

Economic Impact of General Aviation in Canada 2017



Executive Summary

General aviation (GA) is a diverse industry in Canada that includes all civilian air operations associated with business aviation, helicopter operations, medevac, flight schools, personal business, personal leisure, fishing, agriculture, etc. In addition to providing an economic contribution to Canada through GA operations, the industry also plays a role in providing life-saving operations through Medevac, social connectivity for remote regions, training for pilots for commercial air service at flight schools, transportation of critical products and equipment, agricultural use and other various roles in a variety of industries.

General Aviation operations in Canada support diverse activities across many industries

General aviation activities in Canada are carried out by a number of different aircraft type, including:

- Fixed wing aircraft;
- Rotary aircraft; and
- Balloons, Gliders and Gyroplanes.

General aviation is defined as being everything but scheduled passenger service and military operations. For the scope of this study, the analysis includes all privately registered aircraft, and any commercially registered aircraft weighing under 12,500 lbs.

Based on Transport Canada's Civil Aircraft Register, there are a total over 32,200 GA aircraft in Canada.¹ The majority (87%) are fixed wing aircraft, numbering over 28,000. There are roughly 2,800 rotary aircraft, comprising 9% of GA aircraft and the remaining 4% are classified as balloons, gliders or gyroplanes accounting for over 1,300 aircraft in Canada.

Ongoing Economic Impact of General Aviation Operations

Economic impact is a measure of the spending and employment associated with a sector of the economy, a specific project, or a change in government policy or regulation. The three major components of economic impact are classified as direct, indirect and induced impacts. Together, these classifications serve as a basis for estimating the total economic impact of general aviation operations in Canada.

As shown in **Figure ES-1**, direct employment supplied by ongoing general aviation operations in Canada (e.g., pilots, crew, flight school instructors, dispatchers, engineers, fixed base operators, etc.) amount to 18,510 full-time equivalents (FTEs) of employment. The total direct wages of these employees is estimated to be





General Aviation operations in Canada support over 18,500 FTEs of employment nation-wide

¹ Source: Transport Canada Civil Aircraft Register (February 2017).

nearly \$1.4 billion. The total direct GDP generated by general aviation in Canada is estimated to be \$2.2 billion, while economic output is estimated to be \$5.4 billion.

Including multiplier impacts (indirect and induced); the total employment supported by general aviation activities in Canada is estimated to be over 35,600 FTEs, earning a total of nearly \$2.5 billion in wages. Total GDP is estimated to be \$4.2 billion, and economic impact is estimated to be nearly \$9.3 billion.

Figure ES-1: Direct, Indirect, Induced Economic Impact of General Aviation in Canada, 2016

| |  |  |  |  |
|--------------|---|---|--|---|
| Impact | Employment (FTEs) | Wages (\$ Billions) | GDP (\$ Billions) | Output (\$ Billions) |
| Direct | 18,510 | \$1.37 | \$2.21 | \$5.43 |
| Indirect | 11,000 | \$0.76 | \$1.20 | \$2.57 |
| Induced | 6,150 | \$0.35 | \$0.79 | \$1.27 |
| Total | 35,660 | \$2.47 | \$4.21 | \$9.28 |

Note: Totals may not add up due to rounding.

Economic Impacts per Aircraft

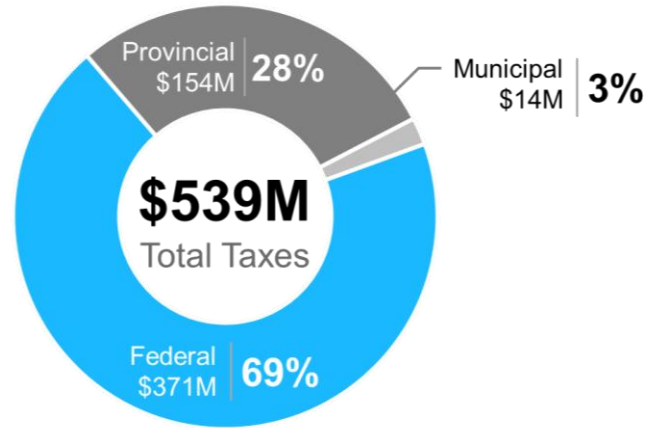
Aircraft used for general aviation purposes require a significant amount of resources to operate and maintain. Based on the analysis conducted, the total direct impacts discussed in Section 4.1, there are 18,510 FTEs of employment, generating \$1.4 billion in wages, \$2.2 billion in GDP and \$5.4 billion in economic output generated by the operations of over 32,200 GA aircraft in Canada. Thus, each aircraft *directly* generates 0.57 FTEs of employment, earning approximately \$42,400 in wages. This contributes \$68,500 in *direct* GDP and \$168,500 in *direct* economic output to the Canadian economy. Including multiplier impacts, operations of a single general aviation aircraft support labour hours for a *total* of 1.1 FTEs, earning \$76,600 in wages annually. Furthermore, the *total* GDP contribution of one general aviation aircraft is estimated at \$130,600 in GDP, while the *total economic output* is measured at \$287,900.

Annual Tax Impacts

Canada's general aviation operations are also an important generator of taxation revenues to all levels of government. Total taxes paid on an annual basis, by employers and employees working in general aviation, are estimated at \$539 million in 2016.

The majority of taxes collected (69%) accrue to the federal government, estimated to be \$371 million. The provincial government received an estimated \$154 million in tax revenues (28% of total). Municipal governments also benefit from general aviation through the collection of property taxes or payments-in-lieu of taxes amounting to approximately \$14 million paid by general aviation operations (3% of total), as shown in **Figure ES-2**.

Figure ES-2: Annual Estimated Tax Revenues of General Aviation Operations in Canada, 2016



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1 Introduction

1.1 Definition of General Aviation

There are over
350,000 GA
aircraft and
700,000 GA pilots
globally

General aviation (GA) is an umbrella term used for all civil aviation operations that are not scheduled air services, or unscheduled air services for hire. The most common GA activities include private aviation, business aviation, agricultural aviation and flight training. According to recent estimates by the International Council of Aircraft Owner and Pilot Associations (IAOPA),² there are more than 350,000 aircraft and 700,000 pilots worldwide who participate in the global GA community on an annual basis. In comparison, commercial aviation accounts for only 60,000 aircraft and 400,000 pilots. This demonstrates the vast size and significance of the GA sector, world-wide.

1.2 Canadian Owners and Pilots Association (COPA)

Founded in 1952, the Canadian Owners and Pilots Association (COPA) is a federally registered not-for-profit association that fosters the advancement of general aviation in Canada. As the leading voice for the flying community nationwide, its mission is to “*Advance, promote and preserve the Canadian freedom to fly*”.³ The organization has over 17,000 members and about 150 local chapters called “COPA Flights.”⁴ The oldest, COPA Flight #1 located in Guelph, ON, has been in operation for over 52 years. The association operates a number of programs on an on-going basis, which include fly-ins, training sessions, and their renowned scholarship program. COPA members receive a number of special benefits such as group rates on extended medical insurance and aircraft insurance. In addition, the association also releases a monthly magazine for its members. The publication is titled COPA Flight, and it highlights the latest news and trends in the industry.



COPA commissioned this economic impact study to gain a better understanding and grasp of the economic impact of GA in Canada. In addition, GA plays an important role in life-saving missions, providing social connectivity for remote regions, training for commercial pilots, transporting critical products and equipment, in addition to facilitating agricultural uses.

² General aviation statistics from the International Council of Aircraft Owner and Pilot Association (IAOPA) webpage

³ Information from the Canadian Owners and Pilots Association (COPA) webpage

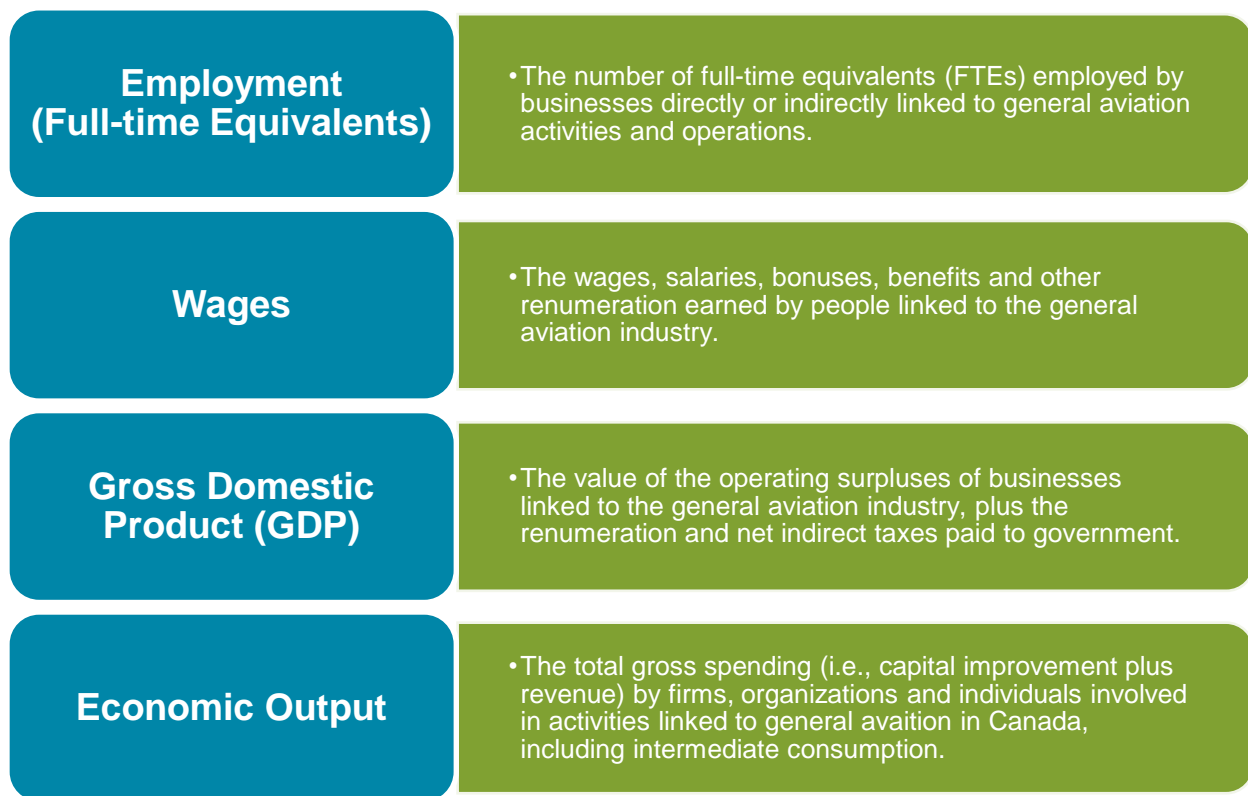
⁴ Canadian Owners and Pilots Association (COPA), 2015 Annual General Meeting Slideshow

1.3 Overview of Economic Impact

Economic impact is a measure of the employment, spending and economic activity associated with a sector of the economy, a specific project (such as the construction of new infrastructure), or a change in government policy or regulation. In this case, economic impact refers to the economic contribution associated with the ongoing operations and activities of general aviation operations and general aviation-related businesses in Canada.

Economic impact is most commonly measured in several ways, including employment, wages, Gross Domestic Product (GDP) and economic output, as summarised in **Figure 1-1**. Canada’s general aviation industry supports both the local economies where the aircraft are located, and the Canadian economy as a whole. The importance of the industry is highlighted by both the employment/wage impacts and the impacts on the greater economy, through both GDP and economic output.

