays to rent a car at the airport, the rental car company will send some of that money to their headquarters outside of the local region, some of the money will be used to purchase goods outside of the local region, and the rest will be spent on local employees, rent, and purchases from businesses within the region. In this case, the cost of the rental car is not the direct impact. Instead, the direct impact is the portion of the expenditure that the business re-spends within the local region.

**Indirect Impacts.** Indirect impacts result when a business makes purchases from other businesses. For example, if a person purchases an item from an airport gift shop, the gift shop owner must then make more purchases from their supplier; the impact on the supplier is an indirect effect.

**Induced Impacts.** Induced impacts result from the expenditures of employee wages. If a person purchases an item from an airport gift shop, the person who sells that item receives a wage for working in the shop. These wages are then put back into the local economy as that person makes purchases for his or her household. This is the induced effect of the gift shop expenditure.

Estimating economic impacts (direct, indirect, and induced) at the airport level involved five key analytic steps:

- **Step 1.** Establish airport footprints to define the impact area for the purpose of estimating attributable economic activity (see sidebar).
- **Step 2.** Estimate on-site business activity within the airport footprint using independent data from multiple sources, but principally based on Department of Revenue tax collections.
- **Step 3.** Estimate off-site spending associated with visitors traveling through each airport using visitor count estimates and average per visit expenditure estimates.
- **Step 4.** Using IMPLAN, an economic impact assessment model, estimate the multiplier effects of direct economic activity for each airport to get indirect and induced impacts.
- **Step 5.** Based on the level of direct spending estimated for each airport, estimate the fiscal impacts resulting from the airport's economic activity.

Draft results were sent to all 135 airports for review and comment, with a particular focus on the list of businesses and estimated footprint jobs.



### Statewide Economic Impacts

The table to the right shows the total impact that can be attributed to aviation-related activity in Washington State: 248,500 jobs, \$15.3 billion in wages and \$50.9 billion in total economic activity.

Clearly the total impact that can be attributed to aviation-related activity both at the airport and associated with travellers passing through the state’s 135 public use airports is significant. Of the total employment impacts, 141,350 jobs are directly supported by on-site activity or visitor spending, with the balance supported by the re-spending of direct wages and business expenditures.

Further, it is noteworthy that the on-site activity is contributing the greatest share of jobs, wages and output, which is primarily due to the major role that aircraft manufacturing plays in this state. This is particularly evident in the estimate of economic output, where a significant majority is estimated to be derived from on-site activity.

#### Comparison with 2001 study

The 2001 Aviation Forecast and Economic Analysis Study estimated total statewide economic impacts of 171,000 jobs, \$4.1 billion in wages, and \$18.6 billion in economic activity.

While the current analysis suggests the economic impacts of airport activity have grown substantially in the last decade, it is difficult to make a complete comparison of the results from the two studies because the approach used in this study was

### Summary of Statewide Impacts Compared to 2001 Study

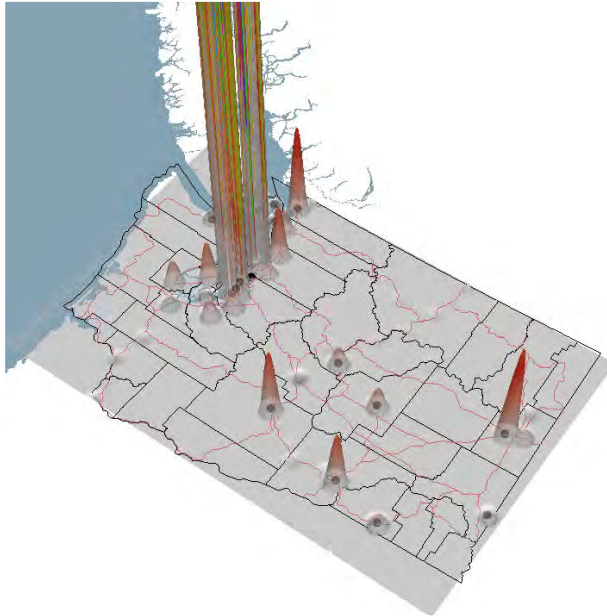
2012 STUDY					
	Direct Impacts			Indirect/ Induced Impacts	Total Impacts
	Visitor Spending	On-site Businesses	Total Direct Impacts		
Jobs	61,400	79,900	141,350	107,150	<b>248,500</b>
Labor Income	\$ 1.8 B	\$ 8.2 B	\$ 9.9 B	\$ 5.4 B	<b>\$ 15.3 B</b>
Output	\$ 5.4 B	\$ 29.4 B	\$ 34.8 B	\$ 16.1 B	<b>\$ 50.9 B</b>
2001 STUDY					
Jobs	91,804	21,351	113,155	58,157	<b>171,312</b>
Labor Income	\$ 1.4 B	\$ 0.7 B	\$ 2.1 B	\$ 1.9 B	<b>\$ 4.1 B</b>
Output	\$ 5.6 B	\$ 7.2 B	\$ 12.8 B	\$ 5.8 B	<b>\$ 18.6 B</b>

different in meaningful ways compared with the approach used in the 2001 study.

The change in approach was developed at least in part to address some specific challenges experienced in the development of the 2001 study. The following are the most significant changes between the two studies:

- Airport footprint definitions in this study include through-the-fence activities, adding significant aircraft manufacturing activity to the total.
- This study worked to identify and exclude non-aviation-dependent businesses from the airport footprints.
- This analysis is based on independent employment and business activity data as opposed to the survey-based approach used in 2001.
- The 2001 study used a separate study of Sea-Tac airport, while this effort applies a consistent methodology to all airports in the state.
- This study estimates impacts in 2009 dollars. The 2001 study was based on 1999 dollars, so there is 10 years’ worth of inflation accounting for some of the difference in impacts.
- There were fewer public use airports operating in the state at the time of the current study, though the airports affected were all small and do not have a material impact on the statewide findings.

### Economic Impacts of Airport Activity



### Distribution of Economic Impacts

While the overall economic impacts are significant, the analysis also suggests that the impacts are heavily concentrated at a few very large facilities.

The map to the left presents the geographic distribution of the estimated economic impacts across the state. The relative magnitude of the impact associated with each of the 135 public use airports is depicted as an elevation on the map. The higher the elevation, the greater the impacts for a given facility.

While there are several nodes of activity scattered around the state, the largest impacts can be seen in the Central Puget Sound region, where the elevation is so great it extends beyond the printable area. There are four significant activity centers in this region that contribute an enormous share of the overall state impacts.

These four airports are Sea-Tac International, Snohomish County (Paine Field), King County International (Boeing Field), and Renton Municipal. Combined, they account for 91% of total jobs and 95% of total statewide output attributable to individual airport activity.

Each of these facilities is estimated to support at least 10,000 jobs and more than \$5 billion of economic activity. Economic impacts at these four are primarily driven by either: (1) major commercial hub service, such as at Sea-Tac; or (2) aircraft manufacturing activity, since the other three are large Boeing employment centers.

This reflects one of the unique features of Washington’s public use airports, namely that aircraft manufacturing is an industry that is both dependent on access to airport facilities and a major contributor to the state’s economic well-being.

Beyond these four large airports, the overall contribution to the airport-level economic impacts are generally more modest and somewhat more geographically dispersed, with key activity centers in several eastern Washington communities (Spokane, Tri-Cities, and Yakima) and northwest Washington (Bellingham). Generally, the impacts correlate with population centers.

The apparent lack of activity in southwest Washington is a reflection of the presence of Portland International Airport, just south of the Washington border. This major international commercial airport serves a large market area, including a significant portion of southwest Washington.

While the economic impacts associated with aviation-related activity at the public use airports are substantially concentrated at four facilities, there are still meaningful direct impacts at a number of facilities beyond this group. The table to the right highlights all of the public use airports where at least 300 direct jobs have been estimated.

All of the airports on this list are classified as either commercial or regional airport facilities, indicating that they are capable of supporting most aircraft operations and/or offer scheduled commercial airline service. Spokane International is the next largest facility after the “Big Four,” with almost 6,000 direct jobs. About two-thirds of these jobs are attributable to the spending of visitors traveling through the airport.

The next three facilities on the list have substantial commercial airline service (Bellingham, Tri-Cities and Yakima), followed by two regional facilities (Arlington and Skagit) with significant aviation-related activity from on-site businesses. The last facility is the home base of Kenmore Air, which offers commercial seaplane services throughout the northwest.

The remaining 124 facilities are estimated to support approximately 3,160 direct jobs, with the majority of the job impacts at these smaller facilities coming from on-site aviation-related business activity.

To further illustrate the distribution of economic impacts, the chart to the right shows that 95 of

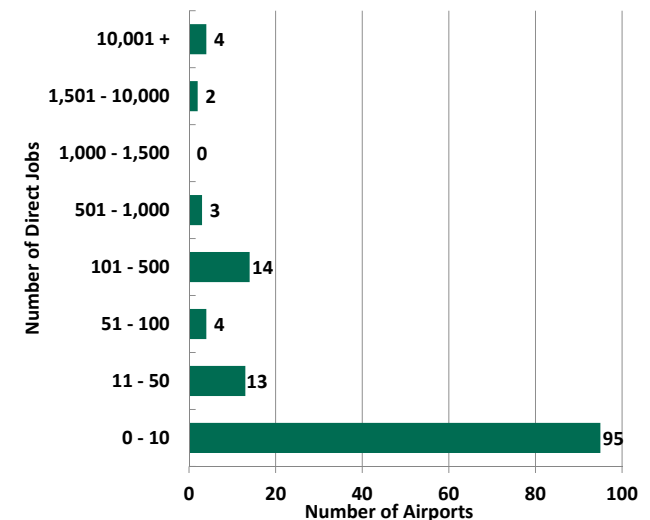
### List of Major Public Use Airports, Ranked by Total Direct Jobs

Airport Name	Direct Jobs			Total Direct Output	Direct Output per Direct Job
	Visitor Spending	On-site Businesses	Total Direct Jobs		
Sea-Tac International	54,700	9,910	64,610	\$ 7,013.9 M	\$ 109,000
Snohomish County/Paine Field	30	34,260	34,290	\$ 14,864.5 M	\$ 434,000
Boeing Field/King County International	220	18,410	18,630	\$ 6,387.9 M	\$ 343,000
Renton Municipal	20	10,270	10,290	\$ 4,933.9 M	\$ 479,000
Spokane International	3,880	2,020	5,900	\$ 718.9 M	\$ 122,000
Bellingham International	990	620	1,610	\$ 160.1 M	\$ 99,000
Tri-Cities	560	350	910	\$ 100.2 M	\$ 110,000
Yakima Air Terminal	110	540	650	\$ 89.1 M	\$ 136,000
Arlington Municipal	30	570	590	\$ 94.5 M	\$ 159,000
Skagit Regional	20	350	370	\$ 41.3 M	\$ 112,000
Kenmore Air Harbor SPB	80	230	310	\$ 34.4 M	\$ 110,000
All Other Airports	770	2,390	3,160	\$ 374.2 M	\$ 118,000

the state’s 135 public use airports have fewer than 10 direct jobs that are attributable to aviation activity. It is among these smaller facilities where the true value of the airport cannot be adequately measured by the direct contribution of airport-related jobs, wages and output.

For these facilities, the real contribution comes from the connectivity that the airport provides to the larger aviation system and through the user-derived benefits of provided services. Both of these concepts are discussed further in subsequent sections.

### Distribution of Job Impacts



### Fiscal Impact Analysis

The economic impacts associated with airport activity also generate tax revenues for state and local jurisdictions. This study analyzed the fiscal impacts associated with the direct activities only and did not consider the estimated multiplier effects.

The tables below present the fiscal analysis findings, which show both the sources of tax revenue by airport classification and an estimate of how these tax revenues are divided among types of jurisdictions in the state.

The analysis suggests that total annual tax revenues in 2009 amounted to \$792 million, with the majority coming from sales and use taxes (50.5%), and the business and occupation (B&O) tax (27.9%).

Aviation-specific taxes such as the aircraft excise tax and the aviation fuel tax comprise about 0.3% of the total fiscal impacts from airports. However, it is important to note that sales tax collected on sales of aviation fuel is included in the sales tax column. Other taxes include utility taxes, leasehold excise tax, rental car tax, and lodging tax.

In terms of how the tax revenues are distributed among various jurisdictions, the State of Washington collects the largest share at more than \$548 million, with cities and special purpose districts each collecting near \$88 million, and counties collecting approximately \$68 million.

### AEROSPACE INDUSTRY TAX INCENTIVES

Washington State supports the aerospace industry and aerospace businesses through tax incentives. Some notable incentives include:

- Reduced B&O tax rate for manufacturers of commercial airplanes or component parts.
- Aviation fuel tax exemption for commercial air carriers, aircraft testing, medical air transport, or private agricultural spraying.
- Sales and use tax exemption for purchases of machinery and equipment used in manufacturing.
- B&O tax credit equal to property or leasehold excise taxes paid on new or renovated buildings used exclusively in commercial aerospace manufacturing.

### Summary of Fiscal Impacts by Tax Source

Classification	Aircraft Excise Tax	Aviation Fuel Tax*	Sales and Use Tax**	Property Tax***	B&O Tax	Other	Total
Commercial	144,000	471,000	390,277,000	30,335,000	121,000,000	115,228,000	657,455,000
Regional	235,000	829,000	7,724,000	13,804,000	98,980,000	6,227,000	127,799,000
Rural Essential	49,000	124,000	680,000	1,628,000	89,000	163,000	2,733,000
Community Service	105,000	364,000	923,000	604,000	401,000	334,000	2,731,000
Local Service	19,000	60,000	132,000	255,000	169,000	37,000	672,000
Seaplane Base	1,000	0	112,000	53,000	10,000	26,000	202,000
<b>Total</b>	<b>553,000</b>	<b>1,848,000</b>	<b>399,848,000</b>	<b>46,679,000</b>	<b>220,649,000</b>	<b>122,015,000</b>	<b>791,592,000</b>
<b>% of Total</b>	<b>0.1%</b>	<b>0.2%</b>	<b>50.5%</b>	<b>5.9%</b>	<b>27.9%</b>	<b>15.4%</b>	

\* Fuel used for commercial aviation is exempt from the state aviation fuel tax.

\*\* Includes sales and use tax paid on general and commercial aviation fuel.

\*\*\* Includes taxes paid on airline service providers' personal property.

