# The Canadian Aerospace Industry: 2012

## Part A: Market Overview

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# 1.0 EXECUTIVE SUMMARY

Following are some the **key highlights** of this overview of the Canadian aerospace industry:

- The Canadian Aerospace industry had total 2011 revenues of $ 22.4 Billion, representing **1.6 % of Canada's total GDP** of $1.414 Trillion in 2011.
- The Canadian aerospace industry is **largely export-based**, with an estimated $16.4 Billion in revenue (or 73% of total aerospace revenues) generated from sales to foreign markets in 2011. Overall, the largest foreign market for Canadian aerospace products and services is the U.S. accounting for an estimated $9.9 Billion in revenues (or 60.1% of total industry exports).
- Total employment in the sector totals 87,231. **Canada currently ranks fifth in world aerospace industry output**, behind the U.S., France, the U.K., and Germany.
- The **14 largest aerospace firms in Canada generate the majority of aerospace jobs**, totalling 51% of total sector jobs. Some of the largest firms active in the Canadian aerospace sector, and briefly profiled in this report, include: Bombardier, Bell Helicopter Textron, CAE, Honeywell Canada, Héroux Devtek, Magellan Aerospace, Mechtronix, Messier-Dowty, Pratt & Whitney Canada, StandardAero and Thales Canada.
- The Canadian aerospace industry in **concentrated in the Province of Quebec**, which accounts for 63.3% of total national aerospace revenues in 2011, or $14.2 Billion in total revenues. Ontario comprises the second-largest component of the industry, with 21%, or $4.7 Billion. Western Canada follows with 12%, or $2.7 Billion, with the remaining 4%, or $ 0.9 Billion in revenue located in Eastern Canada.
- **Montreal i**s the hub of Canada's largest aerospace cluster and is renowned for its expertise in aircraft fabrication and assembly, engine manufacturing, MRO, avionics, and landing gear. Montreal is home to more than10 aerospace research centres
- **Ontario** contains Canada's second-largest aerospace cluster, in the **greater Toronto area (GTA)**, with over 200 firms employing more than 20,000 skilled employees. Ontario has key strengths in aircraft parts manufacturing, aircraft systems and MRO.
- **Winnipeg** is the largest aerospace cluster in Western Canada and a major centre in North America for the manufacturing of composite aircraft components and aircraft MRO. It is the location of Boeing's composite manufacturing plant, the largest such facility in North America.
- **Italian – Canadian trade** in the aerospace sector has resulted in a positive trade balance in favour of Canada in every year measured, but with imports from Italy generally rising over this period while exports from Canada declined significantly, **thus narrowing the trade balance from $385 Million in Canada's favour in 2007 to just $85 Million by 2011, a reduction of over 80%**.
- In terms of the **total Canadian trade balance** in the aerospace sector, Canada has enjoyed a substantial net positive trade balance over the entire 2007-2011 period, ranging from a low of $ 2.8 Billion in 2008, to a high of $ 4.2 Billion in 2010.
- In terms of percentages**, Italian aerospace imports accounted for 1.31% of total imports into the Canadian aerospace sector in 2011**, while Canadian exports to Italy accounted for 1.54% of all of its exports in the aerospace sector.
- In general, Canadian aerospace exports to Italy have been trending downward and **Italian exports to Canada have been trending upward** over the 2007 to 2011 period.

# 2.0 HISTORICAL OVERVIEW OF AERONAUTICS IN CANADA[1]

In 2009, Canada marked the 100th anniversary of its first airplane flight. In February 1909, a pioneer by the name of J.A.D. McCurdy took to the sky in a frail-looking biplane called the Silver Dart. Young McCurdy and Canada's tiny aviation community never looked back, and as a result, their daring achievement led to the development of a whole new industry — Canada's aerospace industry.

How did a country with a population of 7 million in the early 20th century become the fifth nation in the world in the field of aerospace[2]? How did it manage to attract, develop and hang on to global leaders like Bell Helicopter Textron, Pratt & Whitney Canada and Bombardier? How did an enterprise like CAE become a world leader in civil simulation, with more than 70% of the market? How can a country as small as Canada have such a glorious jewel in its crown?

### Canadian Aviation Industry: Origins through World War Two

To find the answers to these questions, one must go back in time. Shortly after McCurdy's flight, World War I saw Canada's aviation industry take off. Almost overnight, Canada became a training ground for British pilots and, as quickly, a manufacturer of training planes. This led to the creation of Canadian Aeroplanes Limited, a crown corporation that manufactured nearly 3,000 planes at its peak. With the end of the WW I, many of our returning pilots wanted to continue flying and soon the country's first bush flying operation entered into service. Laurentide Air Service was launched in the summer of 1920.

The need for improved aircraft led Montreal-based Canadian Vickers to design the "Vedette" — Canada's first specialized bush plane, which was sold to Chile. It was the first Canadian production plane to be exported. As demand for aircraft from commercial operators and the Royal Canadian Air Force increased, other Canadian manufacturers appeared. De Havilland Canada and Pratt & Whitney Canada started operations in 1928. Noorduyn Aircraft developed its first "Norseman" bush plane in 1935 in Montreal. In spite of the Depression, each firm struggled and survived, and eventually blossomed as orders for military aircraft poured in during World War II.

By this time, Montreal and Toronto were Canada's key aviation industry hubs and Boeing also had a solid presence in Vancouver. In 1935, Canada's aircraft industry totalled about 4,000 employees producing 40 aircraft annually. During the second war, this would soar to a peak of 116,000 workers with 16,500 aircraft built during the conflict years. Furthermore, over 130,000 air crew members graduated in all trades from the British Commonwealth Air Training Plan at bases across Canada. At the same time, the Canadian government was in talks with our neighbour to the South.

Both President Roosevelt and Prime Minister Mackenzie King agreed that our governments needed to work with the industry to ensure military self-sufficiency. In 1941, they signed the Ogdensburg Agreement – creating a joint board to oversee defence and harmonize Canada and U.S. defence resources. They followed through with the Hyde Park Declaration, designed to make the most effective use of our production facilities in Canada and the U.S.

### Post-War Canadian Aviation Industry Developments

When World War II officially ended and European countries started repatriating their capabilities, Canada was left with an unprecedented wealth of highly qualified people and of transferred technology. With strong government support, we continued building innovative aircraft.

The post-war boom heralded many Canadian firsts with Canadair producing the "North Star", Canada's first modern airliner; the "Tutor", a basic jet trainer, selected by the Royal Canadian Air Force and the

[1] Excerpted from: ***Our Canadian Aerospace Industry: Towards a Second Century of History-making:*** Presentation by Robert E. Brown President and Chief Executive Officer CAE Inc., Before the AIAC 47th Annual General Meeting and Conference, September 17, 2008

[2] In 2010, Canada ranked fifth in aerospace, behind the U.S., France, the U.K. and Germany. (AIAC 2012/2013 Annual Report – Page 9)

"Yukon", the first swing-tail cargo aircraft among others. De Havilland also pioneered the Short Take-Off and Landing market, introducing the "Beaver"– the world's first short-take-off-and-landing utility transport, as well as one of its most famous bush planes.

