Zephyrhills, Florida
Aviation Cluster Study
March 15, 2021
The Tampa Bay Regional Planning Council is an association of local governments from Citrus, Hernando, Hillsborough, Manatee, Pasco and Pinellas Counties.

About the Economic Analysis Program

Since 1999, the Tampa Bay Regional Planning Council has been producing economic impact studies for a variety of public and private sector clients.

Using the most powerful analytical tools, including IMPLAN and REMI PI+, the Council’s Economic Analysis Program has produced hundreds of reports covering topics such as job creation, land use, natural resources and energy, as well as a variety of public policy questions.
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EXECUTIVE SUMMARY OF THE ZEPHYRHILLS AVIATION CLUSTER STUDY

The US Economic Development Administration has provided a grant under the 2020 Coronavirus Aid, Relief, and Economic Security Act (CARES Act), to the Tampa Bay Regional Planning Council (TBRPC) to provide technical assistance aimed at economic recovery for the Council’s regional partners. At the request of Pasco Economic Development Council, TBRPC conducted a feasibility study of how the City of Zephyrhills might leverage its existing General Aviation airport (Zephyrhills Municipal Airport) and the nearby industrial park as the physical base for an aviation cluster of industries.

An industry cluster is a combination of inter-dependent industries in related fields that take advantage of scale economies in labor and equipment to developed specialized but strong job-growing economies. Silicon Valley’s software cluster and Detroit’s automobile manufacturing cluster are good examples, but smaller clusters in many industries may grow under the right conditions.

The Brookings Institution identified five characteristics of a strong cluster strategy: where decision makers are focused on establishing a robust ecosystem, not quick job gains; the strategy is industry-driven, university-fueled, government-funded; where decision makers are willing to place a collective big bet on a unique opportunity while the ongoing effort is championed by passionate, dedicated leaders, and the cluster is anchored by a physical center.

This study is focused on the characteristics of that robust ecosystem and the physical anchor of the cluster. The physical anchor could consist of the Zephyrhills Municipal Airport property and the nearby Zephyrhills Airport Industrial Park. The two components of this anchor would be combined in a two-tier land use strategy that focuses the most runway dependent firms “within the fence” of the airport, and less dependent firms, such as parts manufacturing or other supplies, focused within the industrial park.

In terms of a robust ecosystem, TBRPC showed that there are gaps in the supply chains of aircraft manufacturing in general and in parts manufacturing in particular by contrasting the effects of a single firm’s growth in Pasco County versus the growth of that firm in the more developed aviation cluster of Duval County. Overall, the analysis also makes clear that an aviation cluster strategy is built on more than fostering the growth of aviation manufacturers. While Zephyrhills and Pasco EDC can pursue aviation manufacturing investment, the analysis shows that a broader base of services and skilled occupations is a foundational requirement of building an industry cluster.

In other words, an aviation cluster approach requires public and private convergence on investment in education as well as a broad perspective on which firms to recruit and which trades to emphasize in the region’s community colleges.

With a few related firms, enough to form a kernel of an aviation industry in Pasco County, TBRPC recommends that the City of Zephyrhills and Pasco County build on their existing partnership to lay the groundwork for the physical anchor of a future aviation cluster at the Municipal Airport. While there are federal grants through the US Economic Development Administration that can assist Zephyrhills, the partners should decide on whether to “collectively invest” in attracting this cluster that bet can be championed by passionate and dedicated leaders.
1. Introduction

1.1 About the Tampa Bay Regional Planning Council

Established as Florida’s first regional planning council in 1962, the Tampa Bay Regional Planning Council (TBRPC) provides a forum to foster communication, coordination and collaboration among its member governments. Serving six counties (Citrus, Hernando, Hillsborough, Manatee, Pasco and Pinellas) and twenty-one municipalities therein, the Council provides a wide range of services, including:

- Economic Modeling and Analysis
- Economic Development District
- Community Visioning and Planning
- Spatial Growth Modeling
- Hurricane and Hazard Preparedness Planning
- The Official Disaster Planning Guide
- GIS Mapping Services
- LEPC: Hazardous Materials
- Technical Assistance to Local Governments
- Agency on Bay Management
- Bay Soundings Quarterly Environmental Journal

As one of the first Regional Economic Models (REMI) users in Florida, TBRPC has been providing economic analysis services to government agencies, non-profits and the private sector. Since 1999, TBRPC has conducted over 400 economic impact studies, covering topics such as transportation, environmental and natural resources management, land use decisions, business investment incentives, taxation, sports and other events and festivals. Many of these reports are available from the TBRPC website, [http://www.tbrpc.org/eap/eap_projects.shtml](http://www.tbrpc.org/eap/eap_projects.shtml).
1.2 About the Zephyrhills Aviation Cluster Study

The US Economic Development Administration has provided a grant under the 2020 Coronavirus Aid, Relief, and Economic Security Act (CARES Act), to the Tampa Bay Regional Planning Council (TBRPC) to provide technical assistance aimed at economic recovery to the Council’s regional partners.

At the request of Pasco Economic Development Council, TBRPC conducted a feasibility study of how the City of Zephyrhills might leverage its existing General Aviation airport (Zephyrhills Municipal Airport) and the nearby industrial park as the physical base for an aviation cluster of industries.

The study considers existing uses at the Airport, what industries comprise an aviation cluster and the implications of cluster development. Next the report introduces the concept of a tiered land use strategy that may be helpful in providing a supportive land use pattern to the long-term goal of establishing a thriving light-aircraft focused aviation cluster at the Airport and the industrial park.

The report closes with some recommendations for future actions.