### Summary of Fiscal Impacts by Jurisdiction

Classification	City	County	Special Purpose	State	Total
Commercial	82,544,000	64,802,000	79,524,000	430,584,000	657,454,000
Regional	4,787,000	2,521,000	6,630,000	113,860,000	127,798,000
Rural Essential	133,000	243,000	1,124,000	1,234,000	2,734,000
Community Service	227,000	234,000	414,000	1,855,000	2,730,000
Local Service	70,000	56,000	98,000	448,000	672,000
Seaplane Base	25,000	25,000	42,000	111,000	203,000
<b>Total</b>	<b>87,786,000</b>	<b>67,881,000</b>	<b>87,832,000</b>	<b>548,092,000</b>	<b>791,592,000</b>

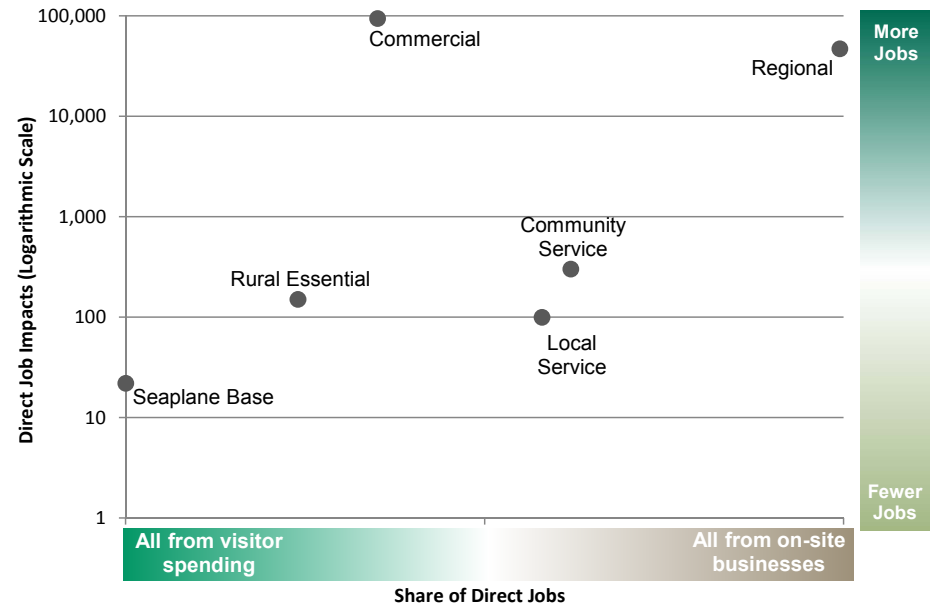
### Economic Impacts by Airport Classification

The table below summarizes the economic impacts of airports by state airport classification and shows that commercial and regional airports account for over 99% of total jobs and output. Commercial airports account for a large portion of overall jobs and output due to the number of trips and visitor spending generated by commercial flights. Regional airports make up a significant portion of statewide impact due to two large Boeing facilities located at Renton Municipal Airport and Paine Field in the regional category.

Commercial airports generate 64% of total jobs and 47% of total output. Regional airports generate 35% of total jobs and 52% of total output and have a higher output-per-job ratio than commercial airports, due to the high Boeing employment on the two regional airports mentioned above. The relatively small impact totals for Seaplane Bases do not include the Kenmore and South Lake Union facilities, which are classified as commercial.

Statewide, on-site businesses account for 62% of total jobs and 80% of total output, with the

Source of Job Impacts and Total Direct Jobs by Classification



remaining activity attributable to impacts from visitor spending. The chart above shows how the source of job impacts differs for each airport class.

Almost all job impacts at regional airports are attributable to on-site business activity, primarily Boeing jobs. The commercial airports have a more balanced distribution, with about 58% of job

impacts attributable to visitor spending.

Among the smaller facility types, seaplane bases and rural essential airports generate the majority of their job impacts from visitor spending, while community service and local service facilities generate job impacts fairly evenly between on-site business activity and visitor spending.

### Summary of Impacts by Classification

Classification	Direct Jobs	Total Jobs	Direct Labor Income	Total Labor Income	Direct Output	Total Output	Total Output Per Total Job
Commercial	93,850	159,700	4,591.4 M	7,793.1 M	14,668.8 M	24,303.4 M	152,000
Regional	46,950	87,950	5,319.1 M	7,478.5 M	20,080.9 M	26,518.0 M	302,000
Community Service	300	500	12.9 M	21.1 M	34.8 M	60.1 M	120,000
Rural Essential	150	200	5.0 M	8.4 M	13.2 M	23.4 M	117,000
Local Service	100	150	4.4 M	6.5 M	13.6 M	20.0 M	134,000
Seaplane Base	22	32	0.6 M	1.0 M	1.6 M	3.0 M	95,000
<b>Total</b>	<b>141,350</b>	<b>248,500</b>	<b>9,933.3 M</b>	<b>15,308.6 M</b>	<b>34,812.9 M</b>	<b>50,928.0 M</b>	<b>205,000</b>



### Washington State RTPOs (Regional Transportation Planning Organizations)



### Regional Distribution of Impacts

Another useful way of breaking down the economic impact analysis results is to look at how the impacts vary by region around the state. While the previous discussion clearly highlighted the fact that a substantial share of the economic impacts are coming from a few large facilities, it is worth looking deeper into the geographic distribution of activity.

To do this, the airport-level economic impacts were aggregated to the 14 regional transportation planning organizations (RTPOs) in the state. The map to the left shows the geographic coverage of the RTPOs. San Juan County is the only area of the state that is not contained within an RTPO, so it is added as a 15th region for the purposes of this analysis.

### Summary of Facilities by RTPO

RTPO	Counties	Comm.	Reg.	Comm. Service	Rural	Local Service	Sea-plane	Total
<b>Puget Sound Regional Council</b>	King, Pierce, Snohomish	4	7	2	10	1	3	27
<b>Quad-County RTPO</b>	Adams, Grant, Kittitas, Lincoln	1	2	3	3	9	0	18
<b>North Central RTPO</b>	Chelan, Douglas, Okanogan	1	1	4	3	6	0	15
<b>Southwest RTPO</b>	Cowlitz, Grays Harbor, Lewis, Pacific	0	2	3	1	7	0	13
<b>Benton-Franklin-Walla Walla RTPO</b>	Benton, Franklin, Walla Walla	2	0	4	1	0	0	7
<b>Palouse RTPO</b>	Asotin, Columbia, Garfield, Whitman	1	0	1	3	2	0	7
<b>Peninsula RTPO</b>	Clallam, Jefferson, Kitsap, Mason	1	1	1	2	2	0	7
<b>Skagit MPO</b>	Island, Skagit	1	1	1	2	1	1	7
<b>Southwest Washington RTC</b>	Clark, Klickitat, Skamania	0	1	2	3	1	0	7
<b>Northeast RTPO</b>	Ferry, Pend Oreille, Stevens	0	1	0	2	3	0	6
<b>San Juan County*</b>	San Juan	2	0	1	0	0	3	6
<b>Spokane RTC</b>	Spokane	1	2	0	2	0	0	5
<b>Whatcom COG</b>	Whatcom	1	0	0	2	0	1	4
<b>Thurston RPC</b>	Thurston	0	1	0	2	0	0	3
<b>Yakima Valley COG</b>	Yakima	1	0	0	1	1	0	3
<b>Total</b>		<b>16</b>	<b>19</b>	<b>22</b>	<b>37</b>	<b>33</b>	<b>8</b>	<b>135</b>

The table to the left summarizes the distribution of airports by RTPO. The Central Puget Sound region has the most facilities at 27, including 4 commercial and 7 regional airports. It also has 10 rural essential airports, which is more than a quarter of all rural facilities in the state.

Another noteworthy observation is that every RTPO contains at least one airport that is classified as either commercial or regional, suggesting that all regions have access to a facility of sufficient scale to support larger aircraft or commercial service of some kind.

The table to the right presents the summary of economic impacts by RTPO. Not surprisingly, the Central Puget Sound region accounts for the majority of the economic impacts at the airport level. The next several areas on the list correlate with large population centers: Spokane RTC, Whatcom, Benton-Franklin-Walla Walla and Yakima.

The Southwest RTPO, while having a larger population than many other RTPOs, has a relatively low level of economic impact. This is likely attributable to the presence of Portland International Airport across the border in Oregon, which is the primary facility serving this part of the state.

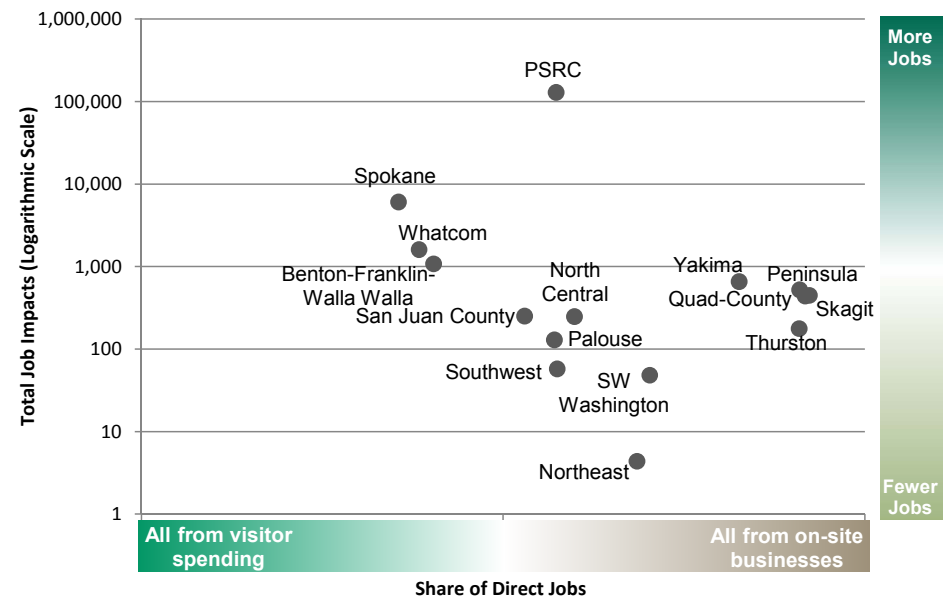
The fiscal impact contributions are similarly focused in the Central Puget Sound area, though it is worth emphasizing that the taxes estimated from visitor spending cannot be definitively located. For example, the vast majority of visitors to the state arriving by air travel come through Sea-Tac. Although in this study the impacts associated with their spending are attributed to Sea-Tac, the actual spending is likely to be spread throughout the state.

When looking at the source of the impacts at the RTPO level, most areas of the state are benefiting from a mix of on-site business activity and visitor spending. There are a few areas (Yakima, Peninsula, Quad-County, Skagit, and Thurston) where economic impacts are primarily associated with on-site business activity.

### Summary of Impacts by RTPO

RTPO	Direct Jobs	Total Jobs	Direct Output	Total Output	State Fiscal Impact
<b>Puget Sound Regional Council</b>	129,600	229,150	33,433.1 M	48,560.4 M	478.1 M
<b>Spokane RTC</b>	6,050	10,700	731.8 M	1,344.7 M	23.3 M
<b>Whatcom COG</b>	1,600	2,500	161.6 M	284.8 M	6.2 M
<b>Benton-Franklin-Walla Walla RTPO</b>	1,100	1,750	123.7 M	206.5 M	21.1 M
<b>Yakima Valley COG</b>	650	1,050	89.3 M	131.3 M	3.4 M
<b>Peninsula RTPO</b>	500	750	69.9 M	98.9 M	1.3 M
<b>Skagit MPO</b>	450	700	52.9 M	79.6 M	1.6 M
<b>Quad-County RTPO</b>	450	600	52.9 M	71.8 M	8.5 M
<b>North Central RTPO</b>	250	400	36.0 M	55.4 M	1.0 M
<b>San Juan County*</b>	250	350	25.7 M	38.5 M	0.7 M
<b>Thurston RPC</b>	200	250	16.4 M	25.1 M	0.5 M
<b>Palouse RTPO</b>	150	200	10.5 M	16.2 M	1.5 M
<b>Southwest RTPO</b>	50	100	5.8 M	9.1 M	0.4 M
<b>Southwest Washington RTC</b>	50	50	3.0 M	5.3 M	0.4 M
<b>Northeast RTPO</b>	4	5	0.2 M	0.4 M	0.1 M
<b>Total</b>	<b>141,354</b>	<b>248,555</b>	<b>34,812.9 M</b>	<b>50,928.0 M</b>	<b>548.1 M</b>

### Source of Job Impacts and Total Direct Jobs by RTPO



## IMPACTS OUTSIDE THE BIG FOUR

Given that the statewide impacts are heavily influenced by the impacts from the four largest facilities, additional summaries by classification were compiled for the other 131 facilities excluding the four largest. When Sea-Tac, Paine Field, Boeing Field, and Renton Municipal are excluded, the following findings are observed:

### Summary by Classification

- Commercial and regional airports still account for the vast majority of airport jobs and output (more than 96%)
- Commercial airports account for 80% of the total while regional airports account for approximately 16%.

### Source of Impacts

- Without the big four, economic impacts come from a more equal balance between visitor spending and on-site businesses.
- Removing Paine Field and Renton Municipal from the regional total changes the source of jobs for regional airports from 100% on-site businesses to 10% visitor spending, 90% on-site.
- Removing Sea-Tac and Boeing Field from the commercial total changes the source of jobs from 58% visitor and 42% on-site businesses to 50% from each.

## Implications of Economic Impact Findings

The most significant overall finding is that the statewide economic impacts attributable to airports are substantial, but heavily concentrated in just four facilities - the three major Boeing activity centers (Paine Field, Boeing Field, and Renton Municipal) and Sea-Tac, which is the principal commercial airline hub in the state and ranked 17th nationally in terms of annual enplanements.

What do these findings suggest about the other airports in the state? If the economic impacts are relatively modest at most airports, what is the state policy interest in ensuring that the whole statewide system is healthy? There are several factors that reinforce the importance of the aviation system as a whole and reinforce the need to support facilities of all sizes:

- While a very large share of the impacts are attributed to a few facilities, the entire aviation system is important to the state and local economies.
- The network of airports extends commerce and economic opportunity throughout the state.
- While some individual airport impacts are relatively small on a statewide basis, they are nonetheless meaningful to their communities at a local level.
- Airports make important economic contributions besides impacts associated with jobs, wages, and output.

This last point is precisely the reason the overall approach to this study considers three distinct, but

related, perspectives on economic contribution. For many airports, particularly the smaller ones, the most important contributions do not come in the form of jobs, wages and output, but rather, in terms of how the facilities and services support economic activity in the communities they serve and how individual users derive benefits from having access to aviation services.

In the subsequent sections of this report, these other forms of economic contribution from aviation services and facilities are discussed.

## OTHER WASHINGTON AIRPORT ECONOMIC IMPACT STUDIES

A number of airports regularly conduct economic impact analyses to estimate jobs, labor income, and output attributable to airport activity. These studies were used as a check on the job, labor income, and output totals from this analysis, and, when appropriate, the airport-specific study findings were used to inform airport profile development.

This study considered facility-specific economic impact studies recently conducted by the following airports:

- Bellingham International Airport
- Boeing Field
- Olympia Regional Airport
- Seattle-Tacoma International Airport
- Spokane International Airport

When comparing findings in this study with those in the airport-specific studies, there are several differences in estimates of jobs, labor income, and output. We feel it is important to address these variations, and offer explanations as to why these differences exist.