Avro Canada developed the "Avro Arrow", a supersonic aircraft well ahead of its time. The Arrow was widely recognized as both an advanced technical and aerodynamic achievement for the Canadian aviation industry. It held the promise of Mach 2 speeds at 50,000 feet or more. Unfortunately, this project was cancelled in February 1959 on what's known today as Black Friday. On the government of the day's orders, the five Arrow aircraft already built were destroyed for scrap metal and sold for six and a half cents a pound to a Hamilton junk dealer. The cancellation struck a terrible blow by putting more than 50,000 people out of work at the plants and their outside suppliers. What happened to this great pool of talent? Fortunately, many stayed in Canada and continued to work in the aerospace industry. Others moved to Europe to become important players in developing the now retired Concorde, or moved to the USA to work on the US Apollo space program which put a man on the moon.

In the mid-1950s, Canada had already impressed the world with our talent in aerospace. With the Ogdensburg and Hyde Park precedents, another development involving Canada and the US would again benefit our industry. Our respective governments concluded the Canada/U.S. Defence Production Sharing Agreement, known as DPSA, which set up a common market. The goal was to better utilize all of the industrial, scientific and technical resources of our two countries towards our mutual defence. These were very important programs, which made it possible for Canadian companies to perform R&D work to meet the requirements of U.S. Armed Forces. They also allowed Canada to establish second-source production facilities and gave us priority access to the significant U.S. defence market.

Many significant projects would later be funded through the Defence Industry Productivity Program, known as DIPP, which followed. Its initial focus was the defence sector but the concept of dual-use civil/military projects was embraced by the late-1960s. It importantly put Canadian companies on a level playing field with their foreign competitors who were supported by their governments.

During this period, Canadair developed the world's first purpose-built water bomber, the CL-215; the world's first surveillance drones as well as the CL-84,the vertical take-off and landing aircraft. It also launched Canada as a leading manufacturer of business and regional jets when it introduced the "Challenger", the first purpose-built wide body business aircraft. For its part, Pratt & Whitney Canada developed the PW200 turbo shaft engine, the leader in the light helicopter market; and the PW300, an advanced technology engine of choice in the mid-size business jet market. And I should mention the PT6, the most successful turbo prop engine of all times.

CAE also pioneered several simulation training firsts at that time, including: the introduction of a newly designed six-degrees-of-freedom motion system; the use of workload-reducing CRT displays in instructor stations; simulation's first low-friction hydrostatic flight control-loading system with accurate digital/analog technology; the first new generation combat simulators; and the first fully hydrostatic motion system. CAE also received its first order for a digital-flight simulator, and by the late-1970s, it had grown internationally holding 50 per cent of the world's commercial flight simulator market! These few examples are testimony of the innovative spirit of this period. Working with our government, our industry was able to make great strides and Canada had already become a world leader in aerospace.

Then, in the mid-1980s, the economy began to slide and the government divested itself of crown corporations. First Canadair, then de Havilland were privatized, DIPP was cancelled and a new program introduced. Technology Partnerships Canada (TPC) was set up to provide funding support for strategic R&D and demonstration projects that produced benefits to Canadians. The bulk went to aerospace. But, contrary to DIPP, which included important defence projects, the new TPC opened the door for discussions under the World Trade Organization to the detriment of many companies. We all remember

the struggle between Bombardier and Embraer, which garnered quite a bit of attention in the media. While this new program may not have been perfect, several companies leveraged real success stories during the TPC years:

- Canadair's success with the regional jet.
- Pratt & Whitney Canada developed innovative engine technologies, including the PW308, the largest and most complex turbofan jet engine ever designed, built and certified in Canada.
- Héroux-Devtek, in collaboration with Messier-Dowty and B. F.Goodrich, developed new, more environmentally-friendly landing gear coatings. Their technology also shortens processing time and is expected to be less costly for both suppliers and aircraft operators.
- CAE has many programs under TPC. CAE's latest R&D program, called Phoenix, has already produced a new, more cost-effective simulator— the CAE 5000 Series. This breakthrough product addresses training requirements for high-volume commercial narrow-body aircraft, as well as the business jet market.

Despite its many successes however, concerns were raised about minimal TPC funding repayments, a significant factor in developing what would follow the TPC – the Strategic Aerospace and Defence Initiative, or SADI.

### The Current Situation - Canadian Aviation Looking Forward

At the end of the first decade of the 21st century, Canada's aerospace industry is poised for growth and faced with critical challenges:

- $23 billion in revenues, with 82% exports; 82,000 jobs;
- At an average salary of $70,000, employees are paid $4.8 billion a year;
- Approximately $1.5 billion in annual income taxes;
- 1.6 billion invested in R&D in 2007—more than half of which spent by the top 5 spenders alone;
- World leadership for small engines through Pratt & Whitney Canada, in regional jets through Bombardier, in simulation through CAE, and much more.

Although Canada currently ranks fifth in the world, China, Korea, Japan, India and others have put the world on notice that they are starting to build their own aerospace industries. Several questions come to mind:

- Where is our industry going?
- What must we do to ensure its continued success?
- How can we keep R&D in Canada and continue to develop our talent pool here?
- How can we avoid a brain drain like other sectors are experiencing?
- What does it take for companies to continue to want to invest in our industry and our country?

Moving forward, we need to realize that the civil and military aerospace industry around the world is closely linked, especially given the obvious movement towards globalization. We must also accept that there is a new market reality out there. We have seen that the development of electronics is very quickly taking over the aerospace industry. We have witnessed this through the design and development of new aircraft simulators and in the aircraft cockpits where fly-by-wire is now the standard. As mentioned, other countries are entering the industry at an incredibly fast pace and we are facing the development of huge markets in China and India.

So, what do we need to do to ensure we have the right foundations for the future? The first factor that comes to mind is a stable environment, an environment where support is for the long-term. Specifically, that translates into our government's continued support:

- Through programs like SADI;
- Support in keeping the doors open to international trade in order for our Canadian aerospace companies to have unfettered access to foreign markets; and
- Its strong commitment to our industry while it rebuilds Canada's military.

# 3.0 STRATEGIC IMPORTANCE OF AEROSPACE TO CANADA

## 3.1 Aerospace Sector as Percentage of Canada's GDP

According to the Aerospace Industries Association of Canada (AIAC), the Canadian Aerospace industry had total 2011 revenues of $ 22.4 Billion, representing **1.6 % of Canada's total GDP** of $1.414 Trillion in 2011. Total employment in the sector totals 87,231. Canada currently ranks fifth in world aerospace industry output, behind the U.S., France, the U.K., and Germany.