1.3. Existing Conditions

The study area includes the Zephyrhills Municipal Airport property and the nearby Zephyrhills Airport Industrial Park. The Airport covers 860 acres with two runways, one 5,000-foot runway and one that is 4,964 feet, undergoing an extension to 6,200 feet. Operated as an enterprise, the Airport sees 45,000 to 50,000 operations a year, roughly two-thirds of which are local general aviation operations, one-third transient operations and a fractional amount of air taxi operations. Revenue sources are primarily ground leases and fuel sales.\(^1\)

In recent years, the Zephyrhills Municipal Airport has received many grants from the Federal Aviation Administration and Florida Department of Transportation for infrastructure improvements of the airport. In 2017, FAA / FDOT awarded $2.6 million to the airport for Taxiway B reconstruction, which connects to the fuel pumps and the southeast end of the airport, connecting to runway 1/19. In 2018, the Airport received $5.9 million from State Appropriations to extended runway 1-19 and a connector road to Alston Avenue promoting development to the Southwest infield area. In 2019, FDOT awarded $500,000 grant for the self-fueling farm. In April 2020, FAA awarded the airport $265,000 for design of Taxiway Alpha and 3.2 million for the reconstruction of Taxiway Alpha, in addition to many other miscellaneous projects.

\(^1\) City of Zephyrhills. Zephyrhills Industrial Corridor Plan. Pg. 15.
The Airport is a base of operations for fuel sales, avionics and aircraft maintenance repair services, hangar and aircraft rentals. There are a number of recreational activities such as a skydiving center, glider school and privately organized flight instruction. The site also supports an 18 hole golf course and restaurant, and camping grounds.
The Zephyrhills Airport Industrial Park lies to the northwest of the Airport and contains 442 acres of subdivisible vacant land, with future land uses designated for a mix of heavy to light industrial uses. The site is served by road access and one of two CSX lines (the Yeoman subdivision) that traverse the larger industrial corridor. The Industrial Corridor Plan also includes a conceptual rail serve layout for a CSX spur track, shown in Figure 1.2.

**Figure 1.2 Conceptual Rail Service Layouts for Selected Plan Area Properties**

These three sites together more than 7 million square feet of potential building space. While the combined floor area of these sites could provide employment of up to 10,000 workers, a full buildout of the industrial space is likely to be dependent upon other factors outside the scope of this study. In brief, there is more than enough space for the development of a robust aviation cluster based at the industrial park, but available land is just one component of a complex process.
2. Leveraging General Aviation for Economic Development

Pasco County, like every county in the United States, faces challenges in recovering from the economic impacts of COVID-19 and the resulting closures. At its height, Pasco’s unemployment rate reached 13.8 percent in April, 2020 as the result of widespread COVID-19 closures, and has since fallen to 6.7 percent as of August 2020.

While the County economy has shown signs of recovery, more can be done to create jobs and to continue to diversify the County’s economy. Recovery will require not only a return of consumer confidence but an added emphasis on creating jobs that are not dependent upon household spending within the County. As such, future growth will depend upon the ability of Pasco County and its communities to create more jobs that bring in investment and wage dollars from outside the County’s boundaries. While the County pursues multiple options for economic development, Zephyrhills Municipal Airport is a valuable asset to drive recovery in Zephyrhills and in the County.

Aviation in a Time of COVID-19

Of all the major industries affected by COVID-19, commercial air travel is among the most adversely impacted. Similar to how the loss of tourism dollars ripples through the accommodation and food service industries, the rapid decline in air travel adversely affects the aviation supply chain as well—fewer travelers means less demand for planes, and therefore less demand for airline services. As with most industries General Aviation (GA) declined in early to mid-2020 due to COVID-19 economic closures. GA saw a fifty percent decrease in demand in terms of total flights from the beginning of March 2020 to the beginning of April 2020. However, unlike commercial airlines, general aviation fully recovered its number of flights by late June of this year. Demand has since exceeded that of early 2020. This is explained by the shift in demand away from crowded commercial airlines to the relatively safer private or chartered flights due to COVID-19 concerns. Of course, this is not a general consumer shift but a shift in travel patterns of relatively few high net-worth individuals.

On the other hand, COVID-19 is changing the face of cargo across all modes of travel. With consumers stuck at home, demand for goods and services provided by online retailers has soared at the expense of local retailers. From this shift in consumer demand, there has been an increase in dependence upon long-distance supply chains and additional demand for just-in-time production needs. As consumers demand more goods and more specialized goods among them, the strains on global supply chains has increased the cost of shipping considerably. As shipping container costs increase, suppliers look at different ways of delivering their goods—for some classes of goods, air cargo can be a cost effective alternative when timely delivery is essential.

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2 Overall, this has led to a decline in aircraft manufacturing while resales are the principal source of sales. [https://www.avbuyer.com/articles/market-insight/business-aviation-market-overview-july-2020-112846](https://www.avbuyer.com/articles/market-insight/business-aviation-market-overview-july-2020-112846)

3 [https://flightaware.com/](https://flightaware.com/)
There are more than five thousand public use airports in the United States, each contributing to the economic base of their host communities. Across the United States, general aviation sustains about 1 million jobs each year. According to the Alliance for Aviation Across America, the 109 general aviation airports in Florida support 108,000 jobs with $5.4 billion in payroll, and about $18.4 billion in Gross State Product.4

Most of those airports are general aviation, servicing private and recreational flying rather than commercial passenger traffic. In addition to supporting small-scale commercial or corporate operations, disaster response, medical shuttles and commercial airport relief, general aviation airports attract businesses and investment that communities without general aviation cannot.

General aviation airports generate local jobs and indirect employment through activities that include fuel sales, hangar and tie-down rental, aircraft maintenance and services on the airport, such as flight schools, restaurants, aircraft sales and rental. Other revenue comes to the community through vehicle rentals, hotel stays and patronizing area restaurants and other attractions.

Zephyrhills can leverage the built-in economic advantages of its municipal airport to create jobs within the airport and in the nearby adjacent industrial park by adopting an industry cluster strategy. By adopting a more strategic approach, Zephyrhills can capture a greater share of the employment generated by development in and around the municipal airport.