Figure 1-1:
Measures of Economic Impact



1.4 Categories of Economic Impact

The three major components of economic impact are *direct, indirect, and induced impacts*, as described in the sections below. These distinctions are used as a base for the estimation of total economic impact of an industry. Each of these three components requires different tools of analysis. Employment impact analysis determines the economic impact in terms of employment created and salaries and wages paid out. In the case of general aviation in Canada, the direct, indirect, induced, and total full-time equivalents (FTEs) generated by general aviation-related activity are examined to provide an overview of the industry.

Direct Economic Impact

Direct impacts account for the economic activity of the target sector itself. It is the employment, wages, GDP and economic output that can be attributed to general aviation activities and operations. This includes activities by pilots, crew, flight school instructors, dispatchers, engineers and fixed base operators, aircraft maintenance activities, among others.

Indirect Economic Impact

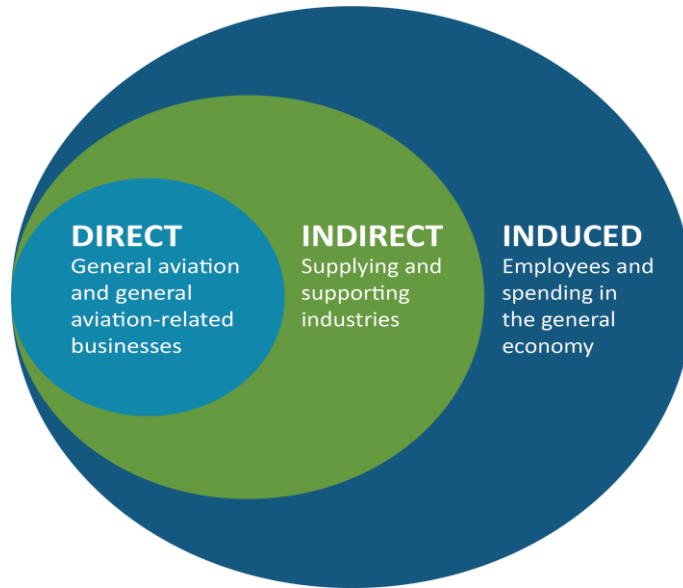
Indirect impacts are those that result because of the direct impacts. It is the employment, wages, GDP and economic output generated by down-stream industries that result from the presence of the general aviation industry. For example, these could include oil refining activities for jet fuel, companies providing accounting and legal services to aircraft operators, etc. Indirect employment is generated in industries that supply or provide services to the general aviation industry.

Induced Economic Impact

Induced impacts are economic impacts created by the spending of wages, salaries, and profits earned in the course of the direct and indirect economic activities. It captures the economic activity generated by the employees of firms directly or indirectly connected to the general aviation industry spending their wages in the national economy. This is often described as the “household” spending impact. For example, a pilot might spend his/her wages on groceries, restaurants, child care, dental services, home renovations and other items which, in turn, generates employment in a wide range of sectors of the general economy.

Total impacts are the sum of direct, indirect, and induced effects. These three categories of impacts are summarised in **Figure 1-2**.

**Figure 1-2:
Categories of Economic Impact Generated and Facilitated by General Aviation in Canada**



CASE STUDY

Langley Regional Airport, British Columbia

The Langley Regional Airport (YNJ) provides dedicated general aviation services to the Lower Mainland of British Columbia. Under the oversight of the Township of Langley since 1967, the airport has grown into one of the busiest rotary wing airports in the country, boasting 14 helipads (in addition to two runways) and a well-renowned concentration of leading helicopter businesses located onsite. Altogether, YNJ is home to over 350 aircraft, with capacity for up to 100,000 rotary and fixed-wing air traffic movements annually.

Everything in One Place

Located within driving distance from larger commercial airports (approximately 50 km from Vancouver International Airport and 20 km from Abbotsford International Airport), YNJ maintains a foothold in the local market by catering to the needs of general aviation users and the community as a whole. The airport is home to a business centre of 55 different firms – roughly 33 of which are helicopter-related – which are collectively capable of offering charters, flight training, hangar leasing and advanced MRO services for both rotary and fixed wing aircraft. Several industry-leading innovators including Vector Aerospace call YNJ home, attracting similar businesses and making the airport a hub for aerospace technology development.

YNJ's helicopter-centric infrastructure is developed with the local economy in mind. Rotary-wing aircraft often operate in niche markets where fixed-wing aircraft and other modes of transport cannot reach. As a result, they are well-suited to serve the predominantly agricultural and rural backdrop that characterizes the surrounding locale. Helicopter businesses at YNJ offer the following:

- Agriculture – crop spraying, greenhouse snow removal
- Health & Safety – air ambulance, RCMP air services, forest fire suppression
- Transport & Lifting – logging and industrial heavy lifting, pipeline and hydro patrol

The airport also supports community groups such as the Langley Aero Club and the Pacific Regional Cadets (Royal Canadian Air Cadets 746 Squadron and Air Cadets Gliding Program), and has served as the site for the 40,000+ ft² Canadian Museum of Flight since 1996. YNJ has hosted a number of major local events, with capacity to serve tens of thousands of visitors, and prides itself as a popular film production destination for both recurring television spots as well as feature-length motion pictures.

The airport and onsite businesses generate over \$70 million in revenue annually and support an estimated 870 employees.

2 Canada's General Aviation Industry

2.1 Industry Background

General aviation has played an important role in Canada's economy for decades. Apart from allowing individuals experience the joy of private flight, GA activities maintain and support a large amount of important infrastructure. Through the years, a dedicated industry has emerged that supports the needs of general aviation participants around the country. These organizations may be grouped into four main categories, as outlined below.



Airports

- There are currently 1,961 aerodromes in Canada. There are 26 NAS airports, 71 regional and local airports, 31 small and satellite airports, 13 remote airports and 11 Arctic airports (of which 3 are already included in the NAS airport total).
- The vast majority of Canada's airports receive no commercial traffic, and instead rely upon general aviation activities to support their operations. These smaller airports are often operated by the municipalities in which they are located, and generally cater to private flyers. The most common general aviation activities performed at airports are takeoffs and landings, parking and storage.

Source: Canadian Airports Council (CAC) webpage



Fixed-Base Operators

- Fixed-Base Operators, or FBOs as they are commonly known, provide integral support to the general aviation community. They are private companies that help alleviate some of the stress on airport infrastructure by offering their own private sector alternatives. There are currently over 70 fixed base operators in the country, spread over all of the country's 13 provinces and territories.
- Smaller FBOs are often found at regional and municipal airports, and they perform a variety of general services, including maintenance, refueling and storage. Larger FBOs generally cater to business aviation clients, and offer advanced services such as lounges, catering, and car rental desks.



Maintenance and Repair

Source: Research on data on FBOs in Canada was conducted by InterVISTAS Consulting, by reviewing industry directories, industry websites, and individual FBO websites.

- According to the Aerospace Industries Association of Canada, there are over 1,100 certified aircraft maintenance, repair and overhaul (MRO) organizations in the country. They collectively generate \$3 billion in economic activity and employ over 17,000 highly specialized workers.
- Unlike road vehicles, aircraft must meet comprehensive airworthiness standards to be allowed to operate. These maintenance, repair and overhaul organizations may be the original manufacturers of aircraft, or independent organizations that have specialized in working on certain types. Typical services performed by MROs include avionics upgrades, engine installations and airframe overhauls.

Source: Information from the Aerospace Industries Association of Canada (AIAC) webpage



Flight Schools

- Flight training refers to the acquisition and honing of airmanship skills through a combination of educational exercises performed both on the ground and in the air. According to the Canadian Owners and Pilots Association, there are currently over 370 flight schools in the country. To fly professionally, one must first acquire a Private Pilot's License (PPL), and then attain a Commercial Pilot's License (CPL).
- In order to attain a PPL, students must complete 40 hours of in-class ground school instruction and a minimum of 45 hours of flight training. CPL prerequisites include an additional 40 hours of ground school and a minimum of 200 hours of flying experience, among other requirements.

Source: Statistics from the Canadian Owners and Pilots Association (COPA) and Transport Canada webpages

2.2 Examples of Activities Facilitated by General Aviation

The existence of the general aviation industry makes it possible for private organizations to provide a number of services that help improve the lives of Canadians. The following are some examples that provide a brief glance at the importance of these activities.

Business Aviation

Business aviation plays an integral role in facilitating transportation of service, specialist employees and executives to further their business initiatives and operations in Canada and abroad. Business aviation in both fixed wing and rotary aircraft helps to improve worker productivity, customer service and retention, and also enhances supply chain performance across Canada.

Flight Training

Every year there are more than two thousand new Private Pilot Licenses (PPL) issued,⁵ and approximately 30% of those individuals will continue their studies to attain Commercial Pilot Licenses (CPL). The 30,000 CPL license holders in Canada perform a variety of activities that range from scheduled air transport services to flying essential supplies to rural communities. It is important to note that every pilot, including commercial and military pilots, must begin their training in the cockpit of a general aviation aircraft. Without a thriving general aviation industry, it would not have been possible to train Canada's highly skilled pilot workforce.

Medical Evacuation Services

Medical evacuation, or medevac, refers to the timely and efficient air transport of a patient to a hospital. In Canada, medevac services are commonly used to transport individuals in need of advanced medical care from rural communities to larger cities. Such flights are usually performed by private air carriers on contract with provincial governments, and would not be possible without the presence of general aviation infrastructure in Canada's rural communities.

Agricultural Aviation

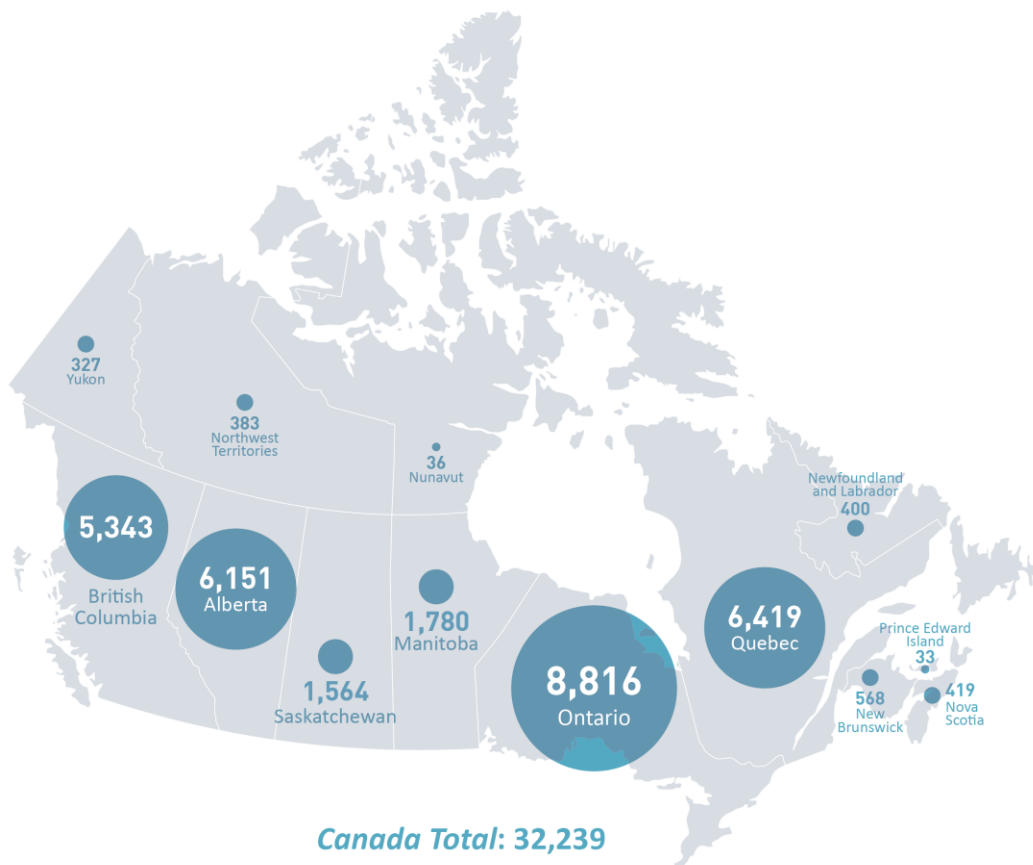
Agricultural aviation, or ag aviation as it is commonly known, refers to the aerial application of products to agricultural land by an aircraft. The most common activities in this industry include the spraying of pesticides and fertilizers by fixed-wing aircraft and helicopters. Ag aviation plays an integral part in today's high-yield agricultural model by helping farmers maximize the amount of crops they recover from a fixed amount of land. In addition, aerial application also decreases the amount of ground equipment needed in the growing process. This in turn minimizes the disturbance of the natural environment located near agricultural land.