The 14 largest aerospace firms in Canada generate the majority of aerospace jobs, totalling 51% of total sector jobs.

The types of jobs generated by the Canadian aerospace industry can be grouped into four categories: engineering and scientific staff; production staff; technicians and/or technologists; and all others. Of these four groups, production staff is the largest category in terms of employment, with an estimated 47% of the total aerospace workforce.

In terms of R&D, $2.0 Billion was spent in the aerospace sector in 2011, $1.5 Billion from internal company sources, and $0.5 Billion from government sources. Capital investments accounted for $ 0.7 Billion of the $2.0 Billion total.

In contrast to the global aerospace industry, which is primarily dominated by the military segment, the Canadian aerospace industry primarily operates within the civil aerospace sector. In 2009, an estimated 83.4% of revenues generated by the Canadian aerospace industry are in the civil sector, compared to 16.6% generated in the military sector. [3]

## 3.2 Location of Primary Centres of Aerospace Industry

According to the AIAC, in terms of regional concentration, the Canadian aerospace industry in **concentrated in the Province of Quebec**, which accounts for 63.3% of total national aerospace revenues in 2011, or $14.2 Billion in total revenues. Ontario comprises the second-largest component of the industry, with 21%, or $4.7 Billion. Western Canada[4] follows with 12%, or $2.7 Billion, with the remaining 4%, or $ 0.9 Billion in revenue located in Eastern Canada[5].

By employment, Quebec leads with 53.16% of direct aerospace jobs, or 43,372 jobs, followed by Ontario with 28.31% or 24,695 jobs, Western Canada with 13.36% or 11,654 jobs, and Eastern Canada with 5.17% or 4,510 jobs.

In terms of job categories employed by the Canadian aerospace industry in 2011, production staff accounted for 42.5% of employment, followed by engineering & scientific staff (22.1%), technicians and technologists (10.7%), and all other categories, including support staff and management (24.7%).

[3] Deloitte & Touche, **The Strategic and Economic Impact of the Canadian Aerospace Industry**, October 2010, page 5
[4] **Western Canada** comprises the Provinces of British Columbia, Alberta, Saskatchewan, Manitoba, and the Territories of Yukon, Nunavut and the Northwest Territories.
[5] **Eastern Canada** comprises the Provinces of Newfoundland and Labrador, Nova Scotia, New Brunswick and Prince Edward Island.

### 3.2.1 Major Canadian Aerospace Clusters

Following are brief outlines of the three largest Canadian aerospace clusters:

**Quebec**
Montreal is the hub of Canada's largest aerospace cluster and is renowned for its expertise in aircraft fabrication and assembly, engine manufacturing, MRO, avionics, and landing gear. Montreal is home to more than10 aerospace research centres, including the Canadian Space Agency and the Aerospace Manufacturing Technology Centre (AMTC) at NRC Aerospace Montreal also has a well-integrated network of support agencies, such as the Quebec Aerospace Association and Aéro Montreal. It is the headquarters of the International Air Transport Association (IATA), the International Business Aviation Council (IBAC), the International Civil Aviation Organization (ICAO) and Airports Council International (ACI). In 2011, Quebec had almost $ 7 Billion worth of aerospace product exports, accounting for 63% of Canada's aerospace exports.[6]

Approximately 42,400 employees work in Quebec's aerospace industry for large firms such as Bombardier Aerospace, bell Helicopter Textron Canada, Pratt & Whitney Canada and CAE, as well as over 200 medium and smaller suppliers.

**Ontario**
Ontario contains Canada's second-largest aerospace cluster, in the greater Toronto area (GTA), with over 200 firms employing more than 20,000 skilled employees. Ontario has key strengths in aircraft parts manufacturing, aircraft systems and MRO. The University of Toronto Institute for Aerospace Studies and the Ryerson Institute for Aerospace Design and Innovation collaborate with industry partners on numerous projects.

Ontario hosts many world-leading aerospace firms, such as Bombardier, Goodrich, Messier-Bugatti-Dowty, Pratt & Whitney Canada, Honeywell Canada, general Dynamics Canada, Magellan Aerospace, Northstar Aerospace, MDA and Arnprior Aerospace.

**Manitoba**
Winnipeg is the largest aerospace cluster in Western Canada and a major centre in North America for the manufacturing of composite aircraft components and aircraft MRO. Winnipeg is the location of Boeing's composite manufacturing plant, the largest such facility in North America, and one of Boeing's 10 major global commercial aircraft sites. The aerospace cluster in Manitoba directly employs some 5,300 skilled people.

Manitoba is also home to Magellan Aerospace, StandardAero and 23 other established firms and several other mid-sized aerospace suppliers. StandardAero is one of the largest MRO firms in the world.

[6] Industry Canada, **Trade Data Online**, 2011

## 3.3 Airport Infrastructure

### National Airports System (NAS)

The Canadian federal government's National Airports Policy (NAP) provides a framework that clearly defines the federal government's role with airports. That role is defined through two main levels of federal involvement in airports with scheduled passenger traffic: a) nationally-significant airports that will form the National Airports System (NAS) and b) regional/local airports. The NAS comprises 26 airports that link the country from coast to coast and internationally. The NAS includes those airports considered essential to Canada's air transportation system, supporting both domestic prosperity and international competitiveness.

### Criteria for the NAS

The NAS includes airports in all national, provincial and territorial capitals, as well as airports with annual traffic of 200,000 passengers or more. Currently, **the 26 NAS airports serve 94 per cent of all scheduled passenger and cargo traffic in Canada** and are the points of origin and destination for almost all interprovincial and international air service in Canada.

### Airports in the National Airports Category (26)


- Kelowna, B.C.
- Prince George, B.C.
- Vancouver, B.C.
- Victoria, B.C.
- Calgary, Alta.
- Edmonton, Alta.
- Regina, Sask.
- Saskatoon - J.G. Diefenbaker, SK
- Winnipeg, Man.
- London, Ont.
- Ottawa - Macdonald-Cartier, Ont.
- Thunder Bay, Ont.
- Toronto - L. B. Pearson, Ont.
- Montreal - Dorval, Que.
- Mirabel, Que.
- Quebec City - Jean-Lesage, Que.
- Fredericton, N.B.
- Moncton, N.B.
- Saint John, N.B.
- Halifax, N.S.
- Charlottetown, P.E.I.
- Gander, N.L.
- St. John's, N.L.
- Iqaluit, NU
- Yellowknife, N.W.T.
- Whitehorse, Y.T.

In addition to the NAS, there 726 certified airports that support scheduled and non-scheduled flights, and 1,700 aerodromes that support takeoffs and landings. 72 of these are classified as regional/local airports and listed below.