In light of the COVID-19 recession, is there a market for new light aircraft or aircraft services? Not for commercial flights in the near term, as the economy struggles to recover. All air travel has decreased. Aircraft manufacturers have furloughed or laid off over 60,000 workers, with airline servicers laying off an additional 46,000 in 2020. Larger consumers of aircraft and aircraft parts cancelled orders in creating a glut of aircraft for the near term. Even if demand increases there would not be an immediate need for manufacturers to increase staff.

Instead, there may be an increase in the near term in demand for executive travel on small aircraft, increased cargo shipments as online retailers increase their market share and just in-time deliveries of perishable medical supplies such as vaccines and organ transplants. Whether demand shifts toward more executive travel or to more air cargo, there are opportunities for growth in general aviation in the Tampa Bay area. An aviation cluster of industries positioned at Zephyrhills Municipal Airport may be able to capture some of the opportunities associated with these shifts.

2.1 What is an Industry Cluster and what drives Cluster Development?

An industry cluster is a group of related industries, in which businesses with similar production characteristics or similar workforce needs locate in proximity to each other to build on the shared advantages of workforce talent, resources and location to thrive. Those advantages yield agglomeration economies—delivered cost advantages to customers, gains in labor productivity and industry innovation that attract new investment and jobs to an area with an industry cluster.

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4 Alliance for Aviation Across America. www.aviationacrossamerica.org/economic-impact/florida/
There are many examples of industry clusters, perhaps the most famous of which is Silicon Valley. Silicon Valley is more than just firms making software, it is home to a highly skilled and mobile workforce and a related complex of venture capital to fuel innovation and firm creation. This technology cluster is not unique to Northern California, and there are similar clusters around Boston, and other places around the world. Clusters also thrive in manufacturing—for example, Detroit gave rise to an automobile cluster which was built around innovation in assembly line production methods, access to superior steel and iron manufacturing, and a suitable labor force.

Some clusters are unplanned but emerge because of luck and circumstance. Hollywood’s film industry grew in part because Southern California offered sunny and clear-sky weather that made filming easier than other parts of the United States. Other industries arise because of necessity, such as defense needs—Israel’s aerospace industry, or the need to quickly rebuild after a devastating war, such as Japan’s automobile industry, which was built with expertise imported from Detroit.

While those examples are large scale or national in character, many smaller areas support niche clusters, either traded clusters, those cluster focused on sales outside of the region, or non-traded clusters, where most business comes from inside the region. Aerospace manufacturing is a traded cluster while gas stations counterpoised across a street intersection or a row of businesses devoted to selling used furniture, such as Magazine Street in New Orleans, are largely non-traded. They serve local customers.

**Indicators of Traded Cluster Development**

Not all clusters contribute equally to the regional economy. As already noted, non-traded clusters serve primarily local markets with little to no spending derived from visitors or customers in other regions. Traded clusters, on the other hand, primarily serve visitors or customers outside of the region. Examples include most kinds of manufacturing, agriculture and hospitality. Of the different variations of clusters, however, the process of developing industry clusters depends the most on two major factors. These are:

- A high relative concentration of related jobs; and
- High wages in target occupations

Economic Developers use a variety of statistical indicators in describing the economies of communities. Location Quotients (LQ) are simple ratios that describe the relative concentration of an industry by employment in a locality compared to the nation’s concentration of that industry.

As such, location quotients tell analysts whether the locality specializes in some industry or group of industries. An example would be that one out of ten employees in County X works in manufacturing widgets. Nationwide, only one out of twenty employees manufacture widgets. County X has a twice the concentration of employees manufacturing widgets that the nation has, and so its location quotient is 2.0.

Location-Quotients are generally used with employment data, but they may also be used to calculate local concentrations of higher wages in an industry, or firm concentration, or employment by occupation, depending on the need. As Table 2.1 shows, the Tampa-Clearwater
metropolitan statistical area is relatively poor when it comes to the availability of aerospace engineers and technologists, compared to other metropolitan areas in Florida.

Table 2.1: Aerospace Engineering and Operations Technologists and Technicians (SOC code 173021), May 2019

<table>
<thead>
<tr>
<th>Area name</th>
<th>Location Quotient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tampa-Clearwater, FL</td>
<td>0.61</td>
</tr>
<tr>
<td>Jacksonville, FL (Duval County)</td>
<td>1.91</td>
</tr>
<tr>
<td>Miami-Fort Lauderdale-West Palm Beach, FL</td>
<td>1.51</td>
</tr>
<tr>
<td>Palm Bay-Melbourne-Titusville, FL</td>
<td>53.97</td>
</tr>
</tbody>
</table>


The other factor is high wages, even though higher Location Quotients does not imply higher relative wages within an occupation or industry. Depending upon the cluster, access to low wage labor markets may also contribute to the formation of a cluster—for example, in service industries catering to tourists, as prevailing low wages may be essential in creating a broad range of experiences and services that make an area attractive to visitors. Clusters do not necessarily generate higher wages even when they create new jobs. On the other hand, clusters drawing on highly skilled labor do tend to generate higher than average wages—but the overall level will be mediated by prevailing wages and the cost of living. Economic developers, therefore, prefer to develop high wages industry clusters, such as in aviation.

In Section 4.1, TBRPC compares the economic impacts of $38.8 million in sales of aircraft manufacturing in Pasco County to the economic impacts of the same sales amounts in aircraft manufacturing in Jacksonville (Duval County). The relative advantage of having an aviation cluster in Duval County are clear when compared to the existing aviation sector in Pasco County, with more money staying inside Duval.