⁵ Information from the Canadian Owners and Pilots Association (COPA) 2015 Annual General Meeting slideshow

2.3 General Aviation Aircraft in Canada

According to the data shown in **Figure 2-1**, there are currently 32,239 general aviation aircraft registered in Canada. The vast majority of these aircraft are located in the country's four largest provinces of Ontario, Quebec, Alberta and British Columbia.

Figure 2-1:
General Aviation Aircraft Registration by Province, 2016



Source: Statistics from the Transport Canada Aircraft Registry, aircraft weight is under 12,500 lbs.

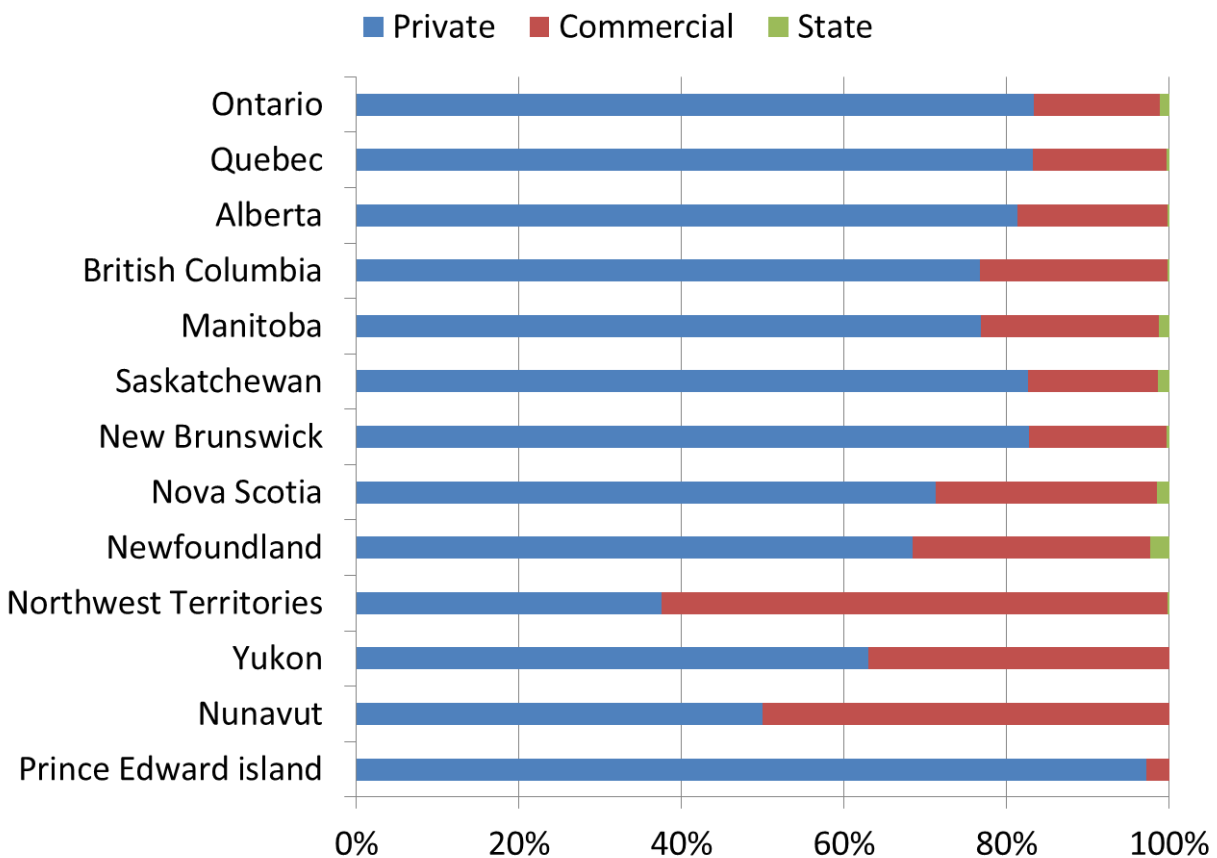
Aircraft may hold private, commercial or state registration. Each form of registration is unique, and allows the aircraft's operator to engage in a different set of activities. Private registration is available to both individuals and entities, and may be used for personal or business activities. For example, a privately registered aircraft may be used for recreational flights, and can also be flown by a business to transport its employees. Commercial registration is used mainly by entities who wish to operate their aircraft under

6 Information from the Canadian Aviation Regulations document.

an Air Operator Certificate (AOC). In the context of general aviation, the majority of commercially registered aircraft belong to flight training organizations. State registrations are only available for aircraft that are both owned and exclusively used in the services of a government in Canada.

As shown in **Figure 2-2**, 83% of all general aviation aircraft in Canada are registered privately, 15% are registered commercially and approximately 2% hold state registration.

Figure 2-2
General Aviation Registration Type by Province, 2016



Source: Statistics from the Transport Canada Aircraft Registry, aircraft weight is under 12,500 lbs.

General aviation aircraft are diverse in nature, and are often classified based on the type of engines they have. Following this method, the most common categories for general aviation are aircraft with reciprocating engines, turbojets, turboprops, turbofans and turboshafts. Finally, aircraft without engines fall under the glider category. Based on Transport Canada's Aircraft Register, 83% of general aviation aircraft have reciprocating engines, 8% have turboshafts and 4% have turboprops. The remaining 5% is split relatively evenly between turbofans, turbojets and gliders.



Reciprocating

- The large majority of general aviation aircraft in Canada use reciprocating engines. Commonly known as piston engines, they run on 100LL aviation gasoline and use a number of pistons to convert pressure into a rotating motion. Since they are relatively simple and inexpensive to maintain, they have proven to be the engine of choice for smaller private aircraft.
- Common examples of aircraft with reciprocating engines include the Cessna 172, Beechcraft Bonanza and Piper Cherokee.



Turboprop

- Turboprop aircraft have one or more gas-turbine engines that turn the propeller(s). These aircraft use Jet-A fuel as their source of power, and are able to fly further and higher than their counterparts with reciprocating engines. They have proven to be faster and more efficient as well, and have become the primary choice for non-jet business air travel.
- Two of the most common turboprop aircraft used in general aviation are the Cessna Caravan and the Beechcraft King Air.



Turbojet

- Turbojet aircraft are relatively rare in the area of general aviation due to their high operating costs. They use a gas turbine and propelling nozzle to provide thrust, and run on Jet-A fuel. Due to their operational inefficiencies, the majority of these aircraft have been replaced by turboprops on short distances, and turbofans on long distances.
- The most common examples of turbojet aircraft in general aviation operation today is the Aero L29.



Turboprop

- Most contemporary jet airliners are powered by turboprop engines. This engine type uses the combination of a ducted fan and turbine engine, and runs on Jet-A fuel. Compared to its predecessor, the turbojet, it is far more efficient in terms of fuel consumption and reliability. However, it has significantly higher maintenance costs due to its complexity.
- Examples of turboprop aircraft used in general aviation include the Bombardier Learjet and Embraer Legacy.



Turboshaft

- Turboshaft engines are mainly used by large helicopters. They are similar in operation to turbojets, but have been optimized to provide shaft power in favour of jet thrust. They are smaller, lighter, more reliable and more powerful than piston helicopter engines, which has positioned the turboshaft as the leading engine type for larger modern helicopters.
- Examples of helicopters commonly used in general aviation include the Eurocopter 130 and Bell 407.



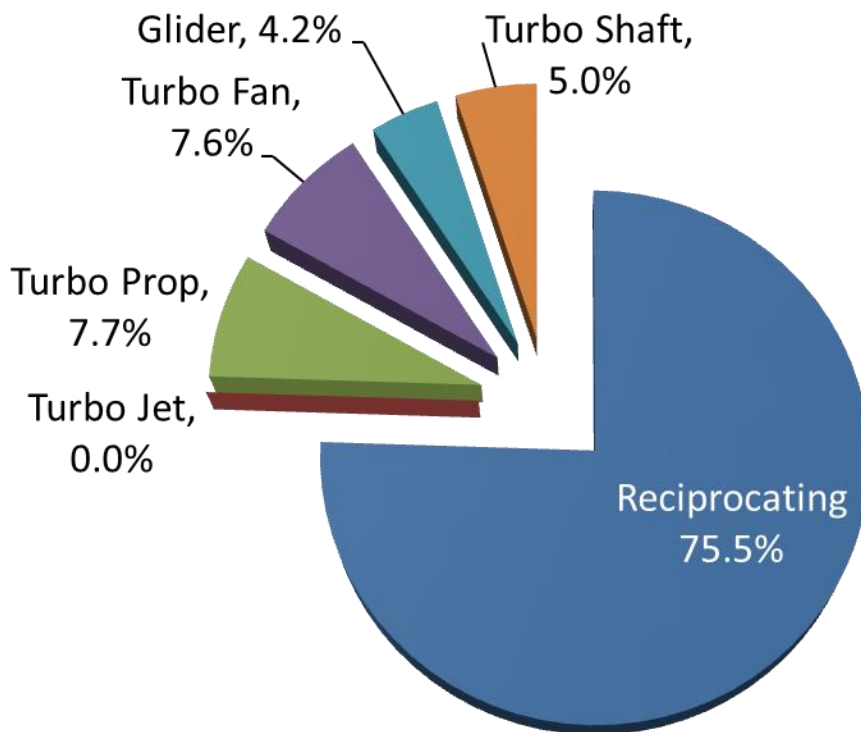
Glider

- Gliders are aircraft that do not have engines, and instead rely on lift that is created when air currents interact with their flight surfaces. They are most commonly used as recreational aircraft, but have also been utilized for military purposes in the past. In the latter half of the 20th century, motorgliders emerged as a popular cross-over between gliders and powered aircraft.
- Commonly used general aviation gliders include the Schweizer SGU series and the PZL PW-5.

2.4 General Aviation Hours Flown in Canada

When conducting research on general aviation activity, it is important to examine the number of hours GA aircraft are being used each year. This information will provide insight on the nature of the industry, and will also help determine the magnitude of the sector's impact on the Canadian economy. As outlined in **Figure 2-3**, the vast majority of Canada's general aviation activity is performed by aircraft with reciprocating engines. At 75.5% of the total sector, these aircraft flew a combined 510,700 hours in 2015. In comparison, the next largest group, turboprops, flew 51,900 hours that year. Turbofan activity totalled 51,400 hours, while turboshafts, gliders and turbojets accounted for 33,600, 28,700 and nearly 40 hours respectively.