### Regional/Local Airports (72)

- Abbotsford, B.C.
- Campbell River, B.C.
- Castlegar, B.C.
- Comox, B.C.
- Cranbrook, B.C.
- Dawson Creek, B.C.
- Fort Nelson, B.C.
- Fort St. John, B.C.
- Kamloops, B.C.
- Nanaimo, B.C.
- Penticton, B.C.
- Port Hardy, B.C.
- Powell River, B.C.
- Prince Rupert, B.C.
- Quesnel, B.C.
- Smithers, B.C.
- Terrace, B.C.
- Williams Lake, B.C.
- Fort McMurray, Alta.
- Grande Prairie, Alta.
- Lethbridge, Alta.
- Peace River, Alta.
- Rainbow Lake, Alta.
- La Ronge, Sask.
- Prince Albert, Sask.
- Uranium City, Sask.
- Brandon, Man.
- Dauphin, Man.
- Flin Flon, Man.
- Gillam, Man.
- Lynn Lake, Man.
- The Pas, Man.
- Thompson, Man.
- Dryden, Ont.
- Earlton, Ont.
- Fort Frances, Ont.
- Gore Bay, Ont.
- Hamilton, Ont.
- Kapuskasing, Ont.
- Kenora, Ont.
- North Bay, Ont.
- Pembroke, Ont.
- Red Lake, Ont.
- Sarnia, Ont.
- Sault Ste. Marie, Ont.
- Sudbury, Ont.
- Timmins, Ont.
- Toronto Island, Ont.
- Windsor, Ont.
- Alama, Que.
- Bagotville, Que.
- Baie-Comeau, Que.
- Gaspé, Que.
- Havre-Saint-Pierre, Que.
- Mont-Joli, Que.
- Natashquan, Que.
- Rimouski, Que.
- Rouyn, Que.
- Sept-Îles, Que.
- Val-d'Or, Que.
- Charlo, N.B.
- Chatham, N.B.
- St. Leonard, N.B.
- Sydney, N.S.
- Yarmouth, N.S.
- Churchill Falls, N.L.
- Deer Lake, N.L.
- Goose Bay, N.L.
- Stephenville, N.L.
- St. Anthony, N.L.
- Wabush , N.L.

## 3.4 Radar Installation Systems

### 3.4.1 Current System Status – NAV CANADA

**NAV CANADA is the non-share capital corporation that owns and operates Canada's civil air navigation service (ANS)**. Aircraft services provided by the company across the country include air traffic control, flight information, weather briefings, aeronautical information, airport advisory services and electronic aids to navigation. NAV CANADA's mandate is to provide an ANS that is safe, efficient and responsive to user needs.

The ANS consists of a network of air routes providing services in accordance with need. The volume and mix of traffic at a given location dictate the type of service provided. The ANS provides essential services to aircraft operating in Canadian domestic airspace, and in international airspace assigned to Canadian control. Control services are ensured in high-density traffic and instrument flight rule (IFR) areas. Air traffic controllers maintain vertical, and lateral or time separation according to strictly defined criteria. Air traffic controllers work in Area Control Centres and Control Towers.

**There are seven Area Control Centres (ACCs)** located in Vancouver, Edmonton, Winnipeg, Toronto, Montreal, Moncton and Gander. ACCs provide control, advisory and alerting services for IFR and Controlled Visual Flight Rules (CVFR) aircraft in a Flight Information Region (FIR).

**Forty-two Control Towers** provide pilots approaching and departing busy airports with clearances and instructions to ensure their aircraft have sufficient spacing (horizontal, lateral and vertical distance from each other). Controllers also ensure separation between aircraft and aircraft and vehicles operating on the manoeuvring area of the airport. This is done primarily using visual control methods, although busier airports have air and ground surveillance radar to monitor aircraft movements. In lower density VFR traffic areas, aircraft are responsible to stay clear of one another. For these aircraft, Flight Service Specialists working in Flight Service Stations or Flight Information Centres provide advisory services.

**There are 57 Flight Service Stations (FSS)** whose services may include the following: weather observations and briefing; pilot pre-flight information; airport advisory; vehicle control; flight plan acceptance and processing; enroute communications; relay of air traffic control clearances; assistance to aircraft in emergency situations; VFR flight planning and alerting; direction finder assistance; issuance of aviation safety notices.

NAV CANADA also has **eight Flight Information Centres (FIC)** established in Halifax, Quebec City, London, North Bay, Winnipeg, Edmonton, Whitehorse and Kamloops. The FICs provide centralized flight information services - including interpretive weather briefings, flight planning services and enroute advisories.

The Company provides aviation weather services, flight and vehicle information and emergency assistance services in Canada’s north through 50 Community Aerodrome Radio Stations (CARS) at designated sites in northern and remote areas.

Air traffic services provided by NAV CANADA are more comprehensive than those offered in other countries. For instance, in the United States, airport advisory services are not available at airports with less than 100,000 movements annually.

### 3.4.2 Future Development & Possible Acquisitions

Since taking over the ANS, NAV CANADA has adopted a strategy to modernize and enhance the delivery of air traffic services across the country in order to improve safety and efficiency. The company has invested and committed close to $1.3 billion in new systems and technologies since 1996. These include improved radar displays for operational personnel, new voice and data communications systems, state-of-the-art flight data processing, and numerous other innovations. NAV CANADA technology solutions are among the best in the aviation industry.

Following are some recent developments:

- (November 19, 2012) - NAV CANADA has signed an agreement finalizing the terms of its participation in Aireon LLC, a joint venture with Iridium Communications Inc., previously announced June 19, 2012. Aireon's mandate is to provide satellite-based surveillance capability for air navigation service providers (ANSPs) around the world. Aireon will deliver this global aircraft surveillance through Automatic Dependent Surveillance-Broadcast (ADS-B) receivers built as an additional payload on Iridium NEXT, the second generation satellite constellation to be launched by Iridium in the 2015-2017 period. The new capability will extend air traffic surveillance to vast regions of the globe, promising a quantum leap in fuel savings and avoided greenhouse gas emissions for the world's airlines.

- (November 8, 2012) – NAV CANADA announced the launch of the second phase of the ENGAGE Demonstration project, a collaborative initiative to reduce aircraft fuel burn and greenhouse gas (GHG) emissions in the North Atlantic – the world's busiest oceanic airspace. NAV CANADA is leading the ENGAGE II Demonstration project in partnership with Air France and NATS, the United Kingdom's air navigation service provider. The ENGAGE II Demonstration will build on and further expand the successes of the ENGAGE flight trials that were completed last year. A Consortium of NAV CANADA and Air France was awarded the ENGAGE II project by the SESAR Joint Undertaking (SJU) as part of its Atlantic Interoperability Initiative to Reduce Emissions (AIRE) Program.