2.2 Identifying employment multipliers

An output multiplier for a given industrial sector is the total value of sales by all sectors of the regional economy necessary to satisfy a dollar’s worth of final demand for that sector’s output. An output multiplier of 1.66, for example, indicates that if a firm’s sales in one region to buyers in another region increase by $10 million, total sales throughout the region are expected to ultimately increase by $16.6 million. That additional $6.6 million in activity is generated by the initial sale, stimulating further sales. Employment multipliers are the employment consequences of that change in output (Coughlin and Mandelbaum, 1991). In this way, 100 jobs created directly by the investment, ultimately lead to 66 jobs in industries supplying the firm and to industries that provide services to employees, such as restaurants, grocery stores and health care.

In Section 4, TBRPC provides employment multipliers for various kinds of industries that may locate on airport property and in the adjacent industrial park.

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5 $38.8 million is roughly the amount to sustain 120 employees of a large aircraft parts manufacturer.
3. A Two-Tier Aviation Cluster Land Use Strategy for Zephyrhills

Large sites of economic activity—central business districts, automobile manufacturing plants, seaports—tend to attract related or ancillary businesses in the surrounding area. When those economic activities are big enough, economic activity will form concentric circles of support activities, declining in intensity as the distance from the primary economic activity increases. For example, most seaports around the world share similar patterns of land use around port facilities. Beyond the docks, there are businesses that service ships and crew, and beyond the immediate loading and unloading facilities, there are warehouses, hotels, and so on. This land use pattern follows a gradient of the most port-related or dependent jobs that peak in the vicinity of the port, then falling off as port and non-port oriented businesses, such as hotels and restaurants, mingle and then blends in with the rest of the surrounding urban area’s commercial activities, as port movements merge into the metropolitan economy.

Airports foster the same kind of concentric land use pattern. In larger airport zones, such as around Atlanta’s Hartsfield, the airport functions like a central business district, with aircraft businesses in the immediate vicinity of the airport grounds, while the larger airport zone attracts businesses with air cargo needs. These kinds of airport-centric development is called an ‘aerotropolis.’

While Zephyrhills Municipal Airport lies on the lower end of the airport size scale, there are certain core similarities with any large airport’s economic development profile. For businesses that rely upon direct access to the runway, adjacency to the runway is a necessity. Those businesses will locate as close as they can to runway access. For businesses that support the landside needs of the airport—caterers, personnel services, or to pilot training, proximity to the airport is attractive, but not necessarily indispensable.

A land use strategy that takes advantage of the economic concentric circles that form around airports is likely to better leverage the value of the airport over a less strategic approach of developing airport adjacent property as the opportunities arise. While attracting any jobs to Zephyrhills and the Zephyrhills Airport Industrial Park is a positive outcome for Pasco County and its residents, a more focused and strategic approach around industry clusters is likely to yield more jobs with higher incomes resulting in an increase of economic activity and an increase of taxable revenues within Zephyrhills and Pasco County. Pursuing an aviation cluster as an economic development strategy, however, also benefits from a master plan for land use and for identifying which industries should fill the industrial park to support an aviation cluster in the County. In this report, TBRPC sets out a basic strategy for cluster development “inside the fence” of the municipal airport and for “outside the fence” in the industrial park.

Inside the fence is the first tier of cluster development—general aviation services that benefit from direct access to aircraft, supplies and airport management such as aircraft services, maintenance and repair. Outside the fence is the second tier, within the industrial park, that supports businesses that benefit from easy access or proximity to the airport but not necessarily need 24-hour runway access, such as parts manufacturers, office support, etc.
3.1 Inside the Fence: General Aviation Services

Under a tiered land use strategy, the first tier for an aviation cluster is comprised of uses that directly support aviation activities. General Aviation Airports can support a wide range of businesses that would not otherwise exist in an area without an airport. Some kinds of commercial activities at General Aviation airports include:

- Corporate air fleet/executive jet services
- Recreation (parachuting and flying clubs)
- Law enforcement and fire control
- Medical services such as air taxi and supply deliveries
- Fixed-Base Operations (FBO)
- Maintenance, Repair and Operations (MRO)

Current uses of Zephyrhills Municipal Airport support recreational activities closely aligned with tourism. While those activities contribute economically to the local economies and add to the area’s quality of life, some economic activities may enjoy positive and diversified feedback loops—the more there is of one kind of service, the more there will be of related uses that rely on those initial set of services. For example, consolidated aircraft support services where light aircraft owners and leasers can one-stop shop their aircraft needs may have spillover effects. Businesses and public services may be attracted to use the airport on a more regular basis, increasing landing fee collection and generating new direct and indirect jobs.

In this Inside the Fence section, TBRPC focused on two highly related direct air support industries to illustrate how a tiered economic development approach may support greater job creation in the future. To do this, TBRPC uses the IMPLAN input-output model to calculate the direct and indirect impacts of either the hypothetical impact of a future Fixed-Base Operations (FBO) or Maintenance, Repair and Operations (MRO) firm on the County’s economy with the Zephyrhills area presumably being the primary beneficiary of this impact.

Because there are few FBOs and MROs in the Tampa Bay Area to compare in running the IMPLAN model, TBRPC ran a simultaneous analysis with the same assumptions in Pasco County but in Duval County. Since the air support industry is much more developed in Duval County, the economic “return” (jobs) is proportionately bigger in Duval County. TBRPC’s recommended strategy for developing an air services industry in the Pasco County focuses on identifying the occupational niches that exist in Duval County that will serve the economic development needs of maximizing the gains from Pasco training its workforce to meet the demands of the air support industry in Pasco.