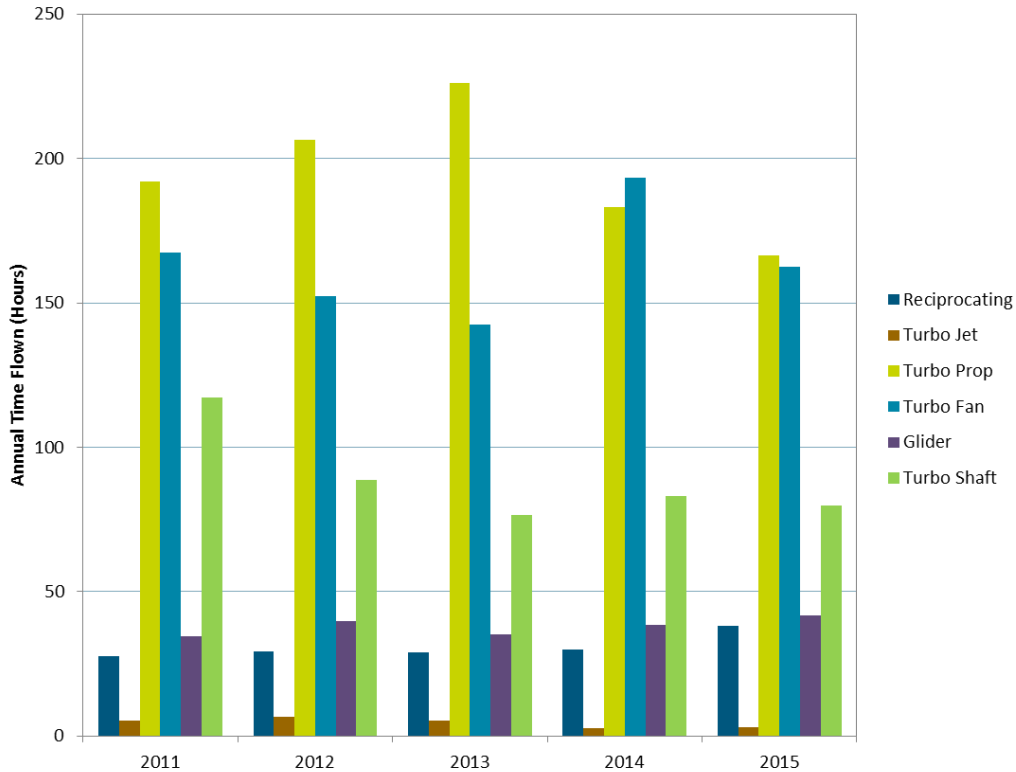
Figure 2-3:
Proportion of General Aviation Hours Flown by Engine Type, 2015



Source: Statistics from Transport Canada

It is also interesting to discover the difference in the utilization of these different aircraft types. As seen in **Figure 2-4**, the number of hours flown per aircraft in each given category ranges from as low as 3 hours per aircraft per year, to as high as 226 hours per year. Based on 2015 values, the highest utilization rate belongs to turboprop aircraft. On average, these aircraft flew 166 hours that year, down from the record value of 226 hours set in 2013. Turbofans flew an average of 163 hours each in 2015, showing a decrease of 31 hours from 2014. Turboshaft utilization has shown a relatively steady decline in recent years, currently averaging 80 hours per year. Turbojets, gliders and reciprocating aircraft flew an average of 3, 42 and 38 hours respectively. From this information, one may conclude that aircraft commonly used for commercial purposes, such as turboprops and turbofans, have higher utilization rates, while aircraft often used for private purposes, such as reciprocating aircraft, have lower usage.

Figure 2-4:
Average Annual Hours Flown per Aircraft by Engine Type, 2011-2015



Source: Statistics from Transport Canada

CASE STUDY

St. Andrews Airport, Manitoba

St. Andrews Airport (ICAO: CYAV) is a community-owned, 473-hectare operation located just outside of the City of Winnipeg. St. Andrews Airport serves the Rural Municipality of St. Andrews as well as the greater Winnipeg metro area, in conjunction with a variety of other commercial and general aviation airports including Winnipeg International Airport (approximately 30 km from St. Andrews), Lyncrest Airport (38 km), and Starbuck Airport (83 km).

CYAV opened in 1962 as a general aviation facility focused on relieving the Winnipeg International Airport of increased flight training and air traffic. The needs of general aviators are well accommodated at CYAV, which offers three paved 3000 ft. long runways, one parallel runway for training, one 1300 ft. grass strip available during the summer months, few traffic delays, pilot-controlled airport lighting, no landing fees for private aircraft, and no transponder requirement (as it is outside of Winnipeg's controlled airspace). Based on Nav Canada's 2014 measurements, CYAV welcomes approximately 96,000 aircraft movements each year – 64% of which are local movements (i.e. flights that remain in the vicinity of the airport and do not leave the air traffic control circuit), ranking the airport at sixth in the country for local air traffic.

In addition, St. Andrews Airport hosts approximately 26 aviation and non-aviation businesses, ranging from fixed-wing flight schools and MRO providers to environmental services and even a funeral home/crematorium. The property is an appealing site for small firms in any industry, offering no business tax while remaining only minutes away from Winnipeg and key attractions in the area. Currently, CYAV offers nearly 65,000 sq. meters of airside land ready for leasing and development, in addition to ground side lots.

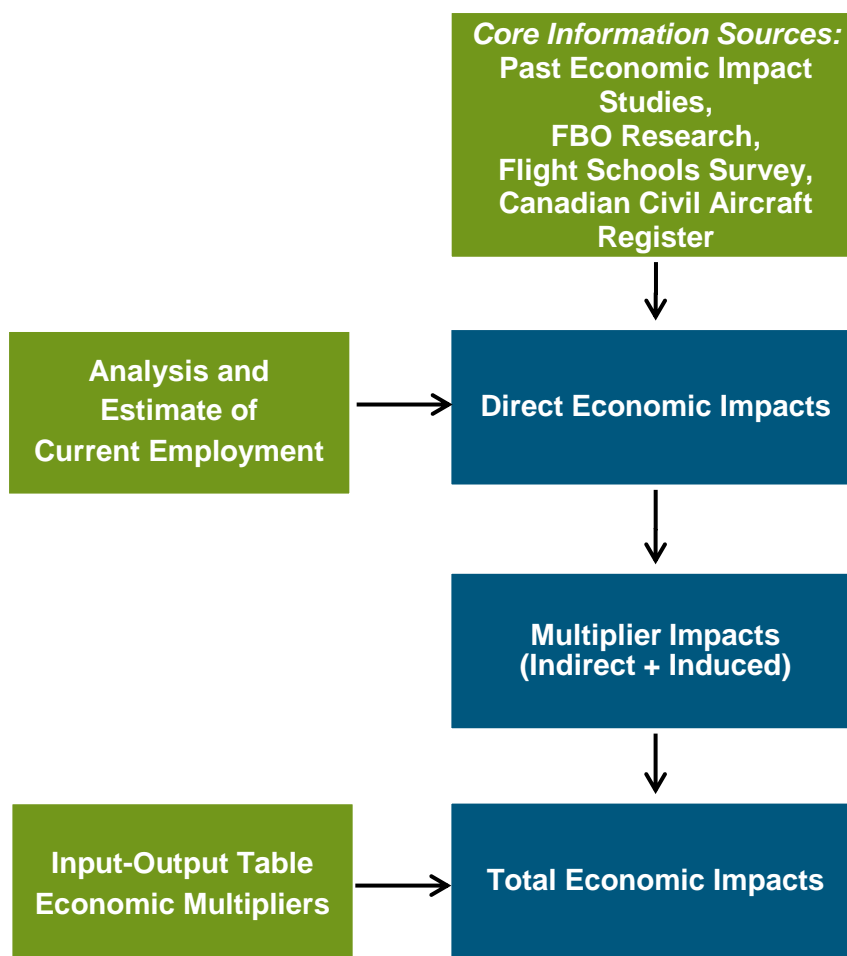
3 Methodology

3.1 Introduction

InterVISTAS conducted this economic impact study from November 2016-March 2017. The study estimates the economic impact of general aviation in Canada. A data driven methodology was applied to estimate the economic contribution of the industry. Reliable and recognised data sources were used as the basis for the analysis, and established quantitative techniques were used to generate the estimates.

The study methodology is summarised in **Figure 3-1**. The key elements are described in the sections below.

Figure 3-1: Study Methodology



3.2 Direct Impacts

The first step in estimating the direct impact of general aviation in Canada is to determine the current level of employment associated with general aviation operators and general aviation-related businesses. The methodology used to estimate the direct employment related to general aviation aircraft was to build the employment from the ground up by estimating the amount of employment that directly contribute to the operations and service each aircraft.

The estimated direct employment is comprised of the following categories:

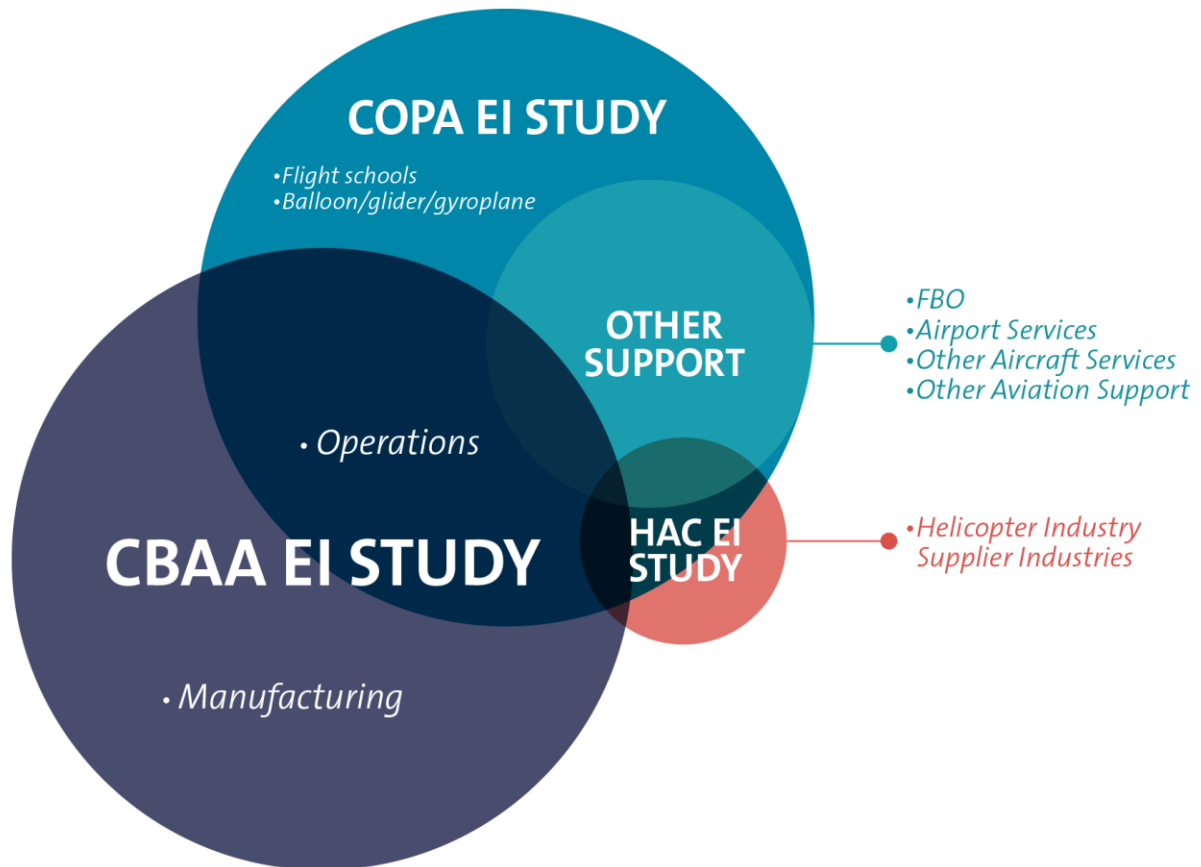
- **Business Aviation Operations – Fixed Wing & Rotary Operations**
Direct employment in this category was estimated using data from past economic impact studies for the Canadian Business Aviation Association (CBAA) and the Helicopter Association of Canada (HAC) that were undertaken by InterVISTAS Consulting. Both studies were reviewed extensively to remove any double-counting and to assess their applicability to general aviation.
- **Flight Schools & Fixed Base Operators**
Interviews were conducted with fixed base operators and online surveys distributed to flight schools to determine employment and gain a better understanding of their operations. Secondary research was also conducted to supplement the information obtained from interviews and surveys.
- **Balloon, Glider and Gyroplane Operations**
Using Transport Canada's Canadian Civil Aircraft Register, the total number of aircraft that are used for general aviation purposes was determined. Together with Transport Canada data on annual hours flown by aircraft provided by COPA and existing economic impact studies, direct employment estimates were developed on a per aircraft basis for all aircraft not captured in the CBAA and HAC studies and the flight school surveys, including balloons, gliders and gyroplanes.
- **Other Aircraft Support**
An estimate of other external aircraft support for general aviation aircraft in the area of maintenance and other support activities is also considered on a per aircraft basis. This employment ratio per general aviation aircraft is based on a review of past InterVISTAS studies as well as economic impact studies prepared by other consultants.
- **Airport Support Services & Other External Support Services**
Employment associated with support by airport management staff, Transport Canada and NAV Canada are also included in the computations. The provision for these services is based on InterVISTAS estimates and aircraft movements to ensure support services are taken account in the analysis.