- ( June 19, 2012) - NAV CANADA has announced its agreement in principle to participate in the formation of Aireon LLC, a planned joint venture whose mandate is to provide revolutionary global satellite-based tracking capability for air navigation service providers around the world. NAV CANADA intends to be a partner in Aireon along with Iridium Communications Inc., with support from the U.S. Federal Aviation Administration (FAA) and suppliers Harris Corporation and ITT Exelis. Final confirmation of NAV CANADA's participation is subject to the completion of formal agreements in the near future. Aireon will deliver global aircraft tracking capability through Automatic Dependent Surveillance - Broadcast (ADS-B) receivers built into Iridium NEXT, the second generation satellite constellation to be launched by Iridium in the 2015-2017 period. Iridium operates the world's furthest-reaching communications network and truly global aircraft tracking will only be available through Iridium NEXT.

- (March 6, 2012) - NAV CANADA announced today that the Civil Aviation Department (CAD) of the Government of the Hong Kong Special Administrative Region of the People's Republic of China has selected NAV CANADA for the provision of Air Traffic Services Data Management System (ATSDMS) to manage and display critical air traffic control information. NAVCANatm technology will be used in ATSDMS to be installed in the air traffic control towers and centres for the Hong Kong International Airport (HKIA). Development and deployment of the system will occur in two phases, the first of which is now underway.

- (March 5, 2012) - NAV CANADA has reached an agreement with DFS Deutsche Flugsicherung, the Air Navigation Service Provider in Germany, to purchase air traffic surveillance fusion and flight tracking technology for implementation in the Canadian air navigation system (ANS). Surveillance fusion is technology that allows the seamless presentation of targets generated from a variety of surveillance sources. These include traditional radar, the newer Automatic Dependent Surveillance - Broadcast (ADS - B), new Multilateration systems, and most recently, video surveillance. The system will provide a more precise fused target from the varying sources, which will be displayed with the corresponding flight data information to the air traffic services staff as they separate aircraft and provide critical information and advisory services to maintain the safety of the skies.

## 3.5 Capacity for Maintenance Services

The Maintenance and Manufacturing Branch of Transport Canada provides service to a varied constituency. With the second largest fleet of civil aircraft in the western world, Canada's maintenance organizations assist in ensuring that all aeronautical products built, operated or maintained under Canadian control conform to national and international airworthiness standards. Ensuring that these standards are met involves a vast network of organizations and personnel, these include:

- 1,001 Approved Maintenance Organizations (AMOs);
- 13,332 Aircraft Maintenance Engineers (AMEs);
- 60 domestic and international aircraft maintenance Approved Training Organizations (ATOs);
- 226 authorized Aeronautical Parts Distributors.

In addition, the Maintenance and Manufacturing Branch provides services to numerous aerospace manufacturing companies. Services include:

- AME Licensing and Training (AARPG)
  The AME Licensing & Training section is responsible for the management of the Canadian Aircraft Maintenance Engineer (AME) Licensing and Approved Training Organization (ATO) Systems, regulations, standards, policies and procedures pertaining to AME licensing and training. This section provides direction, interpretation and guidance to National and International Organizations and Regulatory bodies, as well as Regional and Transport Canada Center (TCC) personnel tasked with licensing & training functions, in order to ensure standardized application of policies, standards, and procedures.

- Aircraft Evaluation Group (AARPG)
  Aircraft Evaluation is a Group within the Maintenance and Manufacturing Branch Operations Division that is primarily responsible for ensuring maintenance programs and instructions for continued airworthiness developed by Canadian and foreign manufacturers meet the required Canadian Standards.

- Standards and Procedures (AARPE)
  Standards and Procedures is responsible for the coordination and management of all regional maintenance and manufacturing activities, other than those coordination and communication point for other Civil Aviation Authorities where services may be required of the regions. We ensure the consistent application of branch policies, standards, and procedures, by coordinating all regional / HQ communications and managing the quality assurance review program for the measurement of departmental aircraft maintenance and manufacturing activities. In monitoring these actions we interpret and evaluate the effectiveness of existing policies and make recommendations for change.

- Recreational Aircraft (AARPE)
  The Recreational Aircraft Division of the Aircraft Maintenance & Manufacturing Branch is the focal point for airworthiness issues affecting recreational aircraft including certified and non-certified aircraft, and amateur-built aircraft. Some of the airworthiness issues include: construction and maintenance of amateur-built aircraft; maintenance requirements for small certified aircraft; flight authorities and maintenance schedules; importation and operation of non-type certified and ex-military aircraft; owner maintenance; IFR flight for amateur-built aircraft; aerobatics by amateur-built aircraft; external delegation of ministerial authority with respect to amateur-built aircraft inspection; validation of foreign flight authorities; liaison with recreational aviation associations and foreign civil aviation authorities.

### 3.5.1 Military Maintenance

Building on capabilities established to fulfill depot-level maintenance requirements of the Canadian Forces, Canadian firms now offer extensive military aircraft MRO services to foreign military customers around the world. These aircraft include Boeing F-18 aircraft, the Sikorsky Sea King Helicopter, Lockheed P-3 maritime patrol aircraft and the Lockheed C-130 cargo aircraft.

- **L-3 Spar Aerospace Limited** (www.spar.ca ) is a leader in heavy maintenance and avionics upgrades for the Lockheed C-130 cargo aircraft.

### 3.5.2 Civil Maintenance

Canadian aerospace companies provide full "nose-to-tail" MRO services for a broad range of large commercial transports, regional jets and turboprops, business aircraft, helicopters and general aviation aircraft.

Canadian MRO firms have developed specific expertise for maintenance, inspection, repair and overhaul of Boeing 737 aircraft, turboprop aircraft such as the DeHavilland Dash 8 series, and the rapidly expanding fleet Bombardier Canadair Regional Jets (CRJ). Other firms focus on MRO services for business aircraft.

Canada's fleet of civil helicopters is the second largest in the world after that of the United States. As a result, Canadian firms have developed a comprehensive array of MRO service capabilities for rotary wing aircraft that are used in virtually all models of helicopters produced in North America and Europe.

In addition to these larger firms, there are several hundred other companies located throughout Canada that provide MRO services for a wide range of small piston and turbine powered aircraft types (5,700 kg. and below) and light helicopters from all of the world's leading manufacturers. While most of these firms are aircraft operators that focus on the MRO needs of their own fleets, many offer MRO services to third party customers. [7]

- **Avmax Group** (www.avmax.ca ) is a world leader in aviation support, training and management services and also offers subcontract support services including: non-destructive testing, composite repairs, interior and exterior refinishing, as well as engine/propeller repair and overhaul.