Fixed-Base Operations

Fixed-Base Operations (FBOs) bundle support services for small, private aircraft, which are usually not operating as a scheduled airline and often operating on a membership, subscription, or contract basis. The bundle typically includes aircraft parking or hangar storage or both; refueling service (but not provision of fuel); flight planning and weather information; assistance in the
loading and unloading passengers, baggage and crew; assistance in aircraft turn-arounds and pre-flight checks; arrangement of ground transportation and accommodation; handling and arrangement of regulatory paperwork; as well as use of conference rooms and lounge facilities, often including showers, kitchenettes, and entertainment equipment.\(^7\)

**Maintenance, Repair and Operations**

Maintenance, Repair and Operations (MROs) provide maintenance and repair services, including installation of replacement parts, for aircraft. Services include parts bundled with maintenance and repair services, washing, cleaning, testing, and inspection services for aircraft.\(^8\)

**Economic Impact Simulation 1: Hypothetical Aircraft Services Impact in Pasco County**

What impacts do aircraft services have on the economy? Is investment in aircraft services good for Pasco County? In this section, TBRPC simulates the economic impacts of the contribution of a hypothetical FBO business located inside the fence of the Municipal Airport. Table 3.1 provides the summary results for jobs, personal income such as wages, and firm sales for a hypothetical FBO located in Pasco County employing 25 workers and generating about $8 million in sales.

**Table 3.1: FBO Economic Impacts in Pasco County**

<table>
<thead>
<tr>
<th></th>
<th>Jobs</th>
<th>Personal Income</th>
<th>Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct</td>
<td>25</td>
<td>$3,046,070</td>
<td>$8,127,234</td>
</tr>
<tr>
<td>Indirect</td>
<td>9</td>
<td>$414,729</td>
<td>$1,136,774</td>
</tr>
<tr>
<td>Induced</td>
<td>14</td>
<td>$523,987</td>
<td>$1,803,474</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>$3,984,786</td>
<td>$11,067,482</td>
</tr>
</tbody>
</table>


**Direct** jobs are jobs created by the FBO firm. **Indirect** jobs are jobs created in the County because they are part of the FBO’s supply chain. **Induced** jobs are jobs created by the household purchases of FBO and indirect firm employees. In this case, for every job the FBO creates, 0.9 jobs are created by increased personal consumption and the supply chain needs of the FBO.

**3.2 Outside the Fence: Aircraft Parts Manufacturing**

In the second tier of the Zephyrhills Aviation Cluster, industries that support aviation but do not require ongoing direct airfield access can be located in the Zephyrhills Airport Industrial Park. While most light aircraft manufacturers would look for sites with direct access to the landing strip, various related industries, such as engine manufacturers or parts manufacturers would not require direct access.

In Simulation 2, TBRPC looks at the impacts of a hypothetical aircraft parts manufacturer that would locate in the industrial park, investing $45 million in up to 100,000 square foot warehouse with equipment and supplies. Table 3.2 provides the summary results for jobs, personal income such as wages, and firm sales.

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\(^7\) https://www.census.gov/eos/www/napcs/finalized/web_4881_final_reformatted_edited_US082208.pdf

Economic Impact Simulation 2: Hypothetical Aircraft Parts Manufacturing Impact in Pasco Co.

Table 3.2: Aircraft Parts Manufacturing Economic Impacts in Pasco County

<table>
<thead>
<tr>
<th></th>
<th>Jobs</th>
<th>Personal Income</th>
<th>Value Added</th>
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</thead>
<tbody>
<tr>
<td>Direct</td>
<td>120</td>
<td>$4,065,818</td>
<td>$9,954,396</td>
</tr>
<tr>
<td>Indirect</td>
<td>33</td>
<td>$1,620,046</td>
<td>$2,656,420</td>
</tr>
<tr>
<td>Induced</td>
<td>14</td>
<td>$558,786</td>
<td>$1,098,911</td>
</tr>
<tr>
<td>Total</td>
<td>167</td>
<td>$6,244,649</td>
<td>$13,709,727</td>
</tr>
</tbody>
</table>

Source: IMPLAN, 2020

Direct jobs are jobs created by the aircraft manufacturing firm. Indirect jobs are jobs created in the County because they are part of the manufacturer’s supply chain. Induced jobs are jobs created by the household purchases of the manufacturer’s and supply chain’s employees.

Because the aviation industry is more developed in Duval County (Jacksonville, FL), it is useful to compare what happens when there are enough firms in the county aviation cluster to capture a larger share of sales and jobs than in areas where the cluster is relatively undeveloped.

While it is clear that aircraft parts manufacturing would create high paying direct and indirect jobs in Pasco County, more jobs would be created in areas with an existing aviation cluster. That is because a greater share of the sales from manufacturing activity would be circulated within the County, and captured by local firms. One area in Florida with a high clustering of aviation activities is in Jacksonville (Duval County), as shown in Section 2.1.

Simulation 3 compares the impact of the hypothetical parts manufacturer in Simulation 2 in Pasco County with the impact that firm would have in Duval County. Table 3.3 shows the impacts for both counties.

Simulation 3: Comparing Aircraft Parts Manufacturing Impact in Pasco County to Duval County

Table 3.3: Pasco Versus Duval County Aircraft Manufacturing Impacts

<table>
<thead>
<tr>
<th></th>
<th>Pasco County</th>
<th>Duval County</th>
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<tbody>
<tr>
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<td>Induced</td>
<td>14</td>
<td>$558,786</td>
</tr>
<tr>
<td>Total</td>
<td>167</td>
<td>$6,244,649</td>
</tr>
</tbody>
</table>

Source: IMPLAN, 2020

In this example, a hypothetical aircraft parts manufacturer with 120 direct employees generates more than three times the total personal income in Duval than in Pasco County, and twice the Value Added (a statistic showing the overall contribution of firms to the total size of the County economy).

That is because of two different kinds of impact that give Duval greater returns from this hypothetical investment. The first is that there are more firms in a Duval manufacturer’s supply chain, that is, the firms that make up a cluster. The total difference in jobs is not great—just 11 jobs, but clusters have a second impact which strongly influences the total jobs created by
households. That is, wages in Duval are higher than in Pasco. That is partly because technology and manufacturing clusters tend to bid up wages for employees, but some of the large differences ($88,000 in Duval versus $34,000 in Pasco) may because there is not enough aircraft parts manufacturing in Pasco to really compare, and the IMPLAN model uses an alternative wage average for the aircraft manufacturing industry when there is not enough industry specific data).