- **Different methodologies to estimate jobs and business activity.** This study draws from statewide data sources to ensure consistency. Draft values were sent to individual airports

to confirm or send corrections based on their on-the-ground knowledge of the airport. In contrast, most individual airport studies use a survey-based methodology, which could not be replicated for each of the 135 airports in Washington.

- **Aviation-dependent businesses.** This study only includes aviation-dependent businesses located on the airport footprint when calculating economic impacts. Several of the other airport economic impact studies are parts of larger port studies and therefore include non-aviation businesses in their totals.
- **Aviation-related businesses off the footprint.** This study does not include aviation-related businesses off the airport footprint in economic impact calculations. Some individual airport studies incorporate businesses off the footprint.
- **Study timing.** This study occurred throughout 2011 and used 2010 data on jobs, labor income, and output, while other airport studies were conducted between 2006 and 2009. In some cases, jobs numbers vary because of the impacts of the recent economic downturn. Additionally, airport job totals fluctuate from year to year based on changes in tenant mix.





# Industry Perspective

The Airport Perspective section uses a traditional approach to economic impact analysis of airports and considers the economic impacts of business activity located on airport footprints or visitors passing through airports. Recognizing that the aviation system supports economic activity beyond the footprint of the airport, the industry-level analysis in this section takes a broader perspective and explores how the presence of airports supports economic activity and affects the location and distribution of businesses in the state.

## HOW DOES AVIATION SUPPORT INDUSTRY?

Aviation services can benefit business and industry by improving the following fundamental aspects of business operations:

1. **Access to Markets.** Allowing for faster and more cost-effective delivery of goods or services to customers.
2. **Access to Factors of Production.** Improving cost-effective access to raw inputs necessary for production (e.g. raw materials, components, labor).

Aviation services do not improve access to markets and factors of production for all businesses and industries. Some businesses place very little emphasis on the immediate availability of aviation services. A wheat farmer, for example, cares much more about having access to productive land, and to non-aviation transportation links that allow him to get his wheat to market, than he does about access to aviation-related services.

For other businesses and industries, however, convenient access to aviation services and facilities is an absolute necessity. At the extreme are businesses like Boeing (which needs airports to deliver and test its products) and international companies like Microsoft or Starbucks. These companies serve worldwide markets and maintain international operational assets; they place high value on making efficient use of key human resources; and last but not least, they rely on a high-skill work force that is mobile and for whom personal access to aviation services is key to choosing where they are willing to establish a home. For companies like these, immediate and convenient access to aviation services is an absolute necessity.

## GLOBAL EXPORTS

Washington is one of the nation's leading exporting states, and has the highest share of manufacturing-related export employment in the country. A functioning and modern aviation system is a crucial element to the continued success of Washington's export-based economy.

Washington State accounts for almost 30% of the nation's aerospace exports, leading the nation with more than \$27 billion of aerospace exports in 2011. These products are a major reason why Washington is the biggest per capita exporter in the country.

In addition to aerospace, there are several other Washington industries that depend heavily on air transportation for access to global markets. A few examples are described below.

Washington's cherries are prized throughout the world, and in 2011, approximately 90% of the state's cherry crop was air freighted overseas. This amounts to over 70 million cherries, with an estimated value of \$107 million, all exported over a short 10-12 week harvesting season.

Seafood products are another Washington export that is highly valued across the world. Companies like Taylor Shellfish rely heavily on air freight to get their products to market. One-third of Taylor's sales are exports, with a substantial amount of seafood headed for a dozen Asian countries. Overall, approximately 70% of Taylor's sales ship by air, all out of Boeing Field.

Maintaining a high-quality aviation system ensures that Washington's exports are able to reach expanding global markets efficiently, expeditiously, and in great condition.

Besides large multinational companies, many smaller businesses and individuals who rely on access to regional, national, or international markets, or who rely on workers who desire access to these destinations for their own purposes, will make location decisions that take into account the availability of aviation services.

## APPROACH

The Industry Perspective section explores the relationship between aviation and industry in greater detail to better understand how businesses use aviation services and determine whether there

is any geographic clustering of business activity around aviation facilities.

The industry-level analysis takes two different approaches to explore the relationship between airports and business.

- **Economic activity near airports.** The first part of the industry-level analysis looks at businesses located near airports to determine the magnitude of business activity and whether certain industry clusters are particularly concentrated around airports. This analysis looks at business concentrations around different types of airports as well as how business activity is

distributed differently within sub-regions of the state.

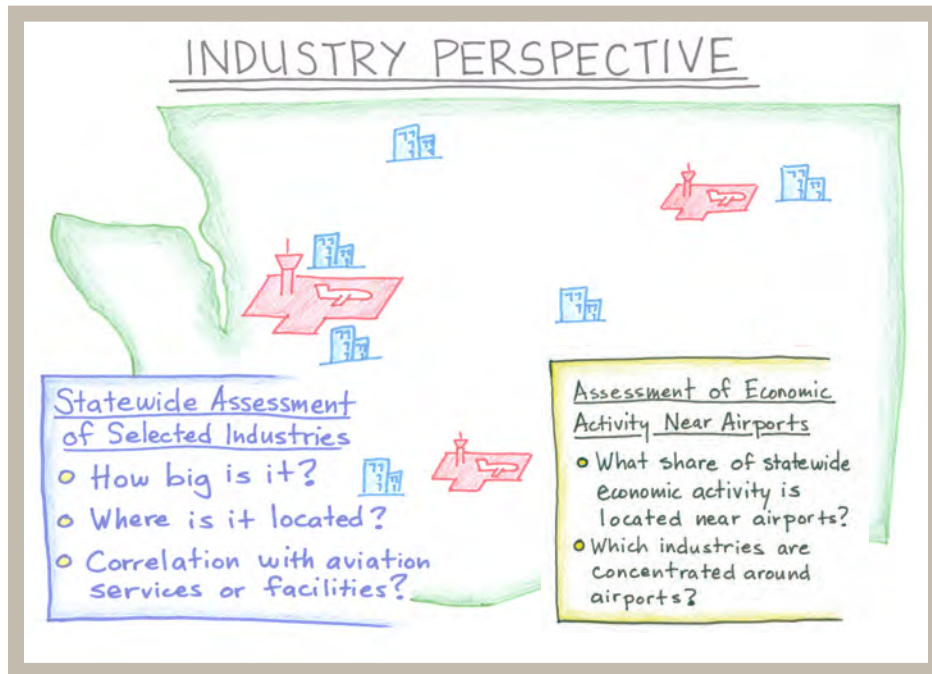
- **Distribution patterns of selected industries.** The second part of the industry-level analysis goes into greater detail analyzing business locations for five selected industries that rely on the aviation system in different ways. For each industry, the analysis includes discussion about location decision factors, how each industry uses the aviation system, and whether aviation services are important criteria in business location decisions.

## Complex Relationship Between Airports & Industry

As mentioned in the introduction, the aviation system is a fundamental component of a modern economy providing basic transportation infrastructure that links communities and businesses across the globe. In this respect, aviation and economic activity are intrinsically linked in a complex interdependent relationship.

Recognizing that a full exploration of the complex relationship between aviation, economic activity, and business locations is beyond the scope of this study, the analysis of economic activity near airports is not intended to prove a causal relationship between airports and business locations.

Instead, the industry-level analysis seeks to highlight interesting patterns in the distribution of



economic activity relative to airport locations and discuss the variety of factors contributing to these patterns.

### Data Limitations

The industry-level analysis relies heavily upon geographic retail sales data from the Washington State Department of Revenue. These data are a valuable resource in analyzing spatial patterns in economic activity, but they have notable limitations:

- Due to the way construction activities are reported, these activities are excluded from the analysis.
- Non-taxable entities (e.g. public sector) or industries with significant tax exemptions (e.g. agriculture) are not represented fully in the data.
- Business activity is not always reported in the correct location and is sometimes aggregated to a central headquarters location. Thus, not all activity is geo-located correctly.

These limitations should be kept in mind when interpreting the results of the industry-level analysis.

### BUSINESSES OFF THE FOOTPRINT

The airport-level economic impact analysis only includes aviation-dependent businesses located on airport footprints. However, there are many other businesses located outside airport footprints that rely heavily on aviation services for basic operations. For example, an air cargo facility located a few blocks off an airport footprint is not being counted in the airport-level economic impact analysis.

It is important to acknowledge the impact of these businesses on local economies and the varied ways in which aviation services are used by businesses.

In this section, several sidebars describe different off-footprint businesses that depend on aviation for their operations to illustrate the variety of ways aviation can benefit business.

## ECONOMIC ACTIVITY NEAR AIRPORTS

Airports are integral components of a modern economy and are often located near urban centers and areas of economic activity. Analysis in this section quantifies economic activity near airports so that meaningful comparisons of activity between industries, airport types, and regions can be made. The fundamental questions being addressed are:

- What share of statewide economic activity is located near airports?
- Do industry concentrations around airports vary in different regions of the state?
- How do industry concentrations vary around different types of airports?

Much of the analysis in this section is based on economic activity occurring within five- and ten-mile buffers around airports. These buffers are shown in the maps to the right. The buffers represent a straightforward way to analyze proximity of business activity at a high level. The buffers do not represent airport market or trade areas, which vary by airport class.

### How Much Economic Activity is Near Airports?

The maps show that a significant percentage of statewide economic activity is located within five and ten miles of an airport. Almost 60% of statewide gross business income (GBI) is located within ten miles of a commercial airport (including Vancouver, BC and Portland, OR). Thirty-six percent of GBI is located within five miles. These percentages climb to 86% and 55% when regional airport buffers are added and 97% and 70% for all 135 public use airports.

These data show that airports are integral to local economies both in major urban centers and rural communities.

#### 5 AND 10 MILE BUFFERS AROUND AIRPORTS



**Share of State GBI**  
 Within 5 miles: 36%  
 Within 10 miles: 59%



**Share of State GBI**  
 Within 5 miles: 55%  
 Within 10 miles: 86%



**Share of State GBI**  
 Within 5 miles: 70%  
 Within 10 miles: 97%



### Regional Differences in Economic Activity Near Airports

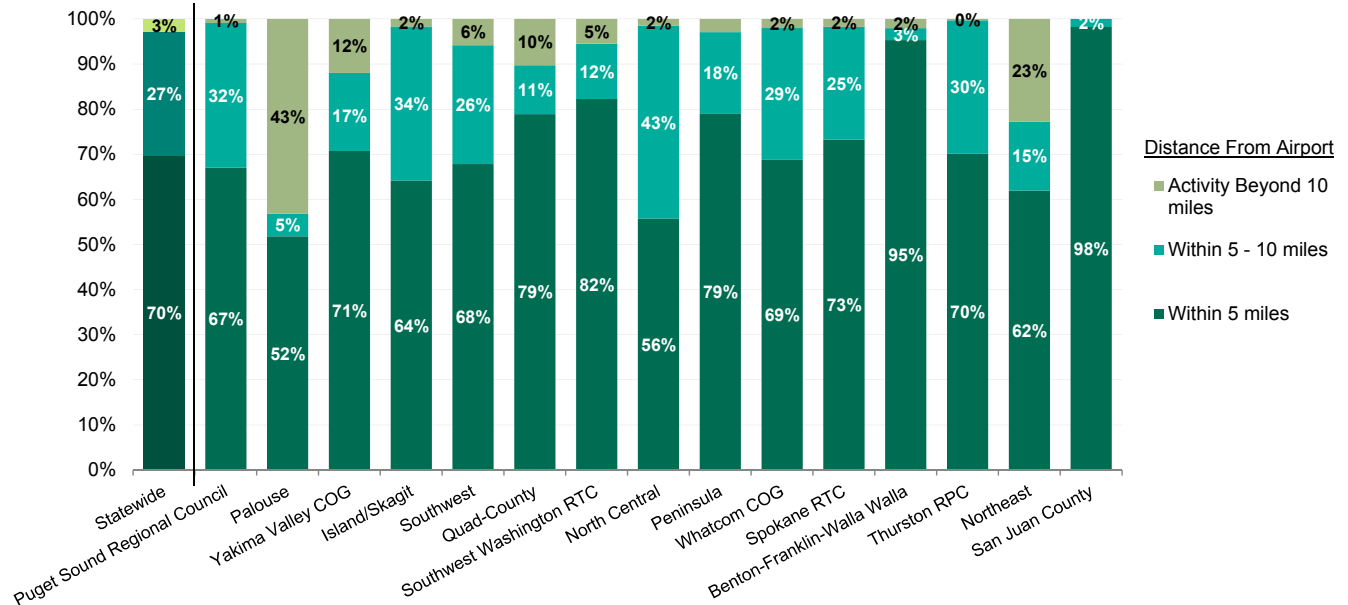
The exhibits to the left highlight regional differences in the concentrations of economic activity near airports.

The top chart shows the percentage of economic activity (GBI) in each Regional Transportation Planning Organization (RTPO) by distance from an airport. Most RTPOs have over 90% of GBI within ten miles of an airport. The notable exceptions, including the Palouse and Northeast RTPOs, reflect regions with more rural economic activity.

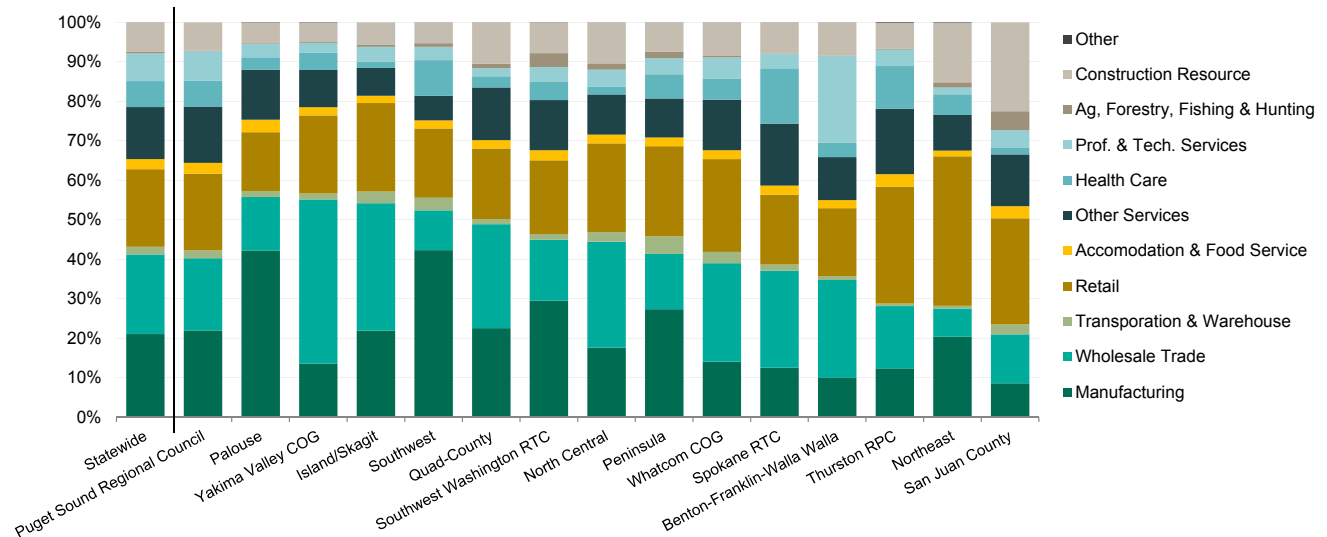
The bottom chart shows the share of estimated economic activity within five miles of an airport by industry sector for each RTPO. What emerges is more of a description of the nature of the local economies than anything particular that can be attributed to airport facilities. This further highlights that airports are necessary to support local economies but do not in and of themselves drive significant business clustering around airports (at least at the five-mile radius level of this analysis).