Prior studies conducted for CBAA and HAC, combined with new research were key in estimating direct impacts

Figure 3-2 shows a Venn diagram of the different types of direct impacts and their information source.

Figure 3-2: Venn Diagram of Direct Impacts

DIRECT EMPLOYMENT IMPACTS OF EI STUDIES



Note: Diagram is not to scale.

3.3 Indirect and Induced Impacts

The indirect and induced impacts were estimated using *economic multipliers and ratios*, as is common practice for economic impact studies. In addition, the *direct* wage, GDP and economic output impacts were also estimated using economic multipliers.

These multipliers were based on the Input-Output model of the Canadian economy maintained by Statistics Canada. An Input-Output (I-O) model is a representation of the flows of economic activity within a region or country. The model captures what each business or sector must purchase from every other sector in order to produce a dollar's worth of goods or services. Using such a model, flows of economic activity associated with any change in spending may be traced either forwards (spending generating income which induces further spending) or backwards (purchases of meals leads restaurants to purchase additional inputs - groceries, utilities, etc.). By tracing these linkages between sectors, I-O models can

estimate indirect and induced impacts. These indirect and induced impacts are represented by economic multipliers, normally expressed as a ratio of total impacts (i.e., direct plus indirect plus induced) to direct impacts. Using the I-O model, multipliers can be produced for employment, income, GDP and economic output, normally expressed in terms of a unit of direct impact (e.g., per dollar of direct economic output).

The ratios and multipliers used in this study were based on the 2010 Input-Output multipliers maintained by Statistics Canada for each of the provinces. These were the most current I-O multipliers available at the time of the study. The economic ratios and multipliers have been updated to reflect current price levels, but no structural changes have been assumed. Multiplier impacts must be interpreted with caution since they may be illusory when the economy experiences high employment and output near industry capacity. When they are reported, it is recommended that the reader should be aware of the limitations on the use of multipliers. Mindful of these limitations, this study has undertaken multiplier analysis to estimate indirect and induced employment.

Great care must be exercised in choosing the appropriate set of multipliers to use. In addition, the use of multiplier analysis is limited by a number of factors, these being:

- the accuracy of the structure and parameters of the underlying model;
- the level of unemployment in the economy;
- the assumption of constant returns to scale in production;
- the assumption that the economy's structure is static over time; and
- the assumption that there are no displacement effects.

As with any model of a complex economy, I-O models have their limitations. For example, I-O models assume constant returns to scale (i.e., no economies or diseconomies of scale) and a fixed input structure with no substitution of inputs (e.g., one fuel type cannot be substituted for another). Furthermore, due to the large amount of data collection and analysis required, the I-O data can be released several years after the period on which they are based, so may not precisely represent current conditions. Nevertheless, I-O models are the most widely accepted and well-established means for estimating multiplier impacts and are based on data unparalleled in its detail and breadth.

3.4 Tax Revenue Impacts

InterVISTAS used the direct employment estimates to calculate the estimated tax impacts (government revenue) generated by general aviation operations in Canada. The tax revenue contributions to the federal, provincial, and municipal levels of government that are associated with general aviation operations are estimated. This includes taxes paid by employers and employees (such as payroll taxes and corporate taxes). Estimated tax revenues are for calendar year 2016. An estimate of aviation fuel taxes collected at the federal and provincial level are included in the analysis.

CASE STUDY

Drummondville Airport, Québec

Airports often serve as a nexus for commercial activity that extends far beyond aviation, and Québec's Drummondville Airport is no exception. Located halfway between Montréal and Québec City, with accessibility to several major Canadian and American markets, the city of Drummondville is strategically situated to drive economic growth throughout the region, making its general aviation airport a keystone for local business development.

Providing Comprehensive Services for Aviators

Though relatively small (generally less than 10,000 aircraft movements annually), Drummondville Airport's array of services and commitment to modernisation mimic those seen at larger operations.

Its features include:

- One 4,000 ft. paved runway
- The only seaplane base in Centre-du-Québec, including a platform and equipment required for releasing and collecting seaplanes.
- Customs services – Drummondville is a national airport of entry, offering on-call CBSA officers for general aviation aircraft carrying up to 15 passengers
- Storage services for fixed wing, rotary and sea aircraft
- Hangar rentals
- Land leasing and sales

Capital improvements are actively underway at Drummondville Airport and include expanding the runway, constructing new hangars, acquiring advanced technology equipment (e.g. precision navigation support), and developing plans for an onsite industrial centre focused on aeronautics.

Flying the Extra Mile for Businesses

The sky is the limit for businesses at Drummondville Airport, which encourages its tenants to “Viser plus haut.” A self-proclaimed “Source of Economic Development”, the airport is managed by the Drummondville Economic Development Authority (SDED), one of Québec's provincially and municipally funded local development centres (CLD) with a mandate to stimulate job creation and support entrepreneurship. SDED works with a network of nearly 500 companies and is capable of catering to onsite firms with value-added services such as business plan development, community relations assistance, and financial support. SDED also provides management consulting expertise in franchising and socio-economic and feasibility assessments. Regardless of the type of pursuit, SDED and the Drummondville Airport can provide the tools necessary to ensure “vos projets iront loin!”

4 Economic Contribution of Canadian General Aviation Operations

SUMMARY

- In terms of direct operations, Canada's general aviation industry generated 18,510 full-time equivalents of employment, and contributed \$2.2 billion in GDP in 2016.
- Together with indirect and induced impacts (suppliers and spending in the wider economy), 35,660 full-time equivalents of employment are generated by Canadian general aviation, and \$4.2 billion is contributed in national GDP.
- General aviation is also an important generator of taxation revenues, with approximately \$539 million paid by employers and employees in the industry, combined to all levels of government.

4.1 Direct Economic Impacts

Every aircraft in Canada used for general aviation has associated employment to support its operations. The operation of an aircraft requires pilots, dispatchers, engineers, fueling services and maintenance personnel, among others. The direct employment related to general aviation also includes some support overhead labour (e.g., managerial and administrative staff). The direct impacts of general aviation are largely related to the operations and servicing of the aircraft.

It is estimated that Canada's general aviation industry directly accounted for a total of 18,510 FTEs in 2016,⁷ as shown in **Figure 4-1**. These employees earn nearly \$1.4 billion in wages, thereby yielding an average of \$73,800 per FTE per annum. This reflects the quality and number of higher skilled positions that are supported by general aviation in Canada, particularly when compared to the national average annual wage of \$47,600 across all industries.⁸ **Figure 4-2** shows the breakdown of FTEs by job category.

In addition to employment and wages, general aviation operations directly contribute a total of \$2.2 billion to national GDP. Furthermore, direct employment from general aviation generates \$5.4 billion in direct economic output to the national economy. The estimates of wages, GDP and economic output were based on multipliers and ratios derived from Statistics Canada's Input-Output tables as described in **Section 3**.

⁷ One full-time equivalent (FTE) is equivalent to the number of hours that an individual would work on a full-time basis for one year. Full-time equivalent years are useful because part time and seasonal workers do not account for one full-time job. For purposes of this study, one FTE corresponds to 1,832 hours of annual work.

⁸ Based on Statistics Canada's December 2016 data on average hourly wages, and assuming 1 FTE = 1,832 hours. (<http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/labr69b-eng.htm>); (<http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/labr69a-eng.htm>)

**Figure 4-1:
Direct Economic Impacts of General Aviation in Canada, 2016**

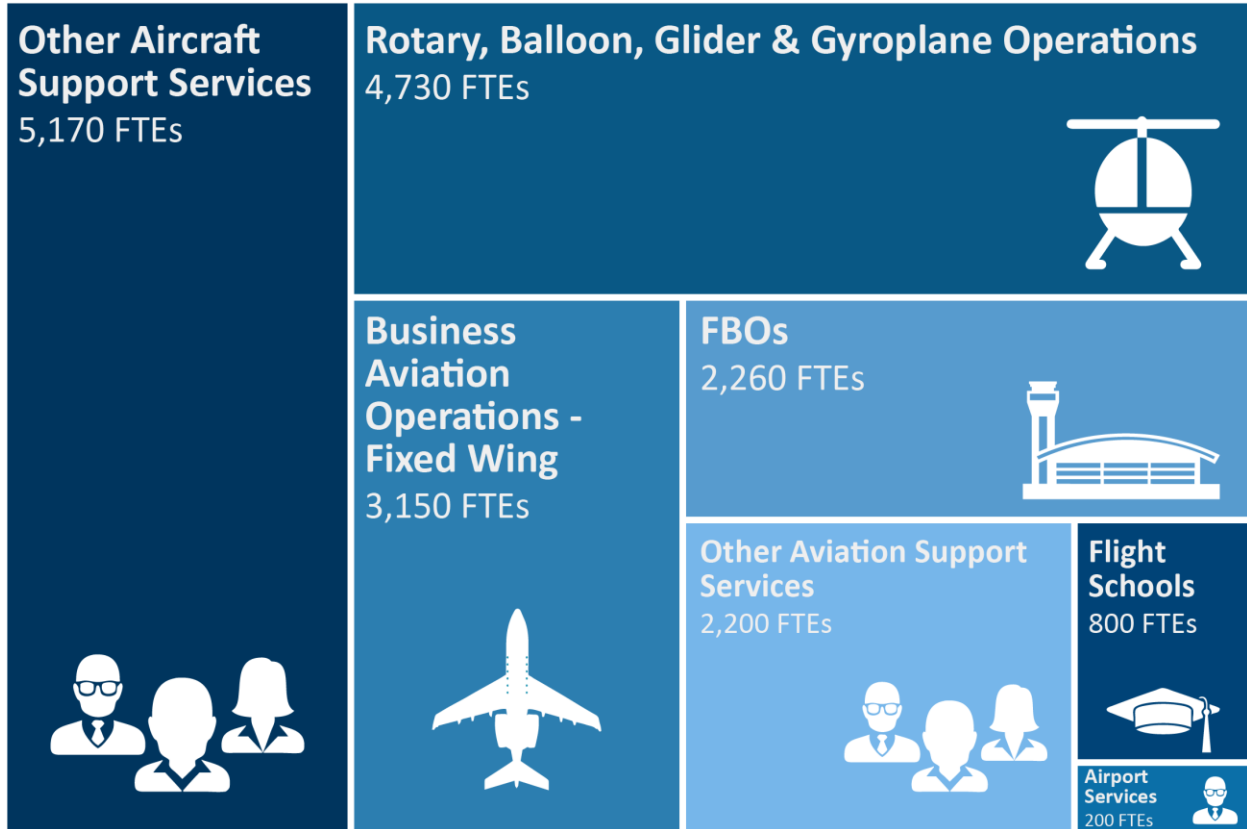
| Impact | Employment (FTEs) | Wages (\$ Billions) | GDP (\$ Billions) | Output (\$ Billions) |
|--------|-------------------|---------------------|-------------------|----------------------|
| Direct | 18,510 | \$1.37 | \$2.21 | \$5.43 |