- **Flightline Training** (www.flightlinetraining.com ) has an established worldwide reputation for excellence and offers exceptional maintenance training that is cost-effective and innovative.

- **Innotech Aviation** (www.innotechaviation.com ) offers MRO services, interior and exterior refurbishment, avionics upgrade, as well as special mission aircraft modification, serving business, government and commercial aviation markets on all continents.

- **Penta Aviation** (www.penta-aviation.com ) is a unique full-service aircraft facility offering aviation services such as avionics, interior refurbishment, painting, maintenance, charters and fixed-base operations (FBO) under a single roof.

- **Voyageur Airways** (www.voyageurairways.com) performs all levels of aircraft inspections, and has the authority to perform maintenance on aircraft registered in Canada, the US and Europe.

[7] http://www.tradecommissioner.gc.ca/eng/services-foreign-companies/local-office.jsp;jsessionid=2345AE9B7293A463BAA36EF5E7852594.InfoExport?did=8412&sitid=138&lang=eng&_requestid=164122

# 4.0 RECENT PERFORMANCE OF AEROSPACE SECTOR

## 4.1 Industry Trade Balance

Canada's industry trade balance in the aerospace sector is calculated by examining the key relevant HS codes for the sector, as follows. Where possible, for this analysis, codes have been grouped by 4-digit groups. 28 codes are captured in this analysis, and are thus **grouped into 11 codes (bolded)** which are reported in this section separately.

- **HS 401130** New pneumatic tires – for aircraft
- **HS 401213** Retreaded tires – for aircraft
- **HS 840710** Aircraft engines
- **HS 840910** Parts for aircraft engines
- **HS 8411** Turbo-jets, turbo-propellers and other gas turbines
    - 841111 Turbo-jets – thrust not exceeding 25 KN
    - 841112 Turbo-jets – Thrust exceeding 25 KN
    - 841121 Turbo-propellers – Power not exceeding 1,100 KW
    - 841122 Turbo-propellers – Power exceeding 1,100 KW
    - 841181 Gas turbines NES – Power not exceeding 5,000 KW
    - 841182 Gas turbines NES – Power not exceeding 5,000 KW
    - 841191 Parts of turbo-jets or turbo-propellers
    - 841199 Parts of gas turbines NES
- **HS 8802** Helicopters, airplanes and spacecraft (which is in turn comprised of)
    - 880211 Helicopters of an unladen weight (2,000 Kg or less)
    - 880212 Helicopters of an unladen weight (more than 2,000 Kg)
    - 880220 Airplanes of an unladen weight (2,000 Kg or less)
    - 880230 Airplanes of an unladen weight (2,000 – 15,000Kg)
    - 880240 Aircraft NES of an unladen weight (more than 15,000 Kg)
    - 880260 Spacecraft (including satellites) and Spacecraft Launch Vehicles
- **HS 8803** Parts of Helicopters, airplanes, balloons, dirigibles and spacecraft
    - 880310 Propellers, rotors and parts thereof – for aircrafts
    - 880320 Under-carriages and parts thereof – for aircrafts
    - 880390 Parts of balloons, dirigibles and spacecraft nes
- **HS 8805** Flight simulators, aircraft launching gear, deck arrestors and similar gear
    - 880510 Aircraft launching gear, deck arrestors and similar gear
    - 880520 Flight simulators (ground flying trainers) and parts
    - 880521 Air combat simulators and parts
    - 880529 Other ground flying trainers (incl. flight simulators) nes and parts
- **HS 901410** Direction finding compasses
- **HS 901420** Instruments & appliances for aeronautical or space navigation (other than compasses)
- **HS 940110** Aircraft seats

Note: Additional codes containing some aerospace trade data were omitted from this analysis if they also contained trade data from unrelated transportation industries (such as motor vehicles, rail etc.)

Also, the "top 5 countries" in terms of trade balances listed are in terms of absolute dollar value, whether positive or negative. Countries are ranked by absolute size of trade balance in 2011.

**Figure 1**
**HS 401130 – New Pneumatic Tires for Aircraft**
Canadian Trade Balance - Latest 5 Years (2007-2011)
Top 5 Largest Balances (+ or -) Plus Italy (In CAD$)

| Country | Trade | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|
| U.S.A. | Exports | 82,950 | 199,158 | 157,397 | 91,323 | 99,809 |
| | Imports | 13,341,985 | 14,273,621 | 11,816,024 | 10,241,583 | 12,008,910 |
| | Trade Balance | -13,259,035 | -14,074,463 | -11,658,627 | -10,150,260 | -11,909,101 |
| Thailand | Exports | - | - | - | - | - |
| | Imports | 1,895,980 | 1,866,230 | 1,799,937 | 2,182,080 | 2,426,523 |
| | Trade Balance | -1,895,980 | -1,866,230 | -1,799,937 | -2,182,080 | -2,426,523 |
| U.K. | Exports | 38,386 | - | 18,062 | 33,582 | 19,306 |
| | Imports | 2,028,358 | 1,836,327 | 1,624,364 | 2,199,031 | 1,926,561 |
| | Trade Balance | -1,989,972 | -1,836,327 | -1,606,302 | -2,165,449 | -1,907,255 |
| France | Exports | 3,580 | - | 4,420 | - | 69,549 |
| | Imports | 365,370 | 387,138 | 1,717,508 | 344,466 | 562,493 |
| | Trade Balance | -361,790 | -387,138 | -1,713,088 | -344,466 | -492,944 |
| Brazil | Exports | 9,031 | - | 36,819 | 45,653 | 17,227 |
| | Imports | 2,263,051 | 1,119,739 | 1,529,009 | 1,189,178 | 280,335 |
| | Trade Balance | -2,254,020 | -1,119,739 | -1,492,190 | -1,143,525 | -263,108 |
| ***Italy*** | ***Exports*** | ***153,072*** | ***24,898*** | ***37,434*** | ***56,153*** | ***83,330*** |
| ***2nd best trade balance*** | ***Imports*** | ***2,630*** | ***11,938*** | ***-*** | ***277*** | ***15,585*** |
| | ***Trade Balance*** | ***150,442*** | ***12,960*** | ***37,434*** | ***55,876*** | ***57,745*** |
| TOTAL | Exports | 697,091 | 306,928 | 483,432 | 501,405 | 847,734 |
| | Imports | 20,100,016 | 19,646,890 | 18,596,936 | 16,229,349 | 17,359,467 |
| | Trade Balance | -19,402,925 | -19,339,962 | -18,113,504 | -15,727,944 | -16,511,733 |