Regardless of the reason, however, the biggest different in job creation is in induced jobs, with aviation creating significantly more jobs in Duval County household related spending than in Pasco because wages are higher and therefore consumer spending is higher.

From TBRPC’s perspective, the most important take-away is that a developed aviation cluster can have extended ripple effects throughout the Pasco economy. **Developing a thriving aviation cluster in Pasco County can increase the employment multiplier effect.** But even with an airport and land, how does Zephyrhills and Pasco County build an aviation cluster?

4. **Building an Aviation Cluster: Robust Jobs Ecosystem and a Physical Anchor**

For thirty years, industry cluster approaches have helped guide economic development across the United States. Not all of the efforts to develop clusters have been successful, however. Unrealistic expectations, lack of sufficient focus on a target cluster and lack of sustained public sector and higher education support for the development of cluster are key reasons why cluster initiatives fail.

Because the gains from industry clusters are so large compared to gains from growth in industries without significant nearby supply chains and shared labor pools, there have been many efforts across the United States and abroad to develop industry clusters, with varying degrees of success. Building on those experiences as case studies, there have been several research reports on which factors most clearly account for the successful development of a cluster.

4.1 Success Factors for Cluster Development

The Brookings Institution conducted a study of how industrial clusters form and sets forth five key success factors for a cluster development initiative. Some factors are intangible, relating to the overall leadership of the community and the willingness of the community to invest resources in cluster development. Other factors include more tangible assets, such as location, workforce training and the cost of labor. Brookings Institution’s key factors are:

1. **Focused on establishing a robust ecosystem, not quick job gains.** Cluster initiatives must be focused on establishing a robust and regenerating ecosystem that produces the innovation, talent, and economic opportunities that firms need to thrive. These initiatives must be first and foremost about the growth and competitiveness of existing firms in the cluster (as well as the needs of related entities, like academic institutions), and not just on job growth.
2. **Industry-driven, university-fueled, government-funded.** The strongest cluster initiatives are private sector-driven, with interventions catalyzed by groups of firms that believe they will benefit by working collectively to fill gaps in the cluster ecosystem and staff with industry expertise and a collaborative mentality. Research universities provide needed innovation and talent, and public investment is critical. Federal, state, and local governments have made major investments to support each cluster initiative and give it early credibility.

3. **Placing a collective big bet on a unique opportunity.** The most successful cluster initiatives are in regions willing to place strategic bets on distinct cluster opportunities. These places have a long-term mindset and are unafraid to “pick winners” from the broad array of potential alternatives. They recognize that resources are scarce and competition is high, and that the only way to distinguish themselves is by funneling their energy and investment into a limited number of truly unique specializations.

4. **Championed by passionate, dedicated leaders.** Individual leaders have proven invaluable in championing each successful cluster initiative. These leaders typically emerge from businesses operating within the sector, driven by a new vision and clear purpose, and/or as CEOs of the lead cluster organizations. They are thought leaders who recognize a unique opportunity, have crafted a compelling narrative, and are willing to dedicate the time needed to launch and sustain a bold cluster initiative.

5. **Anchored by a physical center.** Most of the cluster initiatives profiled have created a physical center to serve as visible proof that the region is a major hub for the cluster and to provide a space that facilitates knowledge spillovers between firms, academic researchers, and related enterprises. While companies and assets involved in the cluster are often scattered throughout each region, these centers tie them together. These centers may take the form of a single building, an urban district, or a suburban campus. One note of caution: Though real estate development can play an important role in cementing a cluster that is already robust, it cannot create a cluster.⁹

In TBRPC’s analysis, points 2 through 4 are important discussion points for Zephyrhills and the Pasco Economic Development Council, and are beyond the scope of this analysis. In regards to point 5, the TBRPC has already established there is a physical center for the aviation cluster—the Municipal Airport and the adjacent industrial park.

### 4.2 Industries and Occupations of the Aviation Cluster

According to a TBRPC analysis of Quarterly Census of Employment and Wages collected by US Bureau of Labor Statistics, there are relatively few businesses that meet the criteria for aviation equipment manufacturing in the Tampa Bay area and about 26 firms that are in the FBO and MRO industries in the larger Tampa Bay region. Together, those FBO and MRO firms employ more than 2,200 workers in the Tampa Bay Area. The building blocks for MROs/FBOs do exist in the Tampa Bay Area and there is potential for aviation equipment manufacturing.

Building on the comparison between Pasco County and Duval County, the Florida county with the highest occupational concentration of the aviation cluster, as shown in Table 3.3 for economic impacts of an aircraft parts manufacturer, table 4.1 presents the value added chain (in sales)

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among industries in the supply chain of an aircraft manufacturer in both counties, based on direct spending of $38.8 million in annual sales—the sales amount TBRPC estimates it costs to sustain about 120 employees.

Table 4.1: Value Chain Sales for Aircraft Parts Manufacturing in Pasco and Duval Counties