As mentioned in **Section 3.2**, the direct employment associated with the general aviation industry is comprised of operations-related employment and support services. A breakdown of the direct employment provides insight into the different categories of employment related to general aviation activity. The following summary details direct employment of each category:

- **Other Aircraft Support Services** accounts for 5,170 FTEs with 28% of direct employment. This includes miscellaneous labour that may contribute to general aviation, e.g., aircraft servicing, heavy maintenance, etc.
- **Rotary, Balloon, Glider & Gyroplane Operations** accounts for 4,730 FTEs with 26% of direct employment.
- **Business Aviation Operations – Fixed Wing** accounts for 3,150 FTEs with 17% of direct employment. This includes pilots, dispatchers and in-house engineering associated with fixed wing business aviation operations.
- **Fixed Base Operators (FBOs)** accounts for 2,260 FTEs with 12% of direct employment. This includes all activity at FBOs related to general aviation, such as fueling services, ground handling, parking, etc.
- **Other Aviation Support Services** accounts for 2,200 FTEs with 12% of direct employment. This includes employment by Transport Canada and NAV Canada associated with general aviation activity.⁹
- **Flight Schools** account for 800 FTEs with 4% of direct employment. This includes flight instructors and other administrative staff.
- **Airport Services** account for 200 FTEs with 1% of direct employment. This includes employment by airport management staff required to support general aviation operations.

⁹ NavCanada direct employment is based on an estimated ratio of employee per GA movement. Information on total NavCanada employees is from <https://takecharge.navcanada.ca/infographics/NAVCAN-company-infographic-EN.pdf>. Transport Canada direct employment is based on an estimated ratio of employee per aircraft movement. Information on total Transport Canada employees is from https://www.tc.gc.ca/media/documents/corporate-services/DPR_2015-2016r.pdf.

**Figure 4-2:
 Breakdown of Direct Employment, by Job Category**



4.2 Indirect & Induced Economic Impacts

The total economic impact of general aviation throughout Canada extends far beyond its direct impacts. General aviation (GA) benefits other sectors of the economy, producing indirect impacts on businesses that supply the goods and services to the direct GA activities, as well as induced impacts resulting from direct and indirect employees spending their wages in the general economy. Thus, the total impact of Canadian general aviation is the sum of the direct, indirect and induced impacts. The indirect and induced impacts were estimated using economic multipliers derived from Statistics Canada’s Input-Output tables as described in **Section 3**.

Based on the application of economic multipliers, it was estimated that 11,000 indirect FTEs are related to general aviation activities. In other words, 11,000 indirect FTEs are generated in industries that supply the businesses directly related to GA operations. The wages associated with the total indirect employment are estimated at \$760 million per annum. Indirect GDP contribution is estimated at \$1.2 billion per year, while indirect economic output generated is estimated at nearly \$2.6 billion annually.





The induced employment is the result of demand for goods and services generated by wage earnings of those directly or indirectly linked to Canadian general aviation. The induced employment attributable to GA in 2016 is estimated at 6,150 FTEs, generating \$350 million per annum in wages. Further, GA supports \$790 million in induced GDP and nearly \$1.3 billion in induced economic output, economy-wide in Canada.

4.3 Total Economic Impacts

Figure 4-3 summarizes the direct, indirect and induced employment, wages, GDP and economic output attributable to Canada’s general aviation industry in 2016.

General aviation is a vital element of national infrastructure and an important facilitator of economic development. Including the activity directly related to general aviation operations and the multiplier impacts that flow from it, Canada’s general aviation industry contributes to the employment of over 35,600 FTEs across the country, earning nearly \$2.5 billion in total wages. Furthermore, general aviation contributes an estimated \$4.2 billion and \$9.3 billion, in total GDP and total economic output, respectively.

Figure 4-3: Direct, Indirect, Induced Economic Impact of General Aviation in Canada, 2016

| |  |  |  |  |
|--------------|---|---|---|---|
| Impact | Employment (FTEs) | Wages (\$ Billions) | GDP (\$ Billions) | Output (\$Billions) |
| Direct | 18,510 | \$1.37 | \$2.21 | \$5.43 |
| Indirect | 11,000 | \$0.76 | \$1.20 | \$2.57 |
| Induced | 6,150 | \$0.35 | \$0.79 | \$1.27 |
| Total | 35,660 | \$2.47 | \$4.21 | \$9.28 |

Note: Totals may not add up due to rounding.

4.4 Tax Revenue Impacts

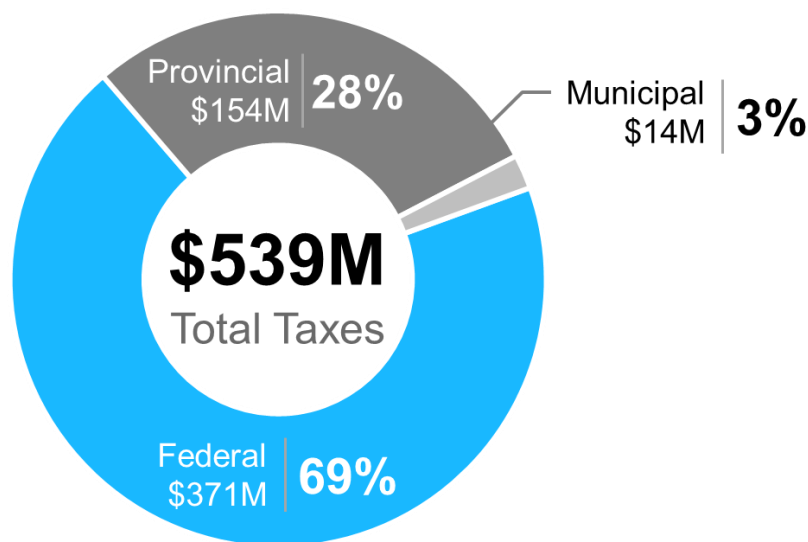
Along with contributing to the national economy, general aviation also contributes to government revenues through taxes. This includes revenues received by federal, provincial and municipal governments.

Taxes paid by direct employees and employers include wages and payroll taxes, corporate taxes and social insurance contributions (such as the employment insurance premiums) among others. Tax revenues also include property taxes or payments-in-lieu of taxes paid by the airport authorities to their respective municipal governments, if applicable. Sales and excise taxes on fuel are also estimated.

For the most part, this study estimates taxes paid based on information on the employers and employees in the GA industry. In a few situations, such as the corporate wages tax paid by employers, an approximate method was used to estimate taxes paid. In every case conservative methods were used.

The direct, ongoing economic activity of general aviation generated tax contributions to various levels of government, estimated to be in the order of approximately \$539 million.¹⁰ The federal government is the largest recipient of tax revenue, receiving \$371 million, as seen in **Figure 4-4**. The vast majority of that total is attributable to taxes paid by employers and employees such as personal income tax, corporate income tax, EI contributions and CPP contributions. The provincial governments received a tax revenue contribution of \$154 million. Municipal taxes are estimated to be \$14 million.

Figure 4-4: Annual Estimated Tax Revenues of General Aviation in Canada, 2016



¹⁰ Tax impacts are based on 2016 tax rates.

4.5 Economic Impacts by Province/Territory

The economic impact of general aviation is also calculated for each of the provinces/territories in Canada. The Province of Alberta had the most direct jobs, accounting for 24% of the total direct FTEs. The Provinces of Ontario and British Columbia comprised 22% and 18% of total direct FTEs, respectively, with Quebec following in fourth at 12%. The top four provinces (Alberta, Ontario, British Columbia and Québec) cover approximately 76% of the direct employment associated with general aviation operations in Canada.

76% of total direct GA employment in Canada occurs in Alberta, Ontario, British Columbia and Quebec

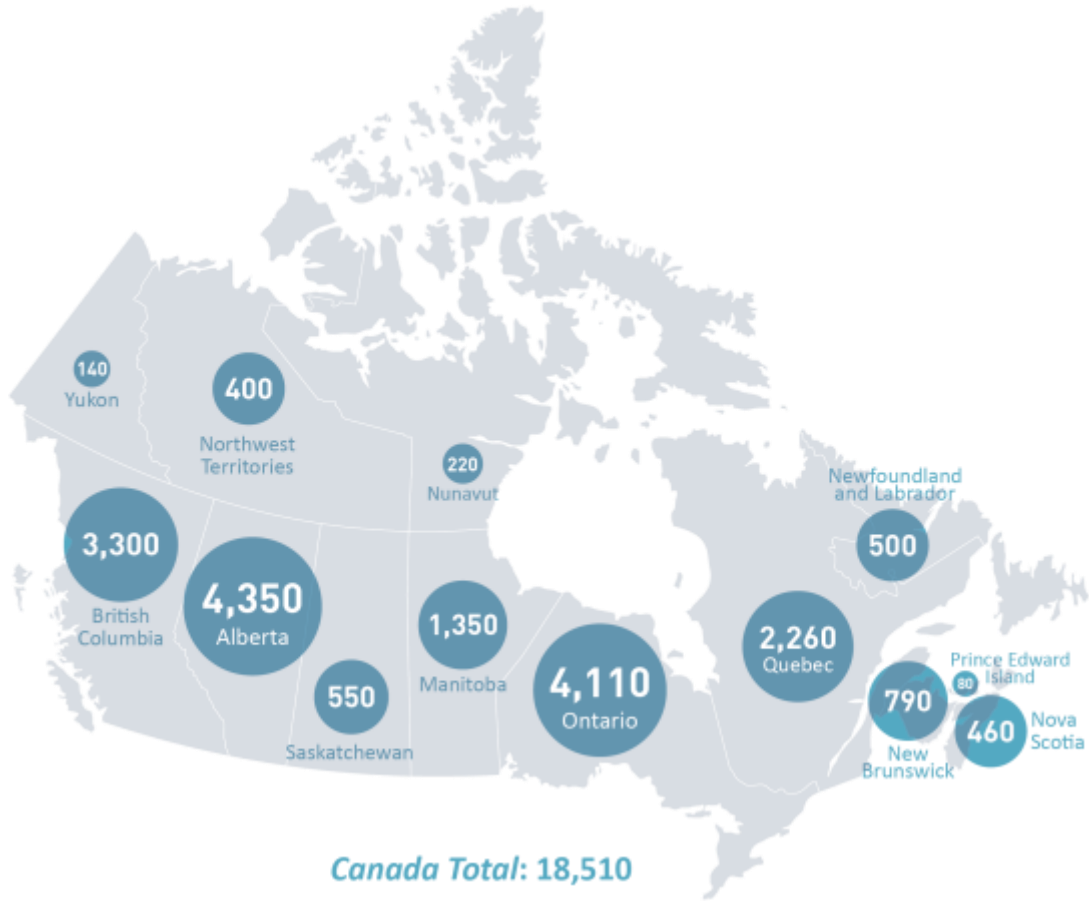
A map of the direct employment across the country is provided in **Figure 4-5**, while a breakdown of direct employment, wages, GDP and economic output impacts by province is summarised in **Figure 4-6**.