**Figure 2**
**HS 401213 – Retreaded Tires for Aircraft**
Canadian Trade Balance - Latest 5 Years (2007-2011)
Top 5 Largest Balances (+ or -) Plus Italy (In CAD$)

| Country | Trade | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|
| U.S.A. | Exports | 2,214 | 22,160 | 4,320 | 2,838 | 16,208 |
| | Imports | 3,172,284 | 3,430,955 | 1,457,361 | 1,891,045 | 1,404,965 |
| | Trade Balance | -3,170,070 | -3,408,795 | -1,453,041 | -1,888,207 | -1,388,757 |
| Thailand | Exports | - | - | - | - | - |
| | Imports | 16,520 | 22,709 | 226,737 | 732,656 | 807,880 |
| | Trade Balance | -16,520 | -22,709 | -226,737 | -732,656 | -807,880 |
| U.K. | Exports | - | - | - | - | - |
| | Imports | 167,627 | 280,544 | 191,160 | 177,237 | 491,357 |
| | Trade Balance | -167,627 | -280,544 | -191,160 | -177,237 | -491,357 |
| France | Exports | - | - | - | - | - |
| | Imports | 856 | 42,257 | 191,771 | 296,552 | 309,150 |
| | Trade Balance | -856 | -42,257 | -191,771 | -296,552 | -309,150 |
| Gabon | Exports | - | - | - | 1,634 | 2,875 |
| | Imports | - | - | - | - | - |
| | Trade Balance | - | - | - | 1,634 | 2,875 |
| ***Italy*** | ***Exports*** | ***-*** | ***-*** | ***657*** | ***-*** | ***-*** |
| ***3rd best trade balance*** | ***Imports*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** |
| | ***Trade Balance*** | ***-*** | ***-*** | ***657*** | ***-*** | ***-*** |
| TOTAL | Exports | 2,214 | 22,160 | 4,977 | 6,999 | 19,083 |
| | Imports | 3,360,273 | 3,780,514 | 2,082,793 | 3,098,454 | 3,013,808 |
| | Trade Balance | -3,358,059 | -3,758,354 | -2,077,816 | -3,091,455 | -2,994,725 |

**Figure 3**
**HS 840710 – Aircraft Engines**
Canadian Trade Balance - Latest 5 Years (2007-2011)
Top 5 Largest Balances (+ or -) Plus Italy (In CAD$)

| Country | Trade | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|
| U.S.A. | Exports | 16,618,953 | 46,893,503 | 51,028,497 | 44,696,599 | 11,489,977 |
| | Imports | 57,997,291 | 62,449,017 | 40,221,766 | 49,459,514 | 37,148,094 |
| | Trade Balance | -41,378,338 | -15,555,514 | 10,806,731 | -4,762,915 | -25,658,117 |
| Re-Imports | Exports | - | - | - | - | - |
| (Canada) | Imports | 2,025,320 | 470,693 | 2,367,905 | 4,211,812 | 8,470,395 |
| | Trade Balance | -2,025,320 | -470,693 | -2,367,905 | -4,211,812 | -8,470,395 |
| Germany | Exports | 965,855 | 166,688 | 5,000,000 | 1,665,043 | 5,035,757 |
| | Imports | 5,487,792 | 673,753 | 107,585 | 127,823 | 26,404 |
| | Trade Balance | -4,521,937 | -507,065 | 4,892,415 | 1,537,220 | 5,009,353 |
| France | Exports | 5,174,973 | 1,448,329 | 368,521 | 180,702 | 79,368 |
| | Imports | 1,769,980 | 1,661,193 | 3,304,069 | 5,803,595 | 3,073,308 |
| | Trade Balance | 3,404,993 | -212,864 | -2,935,548 | -5,622,893 | -2,993,940 |
| Israel | Exports | - | - | - | - | - |
| | Imports | - | 70,217 | 312,173 | 1,550,663 | 2,217,165 |
| | Trade Balance | - | -70,217 | -312,173 | -1,550,663 | -2,217,165 |
| ***Italy*** | ***Exports*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** |
| ***13th worst trade balance*** | ***Imports*** | ***30,588*** | ***5,112*** | ***14,696*** | ***48,425*** | ***32,621*** |
| | ***Trade Balance*** | ***-30,588*** | ***-5,112*** | ***-14,696*** | ***-48,425*** | ***-32,621*** |
| TOTAL | Exports | 41,902,675 | 54,429,679 | 62,497,649 | 52,497,772 | 19,983,156 |
| | Imports | 70,451,793 | 68,374,082 | 50,746,401 | 64,173,990 | 57,845,462 |
| | Trade Balance | -28,549,118 | -13,944,403 | 11,751,248 | -11,676,218 | -37,862,306 |

**Figure 4**
**HS 840910 – Parts for Aircraft Engines**
Canadian Trade Balance - Latest 5 Years (2007-2011)
Top 5 Largest Balances (+ or -) Plus Italy (In CAD$)

| Country | Trade | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|
| U.S.A. | Exports | 6,542,096 | 3,592,118 | 4,297,807 | 6,194,192 | 3,205,934 |
| | Imports | 31,715,374 | 31,031,794 | 35,054,727 | 33,235,671 | 33,029,593 |
| | Trade Balance | -25,173,278 | -27,439,676 | -30,756,920 | -27,041,479 | -29,823,659 |
| Hong Kong | Exports | 3,032 | 61,783 | - | - | 1,622, 176 |
| | Imports | - | 13 | - | - | - |
| | Trade Balance | 3,032 | 61,770 | - | - | 1,622,176 |
| Re-Imports | Exports | - | - | - | - | - |
| (Canada) | Imports | 585,680 | 815,243 | 1,147,329 | 535,470 | 825,138 |
| | Trade Balance | -585,680 | -815,243 | -1,147,329 | -535,470 | -825,138 |
| Afghanistan | Exports | - | - | 150,000 | 20,662 | 496,925 |
| | Imports | - | - | - | - | - |
| | Trade Balance | - | - | 150,000 | 20,662 | 496,925 |
| Israel | Exports | 72,519 | 24,058 | 27,765 | - | 7,375 |
| | Imports | 599 | 148 | 7,440 | 185,683 | 225,106 |
| | Trade Balance | 71,920 | 23,910 | 20,325 | -185,683 | -217,731 |
| ***Italy*** | ***Exports*** | ***85*** | ***540*** | ***55,470*** | ***2,285*** | ***-*** |
| ***7th worst trade balance*** | ***Imports*** | ***72,732*** | ***98,126*** | ***148,668*** | ***91,171*** | ***48,253*** |
| | ***Trade Balance*** | ***-72,647*** | ***-97,586*** | ***-93,198*** | ***-88,886*** | ***-48,253*** |
| TOTAL | Exports | 10,292,205 | 7,742,372 | 8,736,662 | 10,855,665 | 7,947,903 |
| | Imports | 34,849,698 | 39,410,965 | 39,022,381 | 35,739,387 | 35,600,227 |
| | Trade Balance | -24,557,493 | -31,668,593 | -30,285,719 | -24,883,722 | -27,652,324 |