Additional regional distribution exhibits by WSDOT Region and WSDOT Special Emphasis Area are available in Appendix D.

Distribution of Economic Activity (GBI) Within RTPOs



Distribution of Economic Activity (GBI) by Industry Within 5 Miles of an Airport





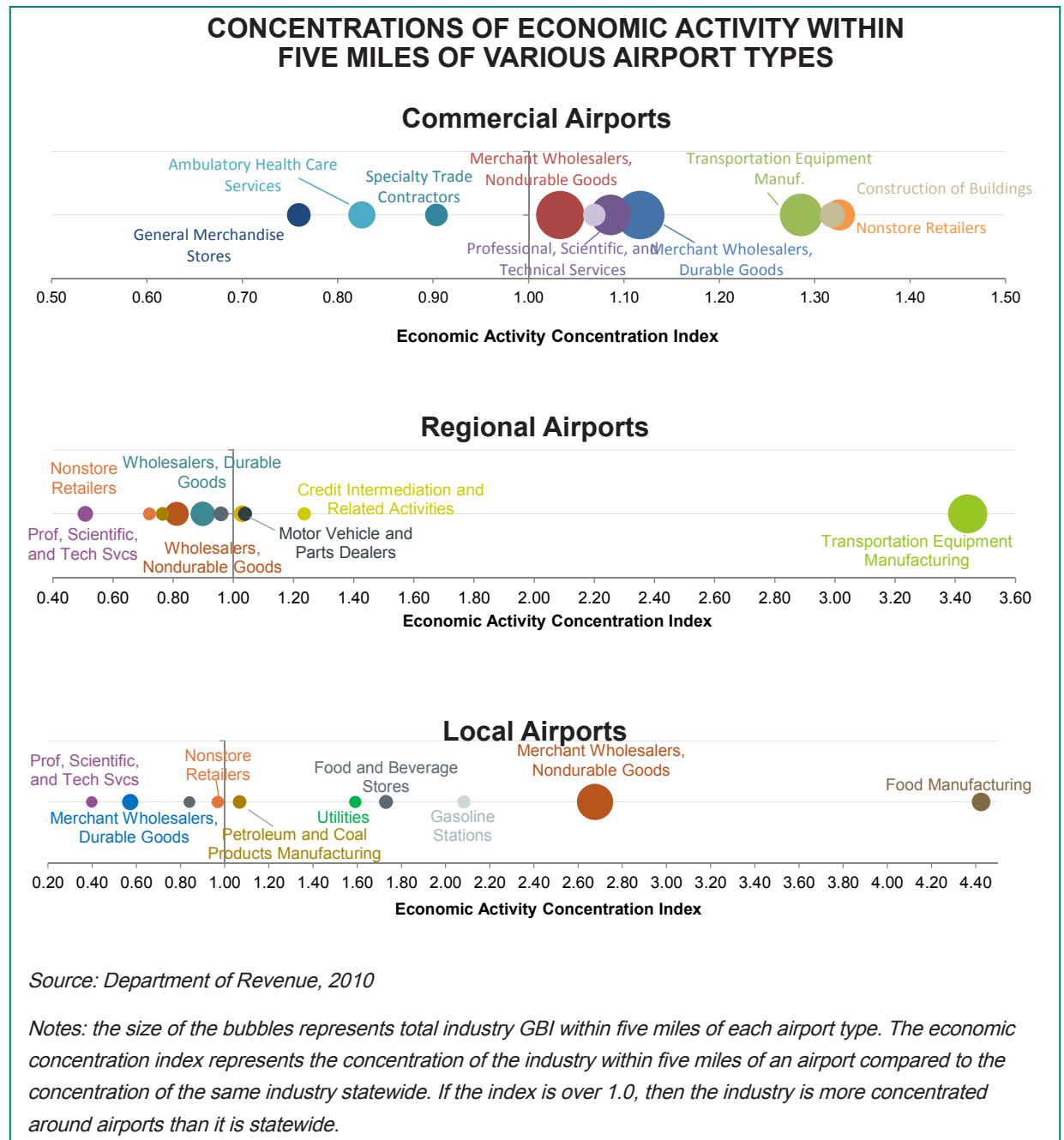
### Which Industries are Concentrated Near Airports?

The exhibits to the right show how different industries concentrate around different types of airports. The charts show the ten largest industries (based on 3-digit NAICS code categories) located within five miles of commercial, regional, or local airports statewide. Similar charts for other airport classifications are included in Appendix D.

The concentration charts provide some interesting data on location preferences for certain industries. Some of the concentrations reflect a clear relationship between business locations and airports. For example, **Transportation Equipment Manufacturing**, which includes Boeing's aircraft manufacturing operations, is over three times more concentrated than the state average near regional airports (including Paine Field, Boeing Field, and Renton Municipal).

**Professional, Scientific, and Technical Services** have a higher than average concentration index near commercial airports (1.09) but lower than average index near local (0.40) airports. These types of businesses tend to locate near major population centers and airports with commercial air service but not in smaller communities served by local airports.

On the other hand, there are other industries where the relationship to airports is less clear. For example, **Merchant Wholesalers** are highly concentrated around commercial airports, but



it is unclear whether this is because of airport proximity or the fact that wholesalers prefer the same types of land as airports - affordable, large parcel, industrially-zoned land.

Overall, it is a challenge to draw concrete conclusions on many of the industry concentrations shown in the bubble charts. There are many factors that affect business location decisions and it is difficult to isolate the effect airport proximity has on where businesses locate.

In order to understand the importance of aviation to businesses, one must take a more detailed look at industry subsectors and the criteria they use when making location decisions. The Distribution Patterns of Selected Industries analysis in the next section provides a more detailed assessment of five industries and their relationships with the aviation system.

## CORPORATE AVIATION

Corporate aviation is an important market for many airports throughout the state. Corporate aviation refers to flights for business purposes that are not scheduled flights offered by commercial airlines. According to the FAA, in 2009, business and corporate travel accounted for 20% of total general aviation (non-commercial) hours flown nationwide.

Corporate travel occurs at airports of all sizes, from large regional airports to small community airstrips, and can take many forms. Some businesses use corporate aviation to travel internationally and interact with global clients and partners. Others use small isolated airport facilities to access remote work sites with small single-engine planes.

Corporate travel provides important benefits to communities and substantial value to business users. For users of corporate aviation, the speed and access provided by air travel can be worth many times the costs paid, particularly if a trip results in a business deal.

For communities, corporate travel can potentially generate large economic impacts. Corporate travelers typically spend higher amounts in the places they visit than those arriving on commercial flights. More importantly, the business activity supported by corporate travel generates investment and other economic impacts in local economies.

## DISTRIBUTION PATTERNS OF SELECTED INDUSTRIES

The five- and ten-mile buffer analysis in the previous section highlights the difficulty in assessing the effect airports and aviation services have on business locations and activities. Unless you take a closer look at factors of production and operations of specific industries, it is difficult to determine whether aviation facilities play a major role in the concentration of activity around airports.

This section assesses in greater detail the ways in which selected industries and subsectors within those industries utilize aviation services and consider aviation facilities when making location decisions.

The industries selected for this analysis are:

- **Business & Professional Services:** Professional, scientific, and technical services, insurance services, and management of companies and enterprises.
- **Agriculture & Resources:** Crop and animal production, forestry, fishing, hunting, and food manufacturing.
- **Tourism:** Accommodations and lodging; sightseeing services; museums and historical sites; amusement, gambling, and recreation activities; performing arts; and spectator sports. Tourism is a very difficult industry to define because non-tourists often patronize the same businesses that tourists do. Notably, restaurants were excluded from the tourism industry definition. Due to limitations in industry codes, some types of attractions (such as wineries or natural attractions) are not included.
- **Manufacturing:** All categories of manufacturing.
- **Aerospace:** This industry includes aircraft manufacturing (Boeing) and is largely a subset of the manufacturing industry. The larger aerospace industry cluster includes many other support industries but these are not included in the analysis because the industry codes associated with these businesses are not all aerospace related. The value of aerospace support businesses are described in greater detail in the sidebar on page 33.

These industries were selected because of their strong relationships with the aviation system, their importance to the state economy, and strong interest from stakeholders and the Advisory Committee.

For each of the selected industries the following issues were considered:

- The size of the industry (in terms of jobs and GBI) and the spatial distribution of activity across the state (shown using a 3-D map).
- How the industry and subsectors of the industry use aviation services.
- How important aviation services and facilities are to businesses when making location decisions.

## BUSINESS SPOTLIGHT: MEDICAL BUSINESSES

Washington's airport and aviation system helps to facilitate the ongoing success of several medical-related businesses in the State.

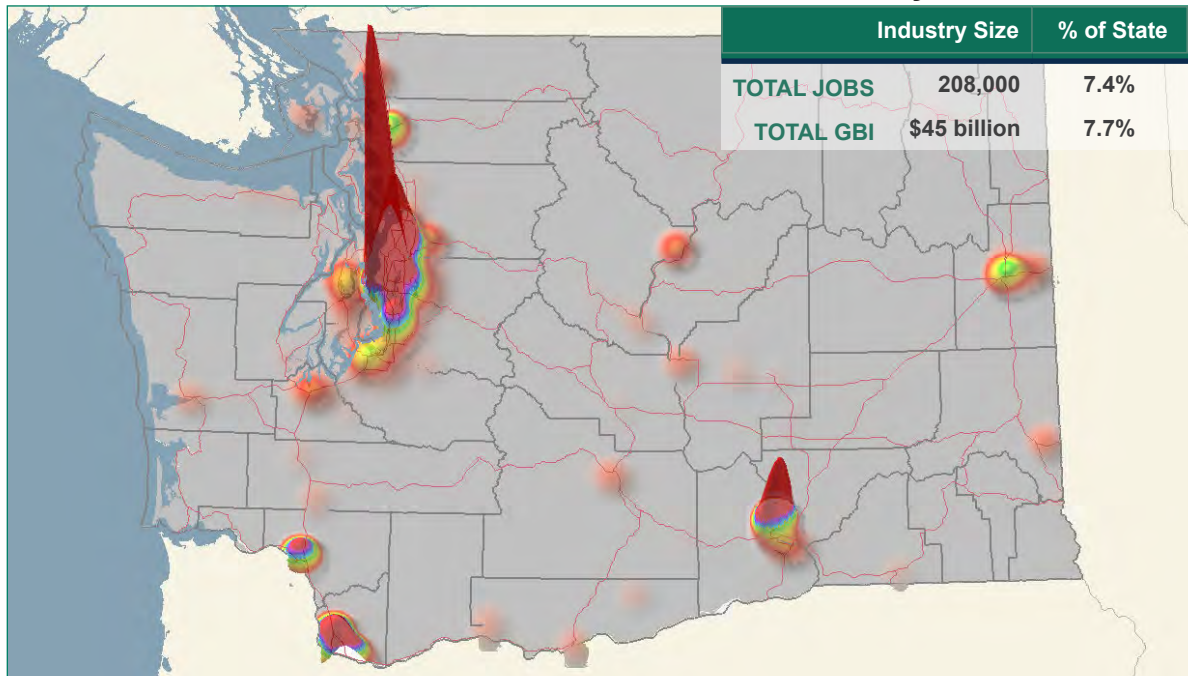
**PETNET Solutions** operates the largest Positron Emission Tomography (PET - an imaging technique that produces 3-D images of functional processes in the body) radiopharmacy network, and has a radiopharmacy and distribution center in Spokane.

The isotope in a PET biomarker has a half life of only 8 hours, so on-time delivery to hospitals, clinics, and research facilities is essential. Spokane was chosen as a location partly because of Spokane International Airport and its location advantage for reaching many areas in the Mountain West quickly.

**The Pacific Cataract and Laser Institute (PCLI)** was started in Chehalis in 1985 and now has 10 locations in Washington and 7 others across five states. While each of the offices has trained and professional staff, PCLI flies their specialized surgeons throughout their clinic network to expand their reach and capabilities.

For PCLI, it does not make economic sense to have a specialized surgeon or surgeons at every clinic when they can easily fly them in on the three private aircraft they have based at Chehalis-Centralia Airport. Aviation facilitates these savings, while also benefiting both the surgeons, who are able to perform more surgeries, and patients throughout the state, who receive access to specialized care. When choosing sites for new clinics, PCLI looks specifically for sites close to airports to leverage their business model.

**Statewide Distribution of Economic Activity**



**Business & Professional Services**

Business & Professional Services are concentrated in urban centers with very little activity in rural areas. The Central Puget Sound has the highest concentration of activity, with other concentrations around the Tri-Cities, Spokane, Bellingham, and Vancouver, WA.

The largest subsector of this industry is Professional, Scientific, & Technical Services. Overall, this sector is not particularly concentrated around airports but, as shown in the airport classification bubble charts earlier, it is slightly more concentrated around commercial airports and less concentrated around smaller local airports.

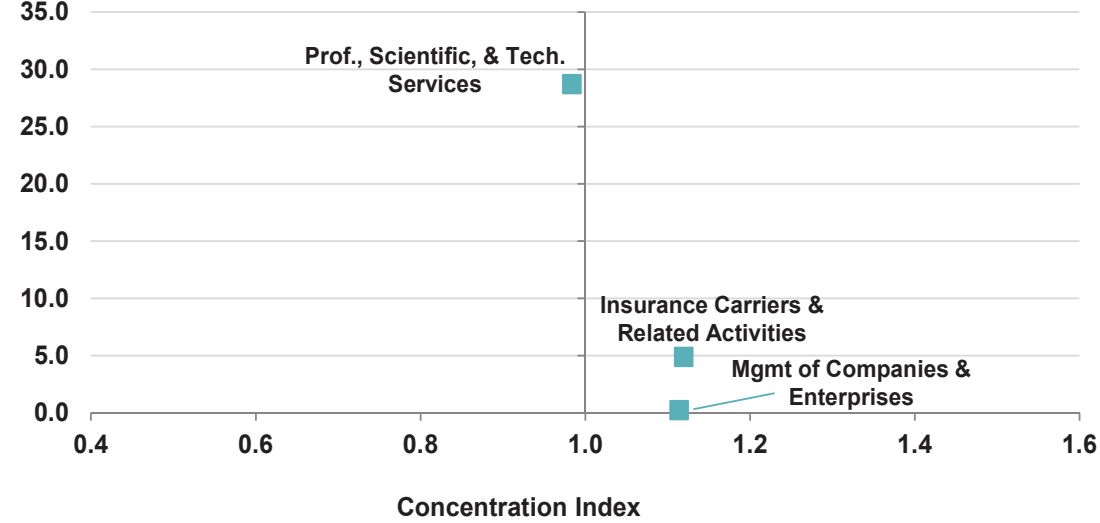
**How Does This Industry Use Aviation?**

This industry uses commercial aviation to travel regionally, nationally, and internationally to visit markets, clients, and partners.