Annual tax contributions of general aviation operations in Alberta amount to \$142 million, comprising 26% of total tax revenues by general aviation in Canada. Ontario generated tax revenues of \$117 million (22% of the total) to all levels of government, while British Columbia generated tax revenues of \$86 million (16% of the total). Quebec made up 12% of the total tax revenues, equivalent to \$67 million. A breakdown of tax revenue by province is provided in **Figure 4-7**.





4.6 Impacts per Aircraft

Aircraft used for general aviation purposes require a significant amount of resources to operate and maintain. Based on the analysis conducted, the total direct impacts discussed in Section 4.1, there are 18,510 FTEs of employment, generating \$1.4 billion in wages, \$2.2 billion in GDP and \$5.4 billion in economic output generated by the operations of over 32,200 GA aircraft in Canada. Thus, each aircraft *directly* generates 0.57 FTEs of employment, earning approximately \$42,400 in wages. This contributes \$68,500 in *direct* GDP and \$168,500 in *direct* economic output to the Canadian economy. Including multiplier impacts, operations of a single general aviation aircraft support labour hours for a *total* of 1.1 FTEs, earning \$76,600 in wages annually. Furthermore, the *total* GDP contribution of one general aviation aircraft is estimated at \$130,600 in GDP, while the *total economic output* is measured at \$287,900.

Figure 4-5:
Map of Direct Employment (FTEs) of General Aviation in Canada by Province, 2016



**Figure 4-6:
Direct Economic Impacts of General Aviation in Canada by Province, 2016**

| |  |  |  |  |
|-------------------------|---|---|---|---|
| Province | Employment (FTEs) | Wages (\$ Millions) | GDP (\$ Millions) | Output (\$ Millions) |
| Alberta | 4,350 | \$375 | \$613 | \$1,423 |
| Ontario | 4,110 | \$298 | \$518 | \$1,304 |
| British Columbia | 3,300 | \$225 | \$315 | \$792 |
| Quebec | 2,260 | \$139 | \$273 | \$607 |
| Manitoba | 1,350 | \$88 | \$131 | \$310 |
| New Brunswick | 790 | \$48 | \$72 | \$187 |
| Saskatchewan | 550 | \$39 | \$58 | \$157 |
| Newfoundland & Labrador | 500 | \$39 | \$55 | \$126 |
| Nova Scotia | 460 | \$31 | \$46 | \$116 |
| Northwest Territories | 400 | \$35 | \$59 | \$207 |
| Nunavut | 220 | \$33 | \$43 | \$130 |
| Yukon | 140 | \$13 | \$17 | \$51 |
| PEI | 80 | \$4 | \$8 | \$23 |
| Total | 18,510 | \$1,366 | \$2,209 | \$5,434 |

Note: Totals may not add up due to rounding.

**Figure 4-7:
Tax Revenue Impacts of General Aviation in Canada by Province, 2016**

| Province | Federal (\$ Millions) | Provincial (\$ Millions) | Municipal (\$ Millions) | Total (\$ Millions) |
|-------------------------|--------------------------|-----------------------------|----------------------------|------------------------|
| Alberta | \$101 | \$39 | \$1.8 | \$142 |
| Ontario | \$82 | \$31 | \$3.4 | \$117 |
| British Columbia | \$61 | \$21 | \$3.4 | \$86 |
| Quebec | \$40 | \$25 | \$2.4 | \$67 |
| Manitoba | \$25 | \$11 | \$0.7 | \$36 |
| New Brunswick | \$13 | \$6 | \$0.8 | \$19 |
| Saskatchewan | \$11 | \$5 | \$0.6 | \$16 |
| Northwest Territories | \$9 | \$4 | \$0.2 | \$13 |
| Nova Scotia | \$9 | \$4 | \$0.2 | \$13 |
| Newfoundland & Labrador | \$8 | \$4 | \$0.3 | \$12 |
| Nunavut | \$8 | \$3 | \$0.2 | \$11 |
| Yukon | \$3 | \$1 | \$0.2 | \$5 |
| PEI | \$1 | \$1 | \$0.2 | \$2 |
| Total | \$371 | \$154 | \$14 | \$539 |

Note: Totals may not add up due to rounding.

CASE STUDY

Moncton Flight College, New Brunswick

Moncton Flight College (MFC) has been educating the world's future pilots since 1929. As the largest private flight school in Canada with a network of roughly 19,000 graduates dispersed globally, MFC is a key player in setting the industry standard for safety and professionalism – a responsibility that the institution does not take lightly. MFC possesses flight training unit (FTU), approved training organization (ATO) and approved maintenance organization (AMO) certifications from Transport Canada, and its courses are approved by the Civil Aviation Administration of China (CAAC) and other international organizations.

MFC's comprehensive courses and facilities ensure its students, whose careers will serve both commercial and general aviation, achieve proficiency beyond basic instruction and possess the ability to fly safely and efficiently. MFC addresses the total lifecycle needs of the professional pilot, from cadet to captain, by offering private and commercial pilot licenses along with other aviation studies such as flight and ground school instruction, safety management systems, crew resource management and air cadet training. MFC is one of a handful of training centres in Canada qualified to offer integrated pilot training programs.

MFC currently owns eight flight simulators and 46 aircraft including King Air C90Bs, Diamond DA20-C1 Eclipses, Piper Seminoles and Cessna 172s. Its fleet is maintained by an onsite staff of aircraft maintenance engineers, in accordance with strict company inspection policies that rise above the regulatory standards of Transport Canada.

The school is based out of the Greater Moncton International Airport in Dieppe, New Brunswick, with a second location at the Fredericton International Airport in Lincoln, New Brunswick. MFC offers the resources to train 450 students annually, supported by a staff of 55 and 190 personnel at the Moncton and Fredericton campuses, respectively. MFC offers courses to international students and is CAAC-approved to train prospective Chinese pilots, which comprise over 70% of its student body.

MFC's economic impact, by way of its sizeable professional workforce and mostly international student body, is well-respected within Canada. MFC has received funding from both the federal and provincial governments, including investments of over \$500,000 announced last year alone by the Atlantic Canada Opportunities Agency and Opportunities New Brunswick, which will be used to create 29 new full-time positions and purchase four state-of-the-art flight training simulators.

MFC plays an integral role in providing pilots, technicians and instructors with access to simulation, safety and other training services to ensure that any aircraft, whether for commercial, educational or recreational use, is operated to the highest level of excellence possible.


5 Summary of Results

5.1 Economic Impacts

It is estimated that Canada's general aviation industry directly accounted for a total of 18,510 FTEs in 2016,¹¹ as shown in **Figure 5-1**. These employees earn nearly \$1.4 billion in wages, thereby yielding an average of \$73,800 per FTE per annum. This reflects the quality and number of higher skilled positions that are supported by general aviation in Canada, particularly when compared to the national average annual wage of \$47,600 across all industries.¹²

In addition to employment and wages, general aviation operations directly contribute a total of \$2.2 billion to national GDP. Furthermore, direct employment from general aviation generates \$5.4 billion in direct economic output to the national economy.

Figure 5-1:
Direct, Indirect, Induced Economic Impact of General Aviation in Canada, 2016



| Impact | Employment (FTEs) | Wages (\$ Billions) | GDP (\$ Billions) | Output (\$ Billions) |
|--------------|-------------------|---------------------|-------------------|----------------------|
| Direct | 18,510 | \$1.37 | \$2.21 | \$5.43 |
| Indirect | 11,000 | \$0.76 | \$1.20 | \$2.57 |
| Induced | 6,150 | \$0.35 | \$0.79 | \$1.27 |
| Total | 35,660 | \$2.47 | \$4.21 | \$9.28 |

Note: Totals may not add up due to rounding.

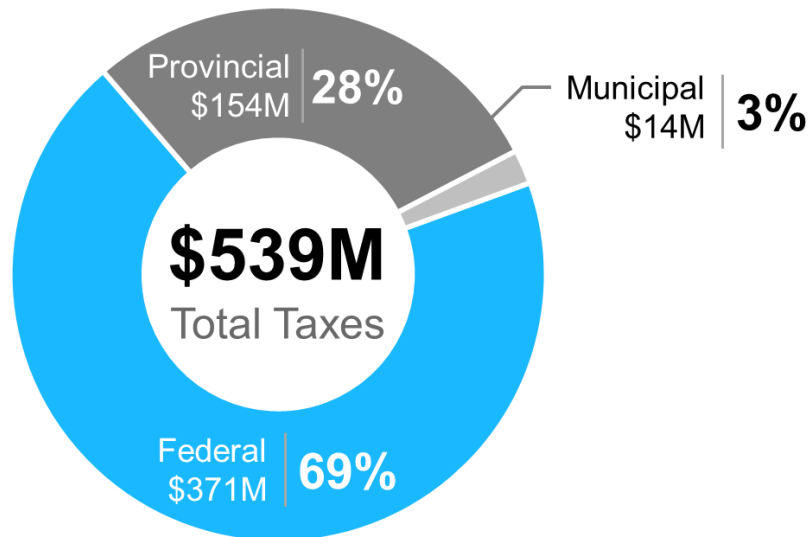
¹¹ One full-time equivalent (FTE) is equivalent to the number of hours that an individual would work on a full-time basis for one year. Full-time equivalent years are useful because part time and seasonal workers do not account for one full-time job. For purposes of this study, one FTE corresponds to 1,832 hours of annual work.

¹² Based on Statistics Canada's December 2016 data on average hourly wages, and assuming 1 FTE = 1,832 hours. (<http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/labr69b-eng.htm>); (<http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/labr69a-eng.htm>)

5.2 Tax Revenue Impacts

The direct, ongoing economic activity of general aviation generated tax contributions to various levels of government, estimated to be in the order of approximately \$539 million.¹³ The federal government is the largest recipient of tax revenue, receiving \$371 million, as seen in **Figure 5-2**. The vast majority of that total is attributable to taxes paid by employers and employees such as personal income tax, corporate income tax, EI contributions and CPP contributions. The provincial governments received a tax revenue contribution of \$154 million. Municipal taxes are estimated to be \$14 million.

Figure 5-2:
Annual Estimated Tax Revenues of General Aviation Operations in Canada, 2016



¹³ Tax impacts are based on 2016 tax rates.

CASE STUDY

Viking Air, Ltd., British Columbia and Alberta

One of Western Canada's most dynamic aerospace companies since 1970, Viking Air, Ltd. manufactures legacy de Havilland aircraft and related parts and systems for customers worldwide. Its operations are split between its headquarters, manufacturing, assembly, modification and repair facilities located at Victoria International Airport in Sidney, BC, and final aircraft assembly facility at Calgary International Airport. The Sidney and Calgary sites employ approximately 330 and 90 personnel, respectively.