<table>
<thead>
<tr>
<th>Top 25 Indirect Sales to Industries</th>
<th>Pasco County Sales</th>
<th>Duval County Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wholesale - Appliances and electrical and electronic goods</td>
<td>$513,924</td>
<td>$170,243</td>
</tr>
<tr>
<td>Wholesale - Machinery, equipment, and supplies</td>
<td>$435,692</td>
<td>$800,143</td>
</tr>
<tr>
<td>Truck transportation</td>
<td>$187,738</td>
<td>$229,484</td>
</tr>
<tr>
<td>Wholesale - Other durable goods merchant wholesalers</td>
<td>$168,825</td>
<td>$425,796</td>
</tr>
<tr>
<td>Custom computer programming services</td>
<td>$142,103</td>
<td>$511,199</td>
</tr>
<tr>
<td>Local government electric utilities</td>
<td>$111,303</td>
<td>$328,095</td>
</tr>
<tr>
<td>Management of companies and enterprises</td>
<td>$74,074</td>
<td>$609,805</td>
</tr>
<tr>
<td>Computer systems design services</td>
<td>$62,011</td>
<td>$129,366</td>
</tr>
<tr>
<td>Employment services</td>
<td>$58,561</td>
<td>$403,971</td>
</tr>
<tr>
<td>Other computer related services, including facilities management</td>
<td>$48,145</td>
<td>$171,949</td>
</tr>
<tr>
<td>Legal services</td>
<td>$34,394</td>
<td>$103,283</td>
</tr>
<tr>
<td>Data processing, hosting, and related services</td>
<td>$34,169</td>
<td>$238,781</td>
</tr>
<tr>
<td>Business support services</td>
<td>$31,516</td>
<td>$151,634</td>
</tr>
<tr>
<td>Management consulting services</td>
<td>$30,285</td>
<td>$61,719</td>
</tr>
<tr>
<td>Insurance carriers, except direct life</td>
<td>$28,934</td>
<td>$69,180</td>
</tr>
<tr>
<td>Architectural, engineering, and related services</td>
<td>$28,420</td>
<td>$115,716</td>
</tr>
<tr>
<td>Accounting, tax preparation, bookkeeping, and payroll services</td>
<td>$24,395</td>
<td>$79,105</td>
</tr>
<tr>
<td>Facilities support services</td>
<td>$22,394</td>
<td>$59,397</td>
</tr>
<tr>
<td>Securities and commodity contracts intermediation and brokerage</td>
<td>$17,976</td>
<td>$69,072</td>
</tr>
<tr>
<td>Other aircraft parts and auxiliary equipment manufacturing</td>
<td>*</td>
<td>$182,440</td>
</tr>
<tr>
<td>Monetary authorities and depository credit intermediation</td>
<td>*</td>
<td>$131,826</td>
</tr>
<tr>
<td>Investigation and security services</td>
<td>*</td>
<td>$128,791</td>
</tr>
<tr>
<td>Wholesale - Other nondurable goods merchant wholesalers</td>
<td>*</td>
<td>$70,352</td>
</tr>
<tr>
<td>Wired telecommunications carriers</td>
<td>*</td>
<td>$63,823</td>
</tr>
<tr>
<td>Warehousing and storage</td>
<td>*</td>
<td>$58,763</td>
</tr>
<tr>
<td>Sample Total</td>
<td>$2,054,858</td>
<td>$5,362,932</td>
</tr>
<tr>
<td>Indirect Sales Related to Manufacturing</td>
<td>$2,757,763</td>
<td>$6,878,769</td>
</tr>
<tr>
<td>Total Aircraft (Part) Manufacturing Sales</td>
<td>$38,800,000</td>
<td>$38,800,000</td>
</tr>
</tbody>
</table>


In nearly every step in the value chain, more sales occur in Duval County when compared to Pasco County. Table 4.1 tells us that of $38.8 million in aircraft part manufacturing sales, only $6.8 million of those sales are captured by Duvall County companies in the manufacturer’s supply chain with the rest going to out-of-county firms, even though its aviation cluster is relatively large by Florida standards. By contrast, $38.8 million in aircraft manufacturing sales in Pasco County would result in just $2.6 million in sales to supply chain firms in Pasco. If Zephyrhills and Pasco County desire to build an aviation cluster, these industries are a good place to start building the aviation cluster, because some companies already exist in Pasco.

Building an aviation cluster will also depend upon the availability of a trained workforce. Because there is a substantial base of workers in the aviation field, TBRPC has identified a list of the various occupations that are employed in the Aviation Cluster.
Occupations of the Aviation Cluster

The aviation cluster relies on many different kinds of occupations to build and maintain aircraft, as well as to fly passengers and cargo. Table 4.2 lists the most typical occupations in the aviation cluster, along with the average US hourly wage. Pasco based training programs can benefit from identifying existing expertise in these occupations as well as prioritizing training new entrants into the aviation industry. Table 4.2 also includes a Pasco County location quotient for each occupation, providing some guidance on future occupational targeting by the County and its workforce development partners.