Some businesses in this industry require proximity to a major commercial airport if they serve clients and markets outside the region. However, for other local-serving businesses, proximity to an airport or aviation services is not particularly important when choosing a business location. For these types of businesses it is more important to locate near customers and clients and centers of population and jobs.

GBI in Billions

**Concentration of Industry Subsectors within 5 Miles of an Airport**



28 Note: The concentration index is the same measure described on page 24



### Agriculture & Resources

Agriculture activities are distributed widely across the state with concentrations in the Central Puget Sound, the Tri-Cities, and central Washington. It is important to note that the geographic data used to generate the 3-D map are not completely accurate because agricultural activity is often reported at central collection points or activity is tax exempt.

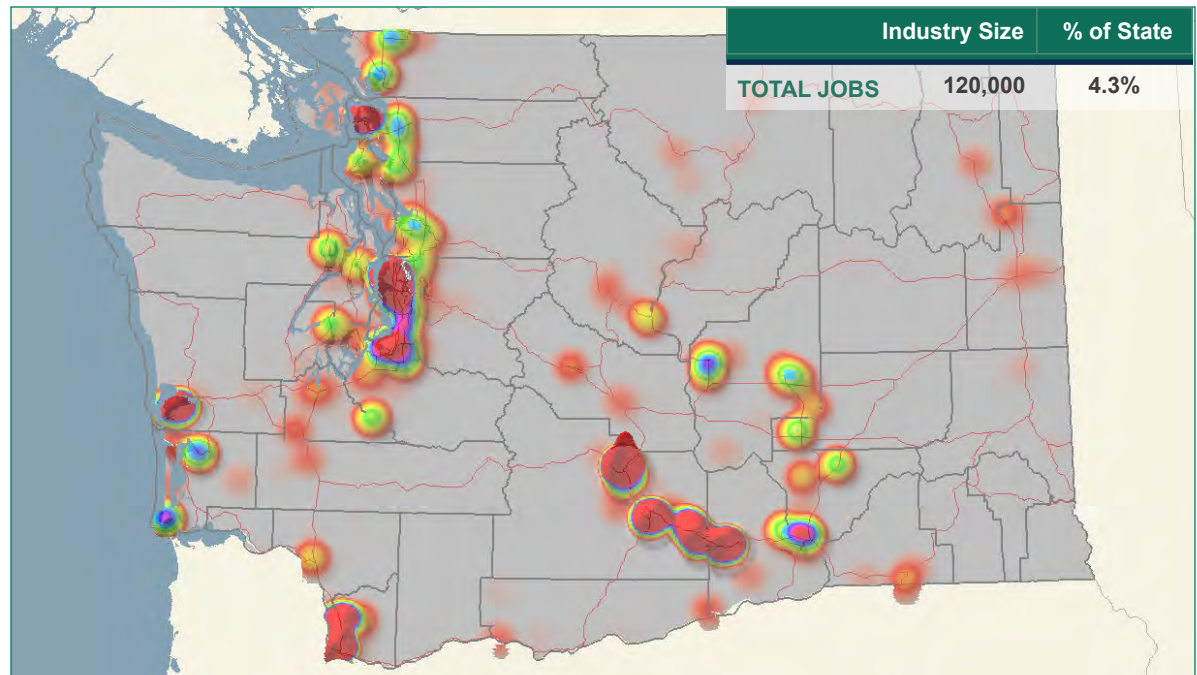
Many of the subsectors of Agriculture & Resources have lower than average concentrations near airports, likely due to these businesses preferring rural locations away from urban centers. The one subsector showing an above average concentration index is Food Manufacturing. This may reflect the tendency for food processing operations to be more centrally located.

#### How Does This Industry Use Aviation?

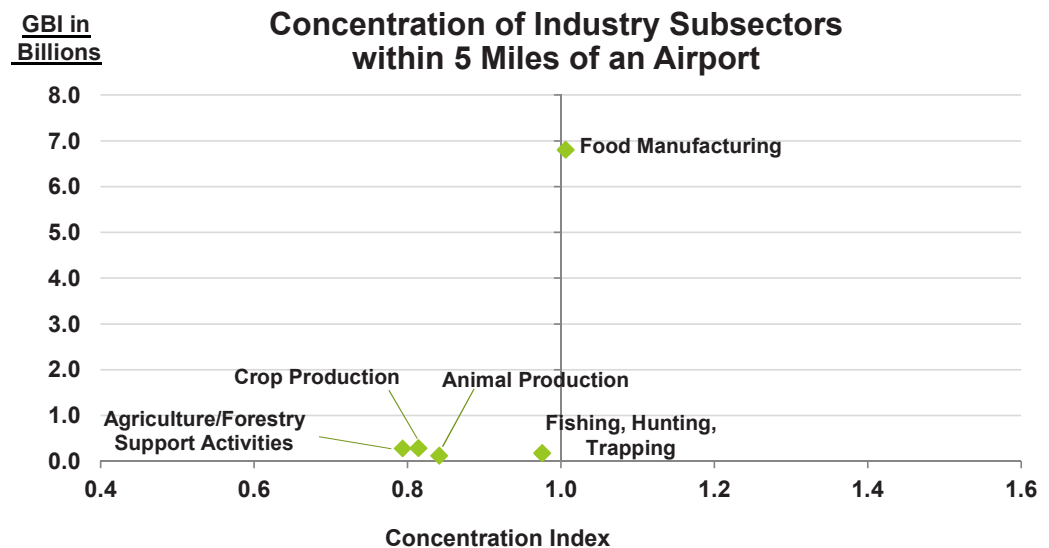
Air cargo services are important for the delivery of time-sensitive fresh produce or other high-value agricultural and animal products around the state, the nation, and the world. Aviation facilities are also used for aerial application of treatments and fertilizer to crops.

Generally, proximity to airports is not a primary location decision factor for many agriculture businesses. Agricultural businesses that rely on air cargo services may consider airport proximity when locating processing facilities.

### Statewide Distribution of Economic Activity

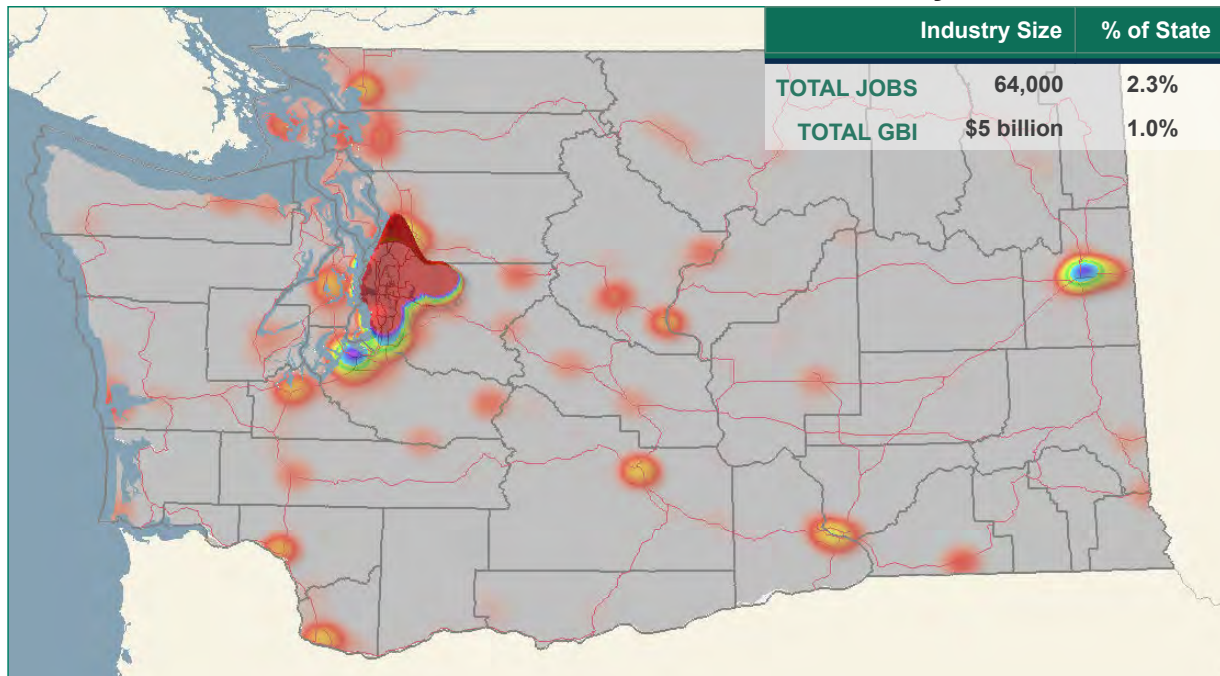


Note: Total GBI and percentage share of state GBI were not calculated due difficulties in accurately estimating GBI for the agriculture industry



Note: The concentration index is the same measure described on page 24

**Statewide Distribution of Economic Activity**



**Tourism**

Tourism businesses are highly concentrated in the Central Puget Sound with scattered activity elsewhere in the state. The largest subsector in the industry is Accommodations (hotels and motels), which has a slightly higher than average concentration index near airports (1.04). Amusement, Gambling, and Recreation industries have a below average concentration index (0.90) likely due to some of these industries being located farther from urban centers because of their ability to draw from much larger market areas. Performing Arts & Spectator Sports businesses have a concentration index of 1.11, likely reflecting the preference of these operations to locate in urban centers.

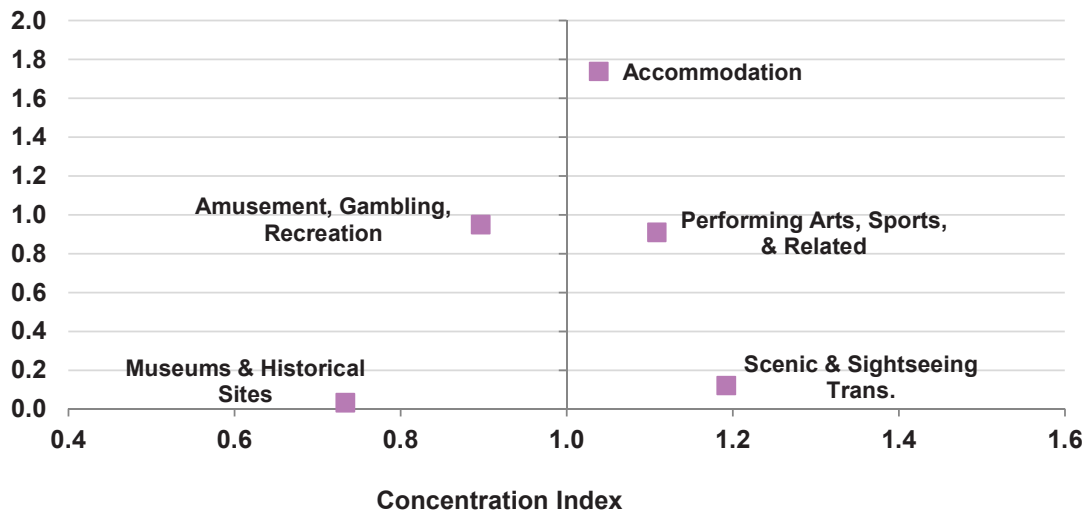
**How Does This Industry Use Aviation?**

Aviation is critical to tourism as it provides a pathway to connect the state to the rest of the world. Because tourists spend their money at so many different businesses not listed in this narrow definition of tourism (e.g. restaurants, retail), the industry is not fully reflected in these exhibits.

From a location decision standpoint, proximity to airports is important for some subsectors of the industry that serve airport customers directly (e.g. hotels, ground transportation). However, many other tourism-related businesses prioritize locations closer to tourist destinations and attractions over proximity to an airport.

GBI in Billions

**Concentration of Industry Subsectors within 5 Miles of an Airport**



30 Note: The concentration index is the same measure described on page 24

## Manufacturing

Manufacturing is a critically important industry to the Washington economy, accounting for 217,000 jobs and \$112 billion in annual GBI. This industry is extremely productive - manufacturing jobs account for 7.7% of the state workforce, but the industry generates a much higher share (19.2%) of total state GBI.

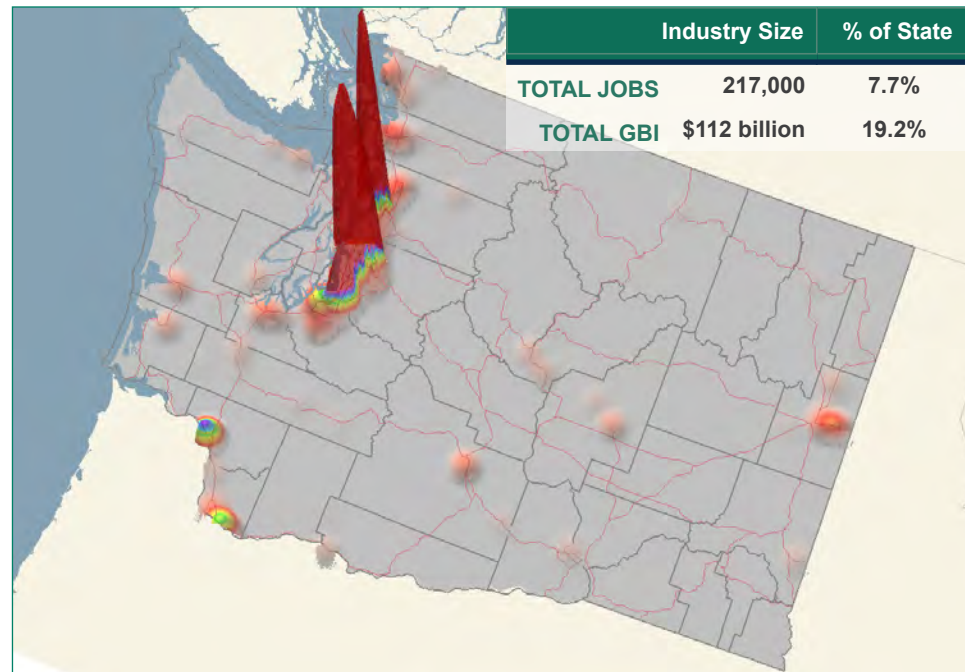
The largest manufacturing subsector is Transportation Equipment Manufacturing (\$37B GBI), which is primarily comprised of Boeing's sizable aircraft manufacturing operations. The concentration index for Transportation Equipment Manufacturing (1.38) is the highest of all manufacturing subsectors.