Viking Air is a mainstay in the Canadian general aviation community, supplying versatile aircraft that are widely used for charter, training, military, emergency and resource management flights in a variety of environments. The company's bread-and-butter offering is the Viking Series 400 Twin Otter, a Viking Air update to DHC-6 Twin Otter and the best-selling next generation turboprop aircraft in its class. The aircraft is designed to be a rugged "short take-off and landing" (STOL) commuter, capable of carrying cargo and passengers into remote areas including ski and water-based locations; in 2001, one Twin Otter even performed an emergency evacuation flight for a critical patient from the South Pole under -60° C conditions. In addition to the Twin Otter, Viking Air provides manufacturing, leasing and MRO services for the entire DHC Series 1-7 fleet as well as contract parts manufacturing for Boeing, Bell Helicopter Textron, Lockheed Martin and Bombardier.

Viking Air's long-term success is measured by its ability to support a widening range of general aviation aircraft and grow its operations. In 2016, Viking Air purchased the manufacturing rights for all of Bombardier's amphibious aircraft and will also be responsible for support, parts and service of these planes. All tooling, parts and inventory for the water bombers, which includes the Bombardier 415 (the only western aircraft made specifically for firefighting), will be managed by an estimated 40 new personnel at a new 50,000 square foot facility at Calgary International Airport.

Further, Viking Air maintains a commitment to serve and develop the Canadian aerospace community including, for instance, the election of CEO David Curtis as the 2014-2015 Chair of the Board of the Aerospace Industries Association of Canada. In addition, Viking Air is an active member of several other organizations such as Canadian Business Aircraft Association, Aviation Alberta, Canadian Aviation Maintenance Council, Pacific Aircraft Maintenance Council and Canadian Association of Defense and Security Industries.

Appendix A: Glossary of Terms

Direct Employment: Direct employment is employment that can be directly attributable to the operations in an industry, firm, etc. It is literally a head count of those people who work in a sector of the economy. In the case of general aviation, all of those people who work in an aviation related capacity would be considered direct employment.

Economic Activity: (also Output, Production) The end product of transforming inputs into goods. The end product does not necessarily have to be a tangible good (for example, knowledge), nor does it have to create utility (for example, pollution). Or, more generally, the process of transforming the factors of production into goods and services desired for consumption.

Economic Output: (also Economic Activity, Production) The end product of transforming inputs into goods. The end product does not necessarily have to be a tangible good (for example, knowledge), nor does it have to create utility (for example, pollution). Or, more generally, it is defined as the process of transforming the factors of production into goods and services desired for consumption.

Employment Impact: Employment impact analysis determines the economic impact of employment in terms of jobs created and salaries and wages paid out. In the case of FBO's, the direct, indirect, induced and total number of jobs or person years created at the FBO is examined to produce a snapshot of its operations.

Full Time Equivalent (FTE): (also Person Year) One full time equivalent (FTE) year of employment is equivalent to the number of hours that an individual would work on a full time basis for one year. In this study, we have calculated one full time equivalent year to be equivalent to 1,832 hours. Full time equivalent years are useful because part time and seasonal workers do not account for one full time job.¹⁴

Gross Domestic Product: (GDP, also value-added) A measure of the value added by labour and capital services used to produce final goods and services, as a result of economic activity in the nation. This measure is net of the value of intermediate goods and services used up to produce the final goods and services.

Indirect Employment: Indirect employment is employment which results because of direct employment. For the FBO, it would include that portion of employment in supplier industries which are dependent on sales to the air transport sector. In some cases, contract work would be considered indirect employment.

Induced Employment: Induced employment is employment created because of expenditures by direct and indirect employees.

Multiplier Analysis: Analysis using economic multipliers in which indirect and induced economic impacts is quantified. Essentially, a multiplier number is applied to the "directly traceable economic impact" to produce indirect, induced and total effects (see Multiplier.)

Multiplier: Economic multipliers are used to infer indirect and induced effects from a particular sector of the economy. They come in a variety of forms and differ in definition and application. A multiplier is a number which would be multiplied by direct effects in order to calculate indirect or induced effects. In the case of the airport, as in many other cases, multipliers can lead to illusory results.

¹⁴ The Dictionary of Modern Economics, David W. Pearce, General Editor, The MIT Press, Cambridge Mass., 1984

Value-Added: (also GDP) A measure of the money value of final goods and services produced as a result of economic activity in the nation. This measure is net of the value of intermediate goods and services used up to produce the final goods and service.

Appendix B: Flight School Survey Example



Dear COPA Flight School Member,

Re: Completing the COPA 2017 Economic Impact Employment Survey

The Canadian Owners and Pilots Association (COPA) is currently undertaking an economic impact study of Canada's General Aviation industry. COPA has commissioned InterVISTAS Consulting Inc. to undertake this study. The results of the study will be used to raise awareness of the General Aviation industry's contribution to Canadian employment and economic activity.

We are seeking your cooperation to undertake this important study to allow us to learn more about the 238 flight schools in Canada and their economic impact within the General Aviation industry. We would ask that you participate in the attached employment survey. In order to keep this initiative on time and on budget, we request that you complete this survey as soon as possible.

The survey is available online at the following link; please click the link below to complete the short survey:

<http://s.giz.mobifs3/COPA-Members-Employment-Survey>

We appreciate that some of the information requested in the survey may be of a sensitive nature to your firm. Please be assured that InterVISTAS will maintain the confidentiality of your survey response, and that the completed surveys will not be viewed by any party other than the researchers at InterVISTAS. InterVISTAS will maintain the confidentiality of your survey response and will not provide individual firm results to COPA. Only aggregate survey totals will be provided in the final report. The published document will not reveal employment figures or other data for any individual firm.

The economic impact survey is under the supervision of Doris Mak, Vice President, Special Projects at InterVISTAS Consulting. Should you have any questions regarding the study, please contact her at 1-877-717-6246 (ext. 1838). Should you have any questions or concerns about the study or if you would like more information on the purpose and scope of the project, please contact me directly, at 1-613-236-4901.

Thank you very much for your time and for being a COPA member!

Bernard Gervais
President and CEO



Canadian Owners and Pilots Association
Members Employment Survey

December 2016

As a member of the Canadian Owners and Pilots Association, we are interested to learn more about your flight school in the assessment of the economic impact of Canada's General Aviation industry. The figures you provide in the following sections are strictly confidential and will be viewed only by InterVISTAS Consulting and reported only in an aggregate form. For the purposes of this study, it is important that the figures you provide are as accurate and current as possible.

Name of Firm: _____

Address of Firm: _____

City, Province: _____ Postal Code: _____

Contact Person: _____ Phone Number: _____

Email: _____

When answering the questions below regarding your business, please include all related subsidiary businesses.

Q1. Your Flight School Background

| | |
|---|--|
| Total Number of Aircraft at Your Flight School in 2016 | |
| Total Number of Hours Flown in 2016 | |
| Total Number of Students Enrolled at Your Flight School in 2016 | |
| Total Number of Instructors at Your Flight School in 2016 | |
| Average Number of Hours per Instructor in 2016 (Classroom Instruction and Flight Time) | |

Q2. Total Employment

Please state the total number of employees you have at present. **This figure should include all full time, part time and seasonal work but should not include employment for work done on contract.**

| | |
|---|--|
| Total Number of Employees: (as of December 2016) | |
|---|--|



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Q3. Part-Time and Full-Time Employees

The sum of the permanent and seasonal employees listed in Q3A and Q3B should equal the number of total employees in Q2.

A. Permanent Employees: A permanent employee is one that works year-round. In reference to the number of total employees in Q2, how many are full-time and how many are part-time?

| | |
|---|--|
| Number of Full-Time <u>Permanent</u> Employees: | |
| Number of Part-Time <u>Permanent</u> Employees: | |
| Total <u>Permanent</u> Employees: | |

For part-time employees, on average, how many hours per week will they work this year?

| | |
|-------------------------|--|
| Number of Weekly Hours: | |
|-------------------------|--|

If it is difficult to obtain this information or if there is great variation, you may provide a range of weekly hours (i.e., less than 10 hours, 10-15 hours, etc.).

B. Seasonal Employees: A seasonal employee is one that is hired for work during peak or specific time periods only. In reference to the number of total employees in Q2, please indicate how many are seasonal full-time and part-time employees (2016)?

| | |
|--|--|
| Number of Full-Time <u>Seasonal</u> Employees: | |
| Number of Part-Time <u>Seasonal</u> Employees: | |
| Total <u>Seasonal</u> Employees: | |

For seasonal workers, on average, how many **weeks** will they work this year (2016)?

| | |
|---------------------------|--|
| Number of Weeks Per Year: | |
|---------------------------|--|

For seasonal workers, on average, how many **hours per week** will they work this year (2016)?

| | |
|-------------------------|--|
| Number of Weekly Hours: | |
|-------------------------|--|

If it is difficult to obtain this information or if there is great variation, you may provide a range of weekly hours (i.e., less than 10 hours, 10-15 hours, etc.).



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Q3. Employment by Occupation

Please estimate below the number of employees included in Question 2 that are in the following occupation categories. *The figures entered below should sum to the same total as Question 2 or sum to 100%.*

| Employment by Occupation | Number of Employees |
|---|---------------------|
| General | |
| Managerial/Supervisory | |
| Clerical | |
| Craft Trades (<i>Electricians, Steam Fitters, etc.</i>) | |
| Airline & Airline Servicing Trades | |
| Pilots/Instructors | |
| Aircraft & Vehicle Mechanics | |
| Aircraft Servicing | |
| Other (<i>Please specify</i>) | |
| | |
| | |

Q4. Location of Employment in Canada

Please indicate the number or % of employees by province or territory.

| Province/Territory | Number or % of Employees | Province/Territory | Number or % of Employees |
|-------------------------|--------------------------|-----------------------|--------------------------|
| British Columbia | | New Brunswick | |
| Alberta | | PEI | |
| Saskatchewan | | Nova Scotia | |
| Manitoba | | Yukon | |
| Ontario | | Northwest Territories | |
| Quebec | | Nunavut | |
| Newfoundland & Labrador | | | |



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Q5. Outsourcing and Contracting Out

Since we do not want to exclude any employment, we would like you to briefly comment on whether your firm contracts out any important services.

A. Individuals on Contract. If you pay some individuals through a contract, as opposed through payroll, please indicate the number of such employees.

| | |
|--------------------------------------|--|
| Number of Contract Employees: | |
|--------------------------------------|--|

Of these employees on contract, how many **weeks**, on average, will they work this year? And, on average, how many **hours per week** do they work?

| | |
|----------------------------------|--|
| Number of Weeks Per Year: | |
| Number of Weekly Hours: | |

B. Firms on Contract. Do you contract any work out to other firms? For example, aircraft maintenance, fuelling, janitorial services, ground handling, etc.

- No.** (continue to next question)
- Yes.** If yes, please complete the following table indicating the functions you contract out to other firms and an estimate of the annual hours on contract. Also include the names of the firms you use so we can ensure that we do not double count any work performed by other firms that we are surveying as a part of this study.

| Function | Name of Firm | Estimated Number of Hours Performed by Firm in 2016 |
|----------------------------|-------------------------------|---|
| <i>Example: Janitorial</i> | <i>Spic and Span Cleaners</i> | <i>100 a year (2 hours per week)</i> |
| | | |
| | | |
| | | |
| | | |

Q6. During which seasons do you operate? (check all that apply)

- Spring Summer Fall Winter



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**Thank you for your assistance in completing this survey.
Please complete this survey online in the link provided,
or return this survey by email or by fax to:**

Attention: Celina Estrella
celina.estrella@intervistas.com
Fax: (604) 717-1818

If you have any questions, please call Celina at 1-877-717-6246 (ext. 1873)



Prepared by

InterVISTAS Consulting Inc.

Airport Square – Suite 550

1200 West 73rd Avenue

Vancouver, BC

Canada V6P 6G5

Telephone: +1-604-717-1800

Facsimile: +1-604-717-1818

www.intervistas.com