Table 4.2: Typical Occupations of the Aviation Cluster

<table>
<thead>
<tr>
<th>Management Occupations</th>
<th>Pasco County Location Quotient</th>
<th>Average US Hourly Wage</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-1021 General and Operations Managers</td>
<td>0.739</td>
<td>$41.19</td>
</tr>
<tr>
<td>11-3051 Industrial Production Managers</td>
<td>0.549</td>
<td>$42.53</td>
</tr>
<tr>
<td>13-1028 Buyers and Purchasing Agents</td>
<td>N/A</td>
<td>$27.80</td>
</tr>
<tr>
<td>17-2112 Industrial Engineers</td>
<td>0.671</td>
<td>$39.26</td>
</tr>
<tr>
<td>17-2141 Mechanical Engineers</td>
<td>0.671</td>
<td>$39.76</td>
</tr>
<tr>
<td>41-4012 Sales Representatives, Wholesale and Manufacturing</td>
<td>0.65</td>
<td>$24.04</td>
</tr>
<tr>
<td>43-5061 Production, Planning, and Expediting Clerks</td>
<td>0.971</td>
<td>$21.43</td>
</tr>
<tr>
<td>43-5071 Shipping, Receiving, and Traffic Clerks</td>
<td>0.971</td>
<td>$14.45</td>
</tr>
<tr>
<td>49-3011 Aircraft Mechanics and Service Technicians</td>
<td>0.144</td>
<td>$27.04</td>
</tr>
<tr>
<td>49-9041 Industrial Machinery Mechanics</td>
<td>0.538</td>
<td>$22.42</td>
</tr>
<tr>
<td>49-9071 Maintenance and Repair Workers, General</td>
<td>1.055</td>
<td>$17.46</td>
</tr>
<tr>
<td>51-1011 First-Line Supervisors of Production and Operating Workers</td>
<td>0.816</td>
<td>$25.91</td>
</tr>
<tr>
<td>51-2011 Aircraft Structure, Surfaces, Rigging, and Systems Assemblers</td>
<td>N/A</td>
<td>$13.69</td>
</tr>
<tr>
<td>51-2041 Structural Metal Fabricators and Fitters</td>
<td>0.574</td>
<td>$15.23</td>
</tr>
<tr>
<td>51-2098 Assemblers and Fabricators, All Other, Including Team Assemblers</td>
<td>0.538</td>
<td>$15.24</td>
</tr>
<tr>
<td>51-4022 Forging Machine Setters, Operators, and Tenders, Metal and Plastic</td>
<td>0.574</td>
<td>$26.01</td>
</tr>
<tr>
<td>51-4031 Cutting, Punching, and Press Machine Setters, Operators, and Tenders</td>
<td>0.574</td>
<td>$14.49</td>
</tr>
<tr>
<td>51-4041 Machinists</td>
<td>N/A</td>
<td>$19.55</td>
</tr>
<tr>
<td>51-4081 Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic</td>
<td>N/A</td>
<td>$15.15</td>
</tr>
<tr>
<td>51-4111 Tool and Die Makers</td>
<td>N/A</td>
<td>$22.13</td>
</tr>
<tr>
<td>51-4121 Welders, Cutters, Solderers, and Brazers</td>
<td>N/A</td>
<td>$17.93</td>
</tr>
<tr>
<td>51-9061 Inspectors, Testers, Sorters, Samplers, and Weighers</td>
<td>N/A</td>
<td>$16.44</td>
</tr>
<tr>
<td>51-9198 Helpers—Production Workers</td>
<td>N/A</td>
<td>$11.93</td>
</tr>
<tr>
<td>51-9199 Production Workers, All Other</td>
<td>N/A</td>
<td>$14.80</td>
</tr>
<tr>
<td>53-7062 Laborers and Freight, Stock, and Material Movers, Hand</td>
<td>0.824</td>
<td>$13.07</td>
</tr>
</tbody>
</table>

Source: John Patten, Jeremy Stiles, Sally Avery. 2018. “Tennessee’s Aerospace and Defense Cluster”. Tennessee Department of Economic and Community Development. Location Quotients are from REMI representing the ratio of employees of that occupation in Pasco of all Pasco employees, compared to the US. LQs in italics are for related occupations where no exact data are available.
4.3 Key Takeaways from Cluster Analysis

In the preceding section, TBRPC showed that there are gaps in the value chains of aircraft manufacturing in general and in parts manufacturing in particular by contrasting the effects of a single firm’s growth in Pasco County versus the growth of that firm in Duval County. Moreover, the analysis also makes clear that an aviation cluster strategy is built on more than fostering the growth of aviation manufacturers.

Instead, as Table 4.2 shows, aviation manufacturing depends upon an **ecosystem** of related occupations, some jobs of which exist in abundance in Pasco County, others are found within commuting distance of the County, and others should be targeted for growth, just as any firm that belongs to the aviation manufacturing and services industry would be targeted.

In other words, an aviation cluster approach requires public and private convergence on investment in education as well as a broad perspective on which firms to recruit and which trades to emphasize in the region’s community colleges. Zephyrhills and its Pasco County partners would benefit from developing jobs in all of the fields described in Table 4.2, as they form the basis of both the aviation cluster but many different areas of manufacturing.

4.4 Space Requirements

Using data provided by Pasco Economic Development Council, an MRO employing 120 workers would need space of up to 100,000 square feet. Services and space needs, however, can vary greatly. In one case, an FBO sought a site with 275,000 square feet, 220,000 square feet for maintenance and modifications, and the rest as a 55,000 square foot painting facilities. Additional space would be required for parking and airside access, in addition to any land development codes of the City of Zephyrhills and the Federal Aviation Authority (if any).
5. Summary and Conclusions

Industry cluster development is not a short-term project. While the aviation cluster requires a general aviation airport, airports do not necessarily engender the development of a cluster. As the Brookings Institution report discusses, clusters arise out of public-private investment and partnerships. While there are federal grant programs, such as through the US Economic Development Administration, that may assist in bridging the public cost of private investment, an aviation cluster will need the attention of Pasco County, the Pasco County Economic Development Council, and the City of Zephyrhills to consistently engage with the area business community and with interested investors from other places to build on the foundation of the existing airport.

To recap Brookings Institution’s criteria for successful cluster development, there are five:

1. Focused on establishing a robust ecosystem, not quick job gains
2. Industry-driven, university-fueled, government-funded
3. Placing a collective big bet on a unique opportunity
4. Championed by passionate, dedicated leaders
5. Anchored by a physical center

With a few related firms, enough to form a kernel of an aviation industry in Pasco County, TBRPC recommends that the City of Zephyrhills and Pasco County build on their existing partnership to lay the groundwork for the physical anchor of a future aviation cluster at the Zephyrhills Municipal Airport. While there are federal grants through the US Economic Development Administration that can assist Zephyrhills, the partners should decide whether to strategically invest in attracting an aviation cluster that will be championed by passionate and dedicated leaders.

Conclusion

TBRPC’s analysis identifies the building blocks of an aviation cluster in the Zephyrhills Municipal Airport and surrounding future industrial corridor. The City of Zephyrhills should continue to engage further with their public partners, the Pasco EDC and the business community to develop strategies and initiatives designed to elevate awareness of business opportunities at the airport that can be used to attract aviation related industries. That need is beyond TBRPC’s immediate capacity to meet so therefore the TBRPC’s recommendation is that the City of Zephyrhills continue a conversation about future development of the airport area to reach a public consensus on next steps.