Aside from Transportation Equipment, the other manufacturing subsectors are evenly distributed between those that are more concentrated around airports and those that are less concentrated. It is likely that many of the subsectors showing high concentrations around airports are locating near airports due to the availability of larger parcels of industrial land.

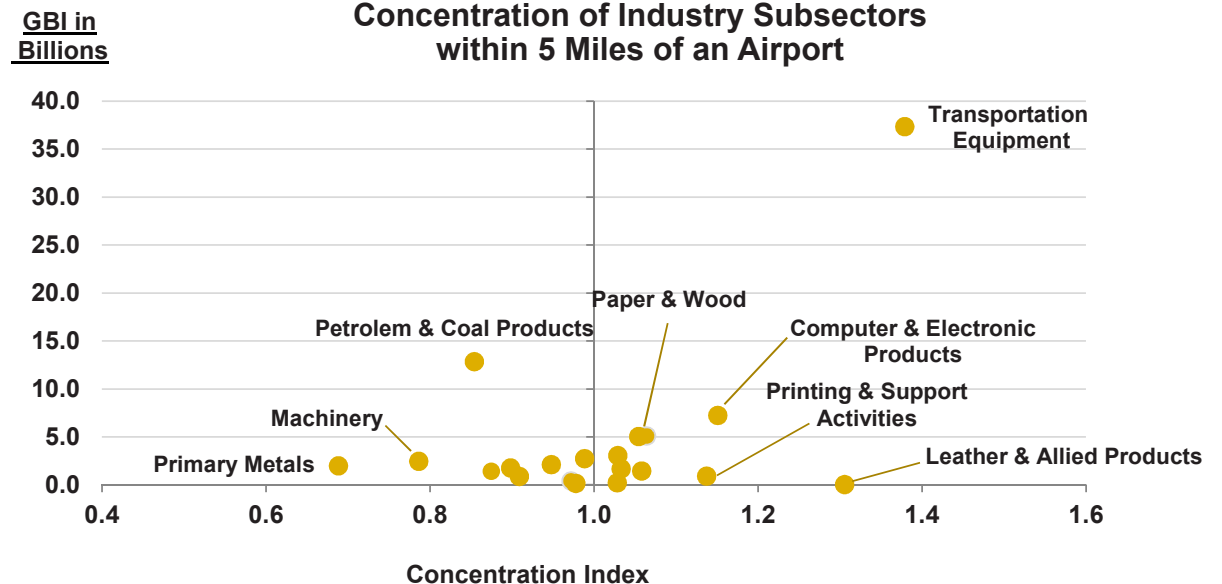
### How Does This Industry Use Aviation?

Certain manufacturing businesses rely heavily upon air cargo services to receive and export raw materials, components, and final products. These manufacturers, particularly those working on aviation-related products, show a clear preference for locating near airports. Other manufacturers that rely more on ground and rail cargo services place less importance on aviation facilities.

## Statewide Distribution of Economic Activity



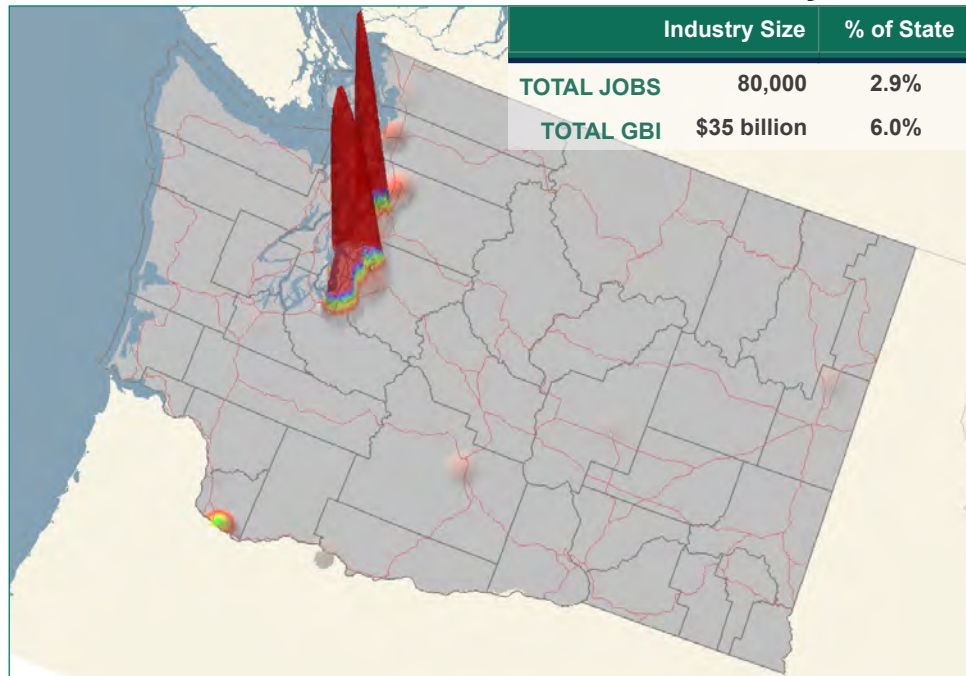
## Concentration of Industry Subsectors within 5 Miles of an Airport



Note: The concentration index is the same measure described on page 24



**Statewide Distribution of Economic Activity**



**Aerospace**

The Aerospace industry is highly concentrated in the Central Puget Sound at airports with a significant Boeing presence. It is important to note that these exhibits only capture a portion of the larger aerospace cluster in Washington, which includes many additional suppliers; maintenance, repair, and overhaul operations; and aviation technology research businesses.

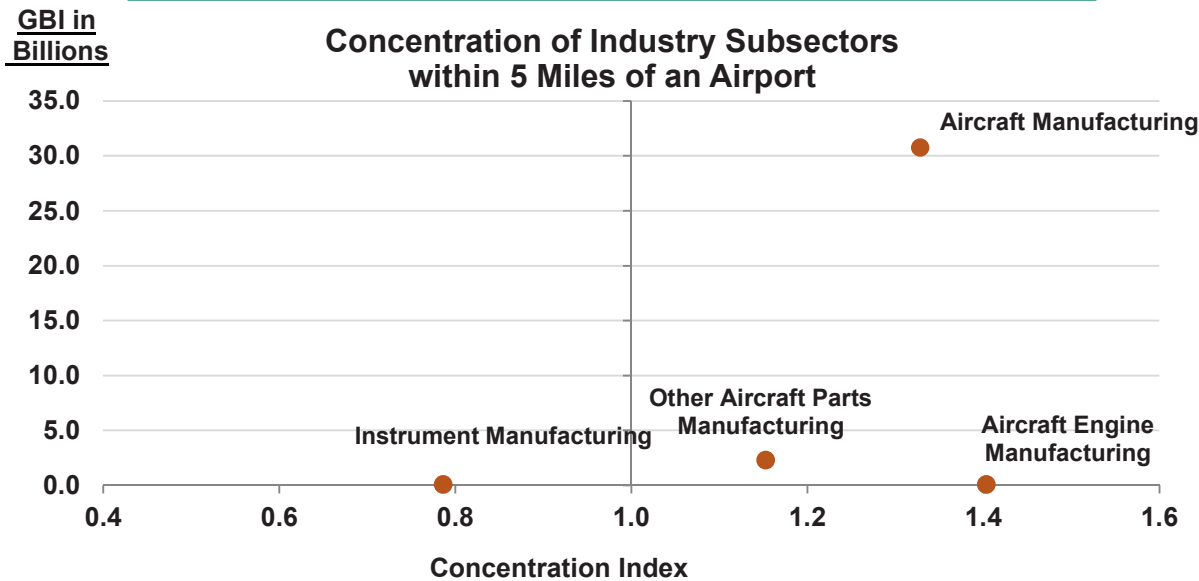
Of the subsectors included in the exhibits, Aircraft Manufacturing and Aircraft Engine Manufacturing are highly concentrated around airports. Other Aircraft Parts Manufacturing, which likely includes some Boeing suppliers, is slightly less concentrated.

**How Does This Industry Use Aviation?**

Access to aviation facilities is integral for aircraft manufacturing operations. Boeing has multiple through-the-fence connections with airports to allow flight testing, aircraft storage, and delivery of components and final products.

Some aerospace suppliers and technology research companies prefer locating near aviation facilities but have more flexibility to locate elsewhere within a reasonable trade area.

Overall, the health of the global aviation system and aviation infrastructure is intrinsically tied to the Aerospace cluster's core markets and sources of demand.



32 Note: The concentration index is the same measure described on page 24

## Implications of Industry Perspective Findings

Economic activity and aviation services are closely intertwined. Over 97% of state GBI is generated by businesses within ten miles of an airport and 70% of GBI is generated within five miles of an airport. These statistics reinforce the point that aviation facilities are a fundamental component of the infrastructure that extend commerce and economic opportunity throughout the state.

When looking broadly at industry location patterns,

a number of industries cluster around airports, but it is difficult to determine whether this is because of airport proximity or not. The one industry clearly concentrated near airports is Aerospace. However, even this industry has a wide network of suppliers that depend on aviation but do not necessarily need direct access to or locate near airports.

Around different classes of airports, clustering of activity varies by industry and subsector. Overall, it is important to note that although 36% of state

*Over 97% of state GBI is generated by businesses within 10 miles of an airport and over 70% of GBI is generated within 5 miles of an airport.*

### AEROSPACE SUPPLIERS & SPINOFFS

One of the limitations of this study is that it does not account for the complete breadth of the aerospace sector, especially those companies that are not entirely aerospace-related but are instrumental to the continuing success of aerospace in Washington state. While the study articulates the importance of aerospace to the state's (and nation's) economy, it does not attempt to conduct a full accounting of it.

The products and services provided by the aerospace supplier network make up a fundamental part of the production process in this industry cluster. For the most part, these are small businesses that provide living-wage jobs in an important industry. The supplier network includes businesses in the following broad categories:

- Airframe manufacturing
- Tooling

- Composites
- Avionics
- Engineering and research
- Interiors
- Maintenance, repair, and overhaul operations

In addition to the more than 75,000 Boeing employees in Washington, a recent Aerospace Competitiveness Study by the Washington Aerospace Partnership identified 8,000 employees in more than 150 other aerospace-focused firms and roughly 650 aerospace supplier companies employing thousands of workers across the state. Estimates of the number of employees at supplier firms range from 25,000 in leaner years to more than 40,000 in better times.

While aerospace suppliers are mostly concentrated in Western Washington to be near the various Boeing production facilities, firms are located throughout the State. Spokane and other parts of Eastern Washington are home to more than 60 manufacturers, suppliers,

distributors, and organizations related to the aerospace sector, according to the Inland NorthWest Aerospace Consortium.

An important impact of aerospace suppliers is the ways these businesses take expertise, technology, and skills gained in aerospace applications and expand into other specialized manufacturing, software, and business applications. Boeing's work in carbon-fiber composites has been a boon to businesses across the state, including Shelby SuperCars, which recently broke ground on a 12,000 square foot factory in Richland, Washington.

Shelby's CEO was recently quoted as saying "the expertise and skills of Pacific Northwest labor, because of Boeing and all the carbon fiber technologies, is quite impressive." These spin-off activities diversify the cluster and create additional jobs and wealth for the state.



## BUSINESS SPOTLIGHT: CHERRY FARMERS

While aviation is important to the agriculture industry in getting goods to market, Washington cherry farmers are using aviation services in a different way.

Cherries are an important part of agricultural production in Washington State, and Rainier cherries are especially renowned. A particular challenge in getting them to market looking as beautiful as possible is preventing cracks, which occur because of moisture (typically from rain) as they near maturity.

How are cherry producers preventing these cracks? One strategy is to fly helicopters above cherry crops to dry the moisture that has accumulated and prevent cracking from occurring. In doing so, fuel is purchased from local airports, helicopter pilots are employed, and Washington's cherries get to market looking much more attractive to consumers.

GBI is located within five miles of airports with scheduled commercial service, just as much economic activity occurs around other airport types without commercial service. These non-commercial airports play different roles in their communities and are often very important to the local economy. Examples of the types of services airports provide for different industries include:

- **Corporate Aviation.** Airports with corporate aviation services facilitate business operations, site visits, and face-to-face interactions with colleagues, clients, and partners. Corporate aviation occurs at large urban airports but also at many smaller community airports where companies access remote work sites and smaller markets (see PCLI business spotlight on page 26).
- **Air Cargo.** Many industries rely on air cargo services for distribution of components and final products. Businesses with high-value products and time-sensitive delivery schedules rely heavily on air cargo services (see PETNET business spotlight on page 26).
- **Commercial Aviation.** From an industry perspective, commercial aviation gives businesses access to markets. In addition to business travel, commercial aviation also provides access to potential customers in industries like tourism. Commercial aviation is not limited to scheduled commercial service out of the larger state airports. Smaller airports also provide charter and air taxi commercial services.
- **Industrial Parks.** Several airports in the state manage or are affiliated with industrial parks. While many of the businesses on these parks may not be aviation-dependent,

these airports play an important role in preserving industrially-zoned land and fostering economic development and industry clusters.

Overall, airports support industry in a variety of ways and connect communities to commerce and economic opportunities that flow throughout the larger aviation system.

The industries supported by aviation are not always clustered immediately around airports. The economic impact analysis presented in the Airport Perspective section is limited to activity occurring on airports and therefore only capturing a portion of the benefits aviation provides to industries and the communities they are located in. It is important to keep the larger industry perspective in mind when considering the value aviation provides to the state economy.

# User Perspective

While the Airport Perspective section uses output and job totals to measure the economic impacts of activity located on and passing through airports, and the Industry Perspective section examines the broader relationship between the state's airport system, selected industries, and the larger economy, the User Perspective analysis measures, where possible, the intrinsic value of the myriad services offered throughout Washington's aviation system.

Looking at user-derived benefits alongside the economic impacts demonstrated in the Airport Perspective section gives greater depth and a more complete picture of the overall value of the aviation system in the state. Larger commercial and regional airports account for a majority of traditional economic impacts measured in terms of jobs and wages. However, for many smaller airports, user-derived benefits from services, such as medical evacuation and search and rescue, far exceed the economic impacts of the handful of jobs located at these airports. The user-level analysis reinforces the importance of the range of activities that the aviation system provides and the value to users.

There is some overlap between the Industry Perspective and the User Perspective because both address the ways in which businesses use aviation services. The difference between the two is that the Industry Perspective describes from the aviation system viewpoint how aviation services benefit industries and the larger economy, while the User Perspective describes the value of aviation services from the individual business user viewpoint.

## APPROACH

Washington State's aviation system supports a diverse range of activities and facilitates millions of transactions each year, including:

- **Moving people and goods.** Commercial passenger service; business and corporate travel; personal transportation; pilot training and certification; air cargo; and blood, tissue, and organ transportation.
- **Protecting people and resources.** Medical air transport; search and rescue; firefighting; national security; and emergency preparedness and response.
- **Supporting industry.** Aircraft manufacturing and agriculture were selected as examples for how individual businesses in a given sector benefit from the availability of airport facilities and services.
- **Supporting research.** Scientific research and aerial photography.
- **Flying for recreation.** Aerial sightseeing and skydiving.

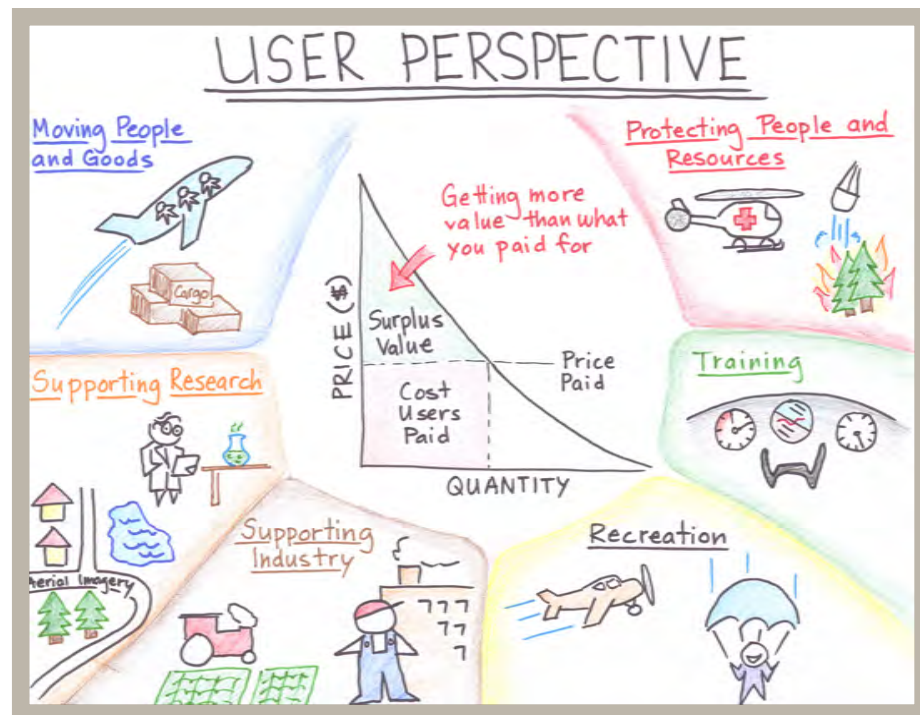
While not comprehensive, these services encompass a range of aviation activities and users, which occur at a number of airports throughout the state. Indeed, one airport will likely offer several of the services listed above.

Measuring the intrinsic worth of aviation services derived by each individual user of the system is challenging because it requires knowing how much each user values a particular service. This is challenging enough when examining only one particular service (e.g. search and rescue services), and more so when one considers the range of services offered throughout the 135 public use airports in Washington.

To begin to estimate their value, three questions were asked:

- What is the scale of the activity or service in Washington?
- What does the service cost the user?
- Beyond what is paid from users, what can be said about the total value created for the user?

Appendix E includes descriptions for each of the above-listed services and activities and, where possible, quantifies the benefits accrued from these services to users.



### How to Estimate Value

It is possible to estimate the relative magnitude of the value users derive from aviation-supported activities, although assigning an exact dollar amount to the value is beyond the scope of this project.

Utilizing a demand curve for some product or outcome can illustrate the varying degrees of individual value assigned to these products or outcomes. The chart to the right shows the different ways that passengers on a commercial flight value the ticket they purchased (the chart assumes that all passengers paid the same price for their ticket). The green demand curve indicates the price different users were willing to pay for the flight and the difference between their willingness to pay and the actual price represents consumer surplus or value.

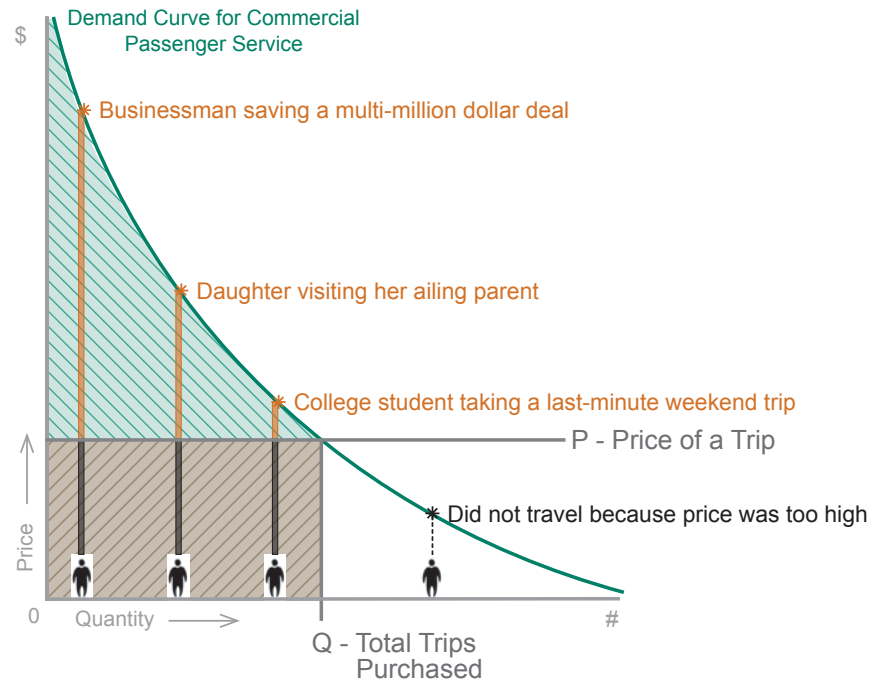
As shown, the value created by this flight varies for each user based on the specific trip purpose. For the businessman, this flight is incredibly valuable, perhaps worth double the amount he paid for the ticket, whereas for the college student, the value created may be only a few dollars more than she actually paid.

The key takeaway from this example, is that while the value created for the user from many aviation-related services is small (e.g. the college student trip in the chart), the value created by a few critical transactions (e.g. the businessman flying to ensure a multi-million dollar deal gets done) can be extraordinarily high. This is especially true of emergency medical flights (see sidebar on page

39), which can mean the difference between life and death.

In some cases the individual value will be both far in excess of the individual costs, but also experienced directly by fewer people. For example, medical air transport or wildland firefighting will have enormous value, but will be experienced by relatively few people. However, even if an emergency service is unlikely to be used, there is a high value to all potential users in a community from knowing that a critical service is available if needed.

### Consumer Surplus Example: Commercial Air Service



## OMAK MUNICIPAL AIRPORT: LOW ECONOMIC IMPACT, HIGH VALUE

Omak Municipal Airport is the largest airport in the Okanogan Valley and is a good example of the value smaller airports can provide for rural communities. As a small airport in rural Washington, its economic impacts pale in comparison to some of the larger airports in the aviation system. Omak Municipal supports only seven full-time jobs, with a total estimated Gross Business Income of less than \$60,000.

When considering the perspective of user value, however, Omak is critically important to its community and surrounding region. These are the aviation services or activities supported by Omak Municipal:

- Wildland firefighting
- Medical air transport
- Agricultural spraying
- Cargo activity
- Aerial surveying
- Civil air patrol
- Border patrol and law enforcement

For the users of these services, Omak Municipal's value is much higher than its economic impact. Whether it is a citizen

*The value of these services far outweigh traditional economic impacts measured in jobs, wages, and total output*

benefiting from medical air transport, a business using the airport to reach a work site, or the larger community benefiting from wildfire protection, Omak Municipal provides integral services for the entire community.

Firefighting activities bring particular value to Omak. During a heavy wildfire season, up to 150 people involved in firefighting activities can be stationed at the airport for weeks at a time. These jobs and spending, in addition to the protection of private property and natural resources, brings immense value to the local community.

Numerous airports just like Omak Municipal are scattered throughout Washington State providing access to valuable services for isolated and rural communities. The value of these services far outweigh traditional economic impacts measured in jobs, wages, and total output located at an airport.

## Why User Value is So Important

Added together, the value that aviation-related services creates for individual users totals tens of billions of dollars per year. That the system creates such monetary value is impressive by itself; however, such a statement conceals the true impact of that value. Entire communities derive value from having certain aviation services near them (e.g. medical air transport or firefighting), and this is particularly true of rural communities and smaller airports. Thus, minor investments that maintain or expand these relatively inexpensive services are returned to users in substantial and important ways.

The user-level perspective captures the additional impacts missing in the job totals from the airport-level and industry-level perspectives. Airports, in addition to supporting wages and businesses, enable life-saving, resource-saving, and recreational services. When considering the total benefit that an airport brings to a community, this user-level economic value is an essential part of the dialogue.



## User Derived Value in a Variety of Activities

The table on the following two pages presents 17 aviation-related activities that provide value to users. In many of these activities, user value is difficult to measure because it is impossible to know the value to a user above the amount an activity costs. And in some instances, like search and rescue or medical air transport, the value may be someone's life, typically valued between \$3 to \$8 million, though the value is much more to the individual whose life is saved. Moreover, how can monetary value be assigned to the comfort a parent experiences knowing that if their daughter or son is lost in the Cascades several aircraft can mobilize to locate them?

It is also necessary to remember the value to a group of users, be it a rural community benefiting from emergency preparedness and disaster response or the entire state in preserved natural resources from firefighting activities. Summing the discrete individual costs is a start towards understanding the value to users, but assigning a monetary value based on how much these services "cost" obscures real, non-monetary value that individuals, communities, and the state get from these activities.

### MEDICAL AIR TRANSPORT

For the most part, air transport is used to move patients with traumatic injuries and a time-critical need for care. In these cases, access to treatment during the first hour after a heart attack, head injury, or severe burn can save lives and prevent long-term disability.

Medical air transport creates value for users by saving lives and improving outcomes. Without the aviation system, the technology and specialists at acute-care hospitals would not be available to residents who do not live near them. Because of these substantial, life-changing impacts, the value created for direct beneficiaries is substantial.

Entire communities derive value from having medical evacuation capabilities nearby.

Having this option in a community can impact where families and businesses decide to live and locate.

A 2007 study estimated that air transport of major trauma patients saves approximately 5.6 more lives per 100 patients than ground transport for similar trauma severity. It is difficult to assign a numerical value to something as important as life or health, but lives are generally valued at extremely high levels.

Medical air transport flights are one of the biggest and most important sources of value creation at many rural airports. Although they may happen infrequently, such a high level of value is created for the users of each flight that it quickly adds up to enormous levels of user value statewide.



*Air transport of major trauma patients saves approximately 5.6 more lives per 100 patients than ground transport.*

	Activity & Who Uses It?	What is the Value to the User?	How Much Value is There?
Moving People and Goods	<b>Commercial Passenger Service</b> Any passenger flying from one of Washington's 16 airports with scheduled commercial service.	Quick, cost-effective access to places, markets, and resources. The value of any specific trip is greater than or equal to the cost (e.g. a weekend getaway or a visit to an ailing relative).	Users paid \$11.3B on commercial air travel in Washington in 2010, and the sheer volume of trips, combined with the value created on each trip, creates tremendous value beyond this figure.
	<b>Business and Corporate Travel</b> Any passenger on a non-commercial, non-military flight traveling for business or corporate purposes.	Quick, flexible access to markets, clients, customers, or destinations, particularly for small or rural communities. Makes businesses more competitive through saving employee time.	Baseline cost is the price of a plane or jet, which can be up to millions of dollars. Value beyond the cost is created through convenience, improved competitiveness, and cost savings.
	<b>Personal Transportation</b> Individuals, families, or groups who fly non-commercial airplanes for transportation.	Access, mobility, and freedom to travel the region, state, and beyond; especially time-sensitive trips to areas with poor access via other modes.	Costs related to owning and maintaining an airplane, with additional value derived from convenience, flexibility, and enjoyment.
	<b>Pilot Training and Certification</b> Pilots earning flight certification to pursue skill mastery, a job as a pilot, and personal enjoyment.	The job opportunities, skill mastery, and enjoyment associated with becoming a pilot.	Annual expenditures between \$15M and \$35M, plus value from opportunities associated with pilot certification and personal enjoyment.
	<b>Air Cargo</b> Individuals and businesses who need to send and receive packages and mail.	Fast and reliable movement of products, supplies, and equipment, particularly those of a time-sensitive nature.	Users paid at least \$6B for air freight and mail in WA in 2010. Additional value created on each shipment and the sheer volume of cargo activity creates tremendous value beyond this figure.
	<b>Blood, Tissue, and Organ Transportation</b> Moving blood, tissue, and organs to assist in urgent medical procedures.	The fast movement of blood, tissue, or organs can lead to improved medical outcomes. Organ transportation is especially time-sensitive.	In addition to the value of a human life, positive health outcomes and life-saving impacts have tremendous value to the patients served.
Protecting People & Resources	<b>Medical Air Transport</b> Individuals experiencing medical emergencies requiring immediate or enhanced medical care.	Access to enhanced medical care that can save a life and improve medical outcomes.	Medical air transport has life-saving benefits, creating significant value (above the cost) for the patient served and for communities with access to this service.
	<b>Search and Rescue</b> Individuals that are lost or missing, particularly in rural or remote areas.	Aircraft cover large areas in shorter amounts of time and provide better visibility in locating missing people than ground transport.	A low-volume but high-value activity. Saved lives provide great value to located individuals and their families.
	<b>Firefighting</b> Individuals and communities that are threatened by wildfires.	Efficient wildfire detection and suppression protects people, property, and natural resources.	The value of property saved from wildfires, lives saved, and reduced impacts to natural resources through fire suppression.

Activity & Who Uses It?		What is the Value to the User?	How Much Value is There?
Protecting (continued)	<b>National Security</b> Border security and military operations using Washington's public use airports.	Safety and security.	In addition to the hard-to-quantify value of safety and security, defense-related economic activity accounted for 100,000 jobs and \$7.9B in spending in 2009 in WA.
	<b>Emergency Preparedness and Disaster Response</b> Communities preparing for and responding to disasters.	Preparedness and infrastructure that functions as staging areas, delivery centers, and bases for medical evacuation.	Individuals and communities get value from fast provision of medical care, supplies, or evacuation infrastructure. Efficiencies from aviation save lives and help communities return to normal.
Supporting Industry	<b>Aircraft Manufacturing</b> Individuals and businesses in the aircraft manufacturing and aerospace sector; all aviation users utilize products from this sector.	Value is created by supporting the construction of aircraft, including engines, parts, and other equipment.	Gross business income in 2009 totaled \$34.8B. Air transportation is a fast-growing mode of travel, and supporting the manufacture of aircraft will ensure future value is created in Washington.
	<b>Agriculture</b> Farmers who need to treat, fertilize, or seed their crops.	Aerial application protects crops by applying treatment over an area more quickly than a ground vehicle and with less crop damage.	The value of preventing crop loss is more than the cost to each individual farmer. Aerial application supports a multi-billion dollar industry (\$6.8B in 2007).
Supporting Research	<b>Scientific Research</b> Researchers, businesses, or government conducting aerial research or researching aviation technology.	Enables research that wouldn't be possible without flight. Increased understanding of natural environment and improved aviation technology.	Research can lead to new products and technological advances, creating opportunities for continued job and industry growth, especially in aviation technology.
	<b>Aerial Photography</b> Individuals, businesses, and governments who need perspectives not seen from the ground.	Gathering information that can't be known any other way for maps and other spatial information.	Assists in the design and construction of highways, environmental monitoring, estimating natural resources, and damages from natural disasters.
Flying for Recreation	<b>Aerial Sightseeing</b> Individuals and tourists taking tours provided by airplanes, seaplanes, helicopters, gliders, and hot air balloons.	The singular and spectacular views afforded by aerial sightseeing generate value, particularly for tourists.	Individual value is the enjoyment provided in addition to, and likely in excess of, the costs.
	<b>Skydiving</b> Individuals and groups who use aircraft in parachuting activities.	Value is created by the enjoyment, adrenaline rush, and views afforded to skydivers.	A single skydive can cost hundreds of dollars, and users derive additional value from the fun, views, and excitement.

## Implications of User Perspective Findings

The User Perspective highlights the immense value created both at individual airports and from Washington's aviation system as a whole, particularly for users of aviation activities and services. Additionally, value accrues to non-users (in the event that they might one day need to use aviation services) and communities (especially from services that protect property and save lives).

Using a mix of quantitative and qualitative measures, the value of aviation services can be demonstrated by more than just estimates of gross business income or the number of jobs at particular airports. Indeed, a measure of value from the User Perspective that is not captured in either the Airport or Industry Perspectives is that of a CEO flying into a community and closing a multi-million dollar business deal. The Airport Perspective captures the visitor spending of the CEO (e.g. if he or she were to purchase a cup of coffee), but the User Perspective shows that the value of the trip is much greater than the cost of the actual flight. Not only is the value to the business greater than the cost, but the community benefiting from this business deal is potentially seeing a value greater than the costs associated in maintaining the airport.

Communities, particularly those in rural or remote areas, benefit from aviation services and activities in many other ways that aren't captured in either the Airport or Industry Perspectives. One of the

most tangible is in the form of firefighting activities: aviation-supported firefighting protects private property from destruction wrought by wildfires. Preventing losses to private property supports the tax base of entire communities. It also protects natural resources that have both industrial uses (timber for logging) and recreational uses (hiking in State parks).

Considering economic impacts as the sole measure of value of the aviation system in Washington State neglects the very real benefits users experience from aviation services and activities. If we were to use economic impacts as the only measure, it would suggest investments should primarily be made in the four airports that account for the vast majority of these impacts. What the User Perspective demonstrates is that a great deal of value, above and beyond the number of jobs and gross business income, is created throughout Washington's aviation system and especially in the smaller airports that make up the majority of the 135 public use airports in the state.

The aviation system facilitates and enables services that save lives, protect property values, allow for business activity, and support recreation. While summing the individual costs necessary for each activity provides a sense of the scale of user value, the value to users, non-users, and communities as a whole is many times greater than the cost, and includes the value of saved lives, stable property values, and personal enjoyment.

# Policy Implications

## LATS and the Washington Aviation System Plan

In 2005, the Legislature passed and the Governor signed Engrossed Substitute Senate Bill (ESSB) 5121, mandating a comprehensive study of Washington's aviation system to systematically identify statewide air transportation needs and solutions. This study is known as the Washington State Long-Term Air Transportation Study (LATS). Pursuant to ESSB 5121, the Washington State Aviation Planning Council was appointed to review the LATS technical studies, solicit public and stakeholder input, and develop the Washington Aviation System Plan (WASP) and supporting recommendations for meeting Washington's long-term aviation needs..

In 2009, the Washington State Aviation Planning Council reported back to the Governor and the Legislature and made three principal recommendations designed to address three primary challenges to the long-term health of the aviation system:

- **Aviation Capacity.** The State has an important role in ensuring that there is adequate aviation capacity for the long-term needs of the state and its communities and to place a priority on funding and planning the aviation system to meet future needs.
- **Minimize Land Use Conflicts.** The State should reaffirm and strengthen its land use legislation to protect public use airports from encroachment of incompatible land uses and safeguard the public's investment in the air transportation system.
- **Stewardship of the Aviation System.** The State should enact legislation and other measures to preserve the existing capacity of the air transportation system and to ensure that adequate measures are in place to fund airport facility infrastructure necessary to meet the needs of intrastate commerce, provide access to communities, provide access to economic development, and provide for emergency services.

In addition to the principle recommendations, the Council developed aviation policy recommendations to address seven key state transportation goals, which included, Capacity, Land Use, Environment, Safety, Stewardship, Economy, and Mobility. Under each of these goals a series of policy recommendations were developed. A complete list of the policy recommendations can be found in the 2009 Washington Aviation System Plan, Chapter 11.

This study finds that there are significant direct economic and fiscal benefits created by the aviation system in the state and that the system is also a core element of the state's transportation infrastructure, which supports local and state economic prosperity. In addition, the value derived by individuals, communities



## FEDERAL FUNDING CHALLENGES

One major challenge faced by all airports - from large commercial hubs to smaller community airports - is the lack of funding certainty from the Federal Aviation Administration (FAA). For years, the FAA has been operating under a series of more than 20 interim authorizations, and is coming off a period - summer 2011 - where there was no funding at all, resulting in 4,000 employee furloughs.

The lack of certainty impacts long-term planning at Washington's airports and also requires airports to break projects into pieces in order to receive FAA funding. Doing so often drives up the cost of the overall project and results in a longer overall project schedule.

The recent FAA furlough delayed the disbursement of grants that were already approved and lengthened the time it took for other projects to be approved, resulting in lost jobs and impacts to economic development, an unfortunate outcome during a recession.

During interviews, airport representatives were unanimous in urging policymakers to ensure long-term funding and certainty from the FAA, an outcome that would benefit all Washington airports.

and businesses from their access to and use of aviation services far exceeds even the direct job, wage, and output impacts.

As state and local jurisdictions grapple with significant budget challenges, it will be critical that aviation system needs, as well as their potential economic and fiscal impacts, be thoughtfully considered when discussing priorities for public funding.

## How Aviation is Funded

Airports in the United States are primarily public utilities and, like most public utilities, their income is a mixture of public and private funding. Many airports are owned and operated by branches of local government such as Port Districts, airport authorities or boards, or directly by County or City governments.

Airport income is generated from both aeronautical or traffic-related activities and non-aeronautical or commercial sources. Aeronautical revenues are derived from the operation and landing of aircraft, passengers, or freight. Sources of aeronautical revenue include aircraft-landing fees, passenger-service charges, aircraft parking and hangar fees, and charges related directly to the handling of the aircraft.

Non-aeronautical revenues come from non-aircraft-related commercial activities in the terminals and on airport land. Non-aeronautical revenues may arise from a range of sources but generally include rents for terminal space, income from concessions of various kinds, automobile

parking fees, and direct charges to tenants for services such as utilities, janitorial services, or other operational costs.

Depending on the size and type of airport, sources of revenue differ. At **commercial service airports** airlines pay rent for ticketing, passenger hold rooms, offices, training facilities, storage facilities, hangars, and maintenance facilities. Additionally, the landing and aircraft parking of commercial aircraft generates fees that are paid for every commercial aircraft that touches down at the airport.

Passengers who use the terminal are also expected to pay for their use of the airport. Passenger Facility Charges (PFCs) are collected as part of airline ticket prices on behalf of the airports. PFCs were made possible by an Act of Congress, and use of their proceeds is limited by Congress to passenger facility improvements. This means an airport can enhance security or safety, make improvements to reduce noise, expand capacity, or enhance air carrier competition through the revenues generated by PFCs.

Commercial service airports also lease space to other tenants, including concessionaires, car rental companies, and others who pay a per square foot lease rate, and/or a percentage of their revenues. Outside the terminal building, airports earn revenues from automobile parking, curbside access fees collected from taxi companies and shuttle buses, and leases of airport land to tenants such as hotels, airline caterers, and private aviation companies.

Other **airports with surplus property**, often larger regional airports, derive significant revenue from tenant leases in industrial areas and industrial parks on airport property. These tenants are not necessarily aviation-related businesses but the lease revenue they generate helps airports fund aviation-related investments. Airports with aircraft manufacturing operations derive revenue from building leases and fees for parking aircraft, testing, and landings and take-offs.

**Smaller airports** tend to be almost entirely dependent on aeronautical revenues, supplemented by some rental income and public funding. At general aviation airports, revenues typically include a percentage of the profit from aircraft services such as refueling (referred to as a flowage fee), maintenance, sales, itinerant aircraft parking, and other services offered by a fixed base operator located on the airport. Additionally, the airport can collect rental fees on aircraft hangars and tie-downs or land lease fees where others have invested money on hangars. Small airports also may have non-aeronautical income sources; however, these are generally limited to land leases with businesses that do not use the airport in their primary business operations.

While proportionally small, **public funding** is a key source of funding for airports throughout the state, and is particularly critical for smaller and non-commercial facilities. Ensuring that there is adequate funding available to continue to invest in this critical element of the state transportation infrastructure will be a key challenge ahead.

## WASHINGTON STATE TRANSPORTATION PLAN

The state's aviation system, which includes 135 public use airports, is essential to the overall transportation system. The state's largest airport, Sea-Tac International, has over 300,000 arrivals and departures each year, including five nonstop routes to destinations in Asia and five nonstop routes to Europe. However, the state's Long-Term Air Transportation Study, completed in 2009, indicated that many public use airports do not meet performance objectives in areas such as pavement preservation, safety standards, land use compatibility, and airport facility infrastructure needs. The Study estimates needs of \$600 million to meet general performance objectives and \$2.3 billion to improve pavement and airport facility infrastructure over the next 20 years. Existing small community commercial air service has particular challenges; loss of this service could significantly impact the economic viability of communities locally and nationally.

The study recommends:

- Direct aviation taxes and fees to fund investments in airport infrastructure.
- Treat aviation capacity as a resource and preserve, protect, and enhance such capacity through strategies focusing on airport operations, technology, safety, and land use.
- Address additional growth needs with a special focus on the unique characteristics of four identified regional aviation Special Emphasis Areas: Puget Sound, Southwest Washington, Spokane, and Tri-Cities.
- Invest in NextGen aviation technologies to meet future aviation needs and reduce greenhouse gas emissions.

Washington Transportation Plan 2030, WSTC, Page 25.

## AEROSPACE EDUCATION

An important element of maintaining Washington's competitive advantage in the aerospace sector is maintaining a high-quality workforce, particularly as baby boomers begin to retire from these jobs. Fortunately, there are a number of programs occurring throughout the education system seeking to increase the supply of appropriately trained workers.

Aviation High School is an aviation-themed high school with goals of training future leaders in careers like scientists, engineers, technicians, and pilots, and becoming the premier school for science, technology, engineering, and math (STEM) in the Northwest. Aviation High School opened in 2004 and enrolls 400 students in 9th through 12th grades. A new campus is currently being built, with an expected opening in 2013, that will give students easy access to the facilities and businesses located at Boeing Field.

Another place for students to gain expertise in aviation-related fields is the Washington Aerospace Research & Training Center (WARTC), which was created to meet workforce demands in the aerospace sector. While courses are currently offered through Edmonds Community College (at a facility at Paine Field), there will be opportunities to take advantage of this program in Renton and Spokane in 2012.

WARTC works with the Aerospace Training Board, made up of members of the aerospace sector and its supplier network, to identify and target the industry's needs. Once needs are identified, WARTC develops a curriculum, trains students, and assists them in finding jobs in the industry. Since opening in 2010, approximately 400 students have completed a certificate program. Graduates have achieved an 87% hiring rate, landing jobs at Boeing and with other companies in the industry.

The Aerospace Futures Alliance of Washington, which established the WARTC, also helped potential students of the Center by lobbying for the creation of the Aerospace Loan Program, which provides low-interest loans to Washington students attending WARTC. Under previous rules, students were unable to receive loans for certificate programs lasting less than one semester.

Finally, Washington has made a commitment to investing in the education and training of aerospace workers, committing almost \$1 million to high schools and colleges throughout the State to increase the number of engineering students, advance aerospace research, and improve the aerospace curriculum in high schools by adding STEM courses.

## Advisory Committee Perspectives on Report Findings

During the discussion of study findings at Advisory Committee meetings and through the broader stakeholder outreach effort, a number of perspectives were offered on how this report and its findings can be used. The list below captures these observations and provides suggestions that the WSDOT Aviation Division and other policymakers can use to inform development of policies to support the aviation system and state and local economies.

### State Legislation

- Legislation is key to helping protect, preserve, and grow the system, and this study provides a useful base for discussion of airport issues at the state level.
- The study can serve as a mechanism to bring different aviation-related interests together to respond to state-level budget and policy issues affecting airports.

### Airport Capacity

- The study provides the state with the ability to look at the economic implications for expanding capacity and maximizing our current inventory of aviation facilities.
- The FAA and the state are currently working to help prepare airports for the acquisition and implementation of NextGen technology, which will increase capacity and safety, as well as reduce emissions and noise. Given the value of airport capacity, WASP policies place a high priority on efforts to enhance existing capacity through improvements in technology.

### Land Use/Accessibility/Mobility

- Land use around airports was a critical issue in the WASP. This study provides a better understanding of the broader statewide value of airport facilities and should be used in policy discussions about improving compatible land use as well as preserving and enhancing facilities.
- While this study does not specifically speak to the role of aviation in a broader transportation system, there is clearly a need to ensure that all of the state's transportation modes work effectively together to maximize the overall effectiveness of the statewide transportation system.
- Along these lines, during a presentation of preliminary findings to the Washington State Transportation Commission, a policy question was raised about whether the State has an interest in undertaking initiatives to improve or expand commercial air service to communities in Washington state. Specifically, commission members were interested in how to leverage federal grant opportunities to improve or expand air service to non-metropolitan communities.
- A significant share of aviation system economic contributions are from mobility and connectivity for both people and freight.

### Rural Airports

- Aviation infrastructure will be a critical element to rural economic development efforts. This study underscores the importance of aviation facilities and services in these parts of the state.

- The study identifies a critical economic value of smaller facilities, namely access to life-saving medical air transport and other critical services such as fire fighting that protect life and property in smaller rural areas.

### Impact of Costs

- Although this study focuses on the benefits of aviation, it is important to note that airports are expensive to build and to maintain. Sometimes the best way to grow means understanding the best ways to prioritize needs and leverage existing assets.
- Another aspect of costs that should be included in policy discussions is that many of the broad economic benefits come at some localized cost, often in terms of noise and traffic impacts.

### Job Growth

- Regional airport facilities are a significant contributor to the state's economy and measures need to be taken to maintain and improve facilities at regional airports so these facilities can continue to support job growth.

### Diversity

- One of the real strengths of the system statewide is the diverse nature of Washington's aviation system, which helps connect communities, spread economic opportunity, and provide essential public and commercial services.