**Figure 5**
**HS 8411 Turbo-jets, Turbo-propellers and Other Gas Turbines**
Canadian Trade Balance - Latest 5 Years (2007-2011)
Top 5 Largest Balances (+ or -) Plus Italy (In CAD$)

| Country | Trade | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|
| U.K. | Exports | 170,401,028 | 133,281,133 | 172,985,228 | 162,945,218 | 151,148,686 |
| | Imports | 843,557,345 | 893,850,487 | 1,035,237,822 | 974,598,864 | 928,302,075 |
| | Trade Balance | -673,156,317 | -760,569,354 | -862,252,594 | -811,653,646 | -777,153,389 |
| U.S.A. | Exports | 2,626,079,457 | 2,993,182,011 | 2,485,935,379 | 2,311,565,791 | 2,417,168,835 |
| | Imports | 2,219,242,244 | 2,549,363,713 | 2,480,354,185 | 2,034,865,951 | 1,902,652,641 |
| | Trade Balance | 406,837,213 | 443,818,298 | 5,581,194 | 276,699,840 | 514,516,194 |
| France | Exports | 395,360,707 | 531,391,183 | 435,669,088 | 352,609,184 | 403,233,557 |
| | Imports | 106,617,728 | 140,648,544 | 204,002,138 | 130,506,009 | 95,623,748 |
| | Trade Balance | 288,742,979 | 390,742,639 | 231,666,950 | 222,103,175 | 307,609,809 |
| Poland | Exports | 37,451,181 | 44,613,839 | 39,209,448 | 33,686,888 | 41,610,865 |
| | Imports | 163,555,366 | 220,466,173 | 262,119,404 | 256,081,394 | 258,876,722 |
| | Trade Balance | -126,104,185 | -175,852,334 | -222,909,956 | -222,394,506 | -217,265,857 |
| Re-Imports | Exports | - | - | - | - | - |
| (Canada) | Imports | 105,825,107 | 67,767,469 | 141,042,279 | 244,784,471 | 208,424,882 |
| | Trade Balance | -105,825,107 | -67,767,469 | -141,042,279 | -244,784,471 | -208,424,882 |
| ***Italy*** | ***Exports*** | ***137,129,015*** | ***179,108,470*** | ***162,950,305*** | ***103,147,282*** | ***137,253,877*** |
| ***6th best trade balance*** | ***Imports*** | ***55,906,463*** | ***71,224,567*** | ***60,579,927*** | ***43,271,901*** | ***65,021,511*** |
| | ***Trade Balance*** | ***81,222,552*** | ***107,883,903*** | ***102,370,378*** | ***59,875,380*** | ***72,232,366*** |
| TOTAL | Exports | 4,187,285,861 | 4,939,920,581 | 4,448,755,275 | 4,096,714,625 | 4,278,739,371 |
| | Imports | 3,795,318,305 | 4,355,240,539 | 4,532,613,964 | 3,896,275,411 | 3,814,307,947 |
| | Total Trade | 391,967,556 | 584,680,042 | -83,858,689 | 200,439,214 | 464,431,424 |

**Figure 6**
**HS 8802 – Helicopters, Airplanes and Spacecraft**
Canadian Trade Balance - Latest 5 Years (2007-2011)
Top 5 Largest Balances (+ or -) Plus Italy (In CAD$)

| Country | Trade | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|
| U.S.A. | Exports | 5,057,210,511 | 4,016,030,267 | 3,687,643,264 | 2,575,704,349 | 2,942,558,605 |
| | Imports | 2,599,362,515 | 2,886,744,547 | 1,596,878,827 | 1,166,414,803 | 1,295,053,343 |
| | Trade Balance | 2,457,847,996 | 1,129,285,720 | 2,090,764,437 | 1,409,289,546 | 1,647,505,262 |
| Germany | Exports | 216,730,401 | 288,856,770 | 609,073,305 | 256,139,464 | 470,211,896 |
| | Imports | 14,707,104 | 16,036,443 | 3,158,163 | 2,999,883 | 5,132,697 |
| | Trade Balance | 202,023,297 | 272,820,327 | 605,915,142 | 253,139,581 | 465,079,199 |
| Re-Imports | Exports | - | - | - | - | - |
| (Canada) | Imports | 518,873,041 | 361,775,667 | 287,733,130 | 300,649,577 | 305,638,757 |
| | Trade Balance | -518,873,041 | -361,775,667 | -287,733,130 | -300,649,577 | -305,638,757 |
| U.K. | Exports | 479,986,638 | 701,245,973 | 861,058,285 | 1,227,908,302 | 249,058,457 |
| | Imports | 8,801,385 | 131,854 | 1,592,027 | 4,163,790 | 6,082,333 |
| | Trade Balance | 471,185,253 | 701,114,119 | 859,466,258 | 1,223,744,512 | 242,976,124 |
| Austria | Exports | 29,320,055 | 220,977,435 | 226,071,214 | 202,310,516 | 219,620,153 |
| | Imports | 28,814,732 | 4,327,636 | 725,580 | - | - |
| | Trade Balance | 505,323 | 216,649,799 | 225,345,634 | 202,310,516 | 219,620,153 |
| ***Italy*** | ***Exports*** | ***324,375,477*** | ***-*** | ***64,157,963*** | ***30,245,260*** | ***-*** |
| ***3rd worst trade balance*** | ***Imports*** | ***22,740,751*** | ***11,442,864*** | ***16,563,946*** | ***59,800,279*** | ***15,938,514*** |
| | ***Trade Balance*** | ***301,634,726*** | ***-11,442,864*** | ***47,594,017*** | ***-29,555,019*** | ***-15,938,514*** |
| TOTAL | Exports | 8,016,364,925 | 6,898,448,349 | 7,846,653,272 | 6,940,810,819 | 6,507,786,251 |
| | Imports | 4,169,435,103 | 3,646,558,997 | 2,301,173,911 | 2,249,285,651 | 2,108,705,268 |
| | Trade Balance | 3,846,929,822 | 3,251,889,352 | 5,545,479,361 | 4,691,525,168 | 4,399,080,983 |

**Figure 7**
**HS 8803 – Parts of Helicopters, Airplanes, Balloons, Dirigibles and Spacecraft**
Canadian Trade Balance - Latest 5 Years (2007-2011)
Top 5 Largest Balances (+ or -) Plus Italy (In CAD$)

| Country | Trade | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|
| U.K. | Exports | 135,037,199 | 145,754,471 | 143,664,317 | 132,918,176 | 127,981,170 |
| | Imports | 670,383,557 | 872,061,236 | 855,258,103 | 626,124,964 | 658,105,370 |
| | Trade Balance | -535,346,358 | -726,306,765 | -711,593,786 | -493,206,788 | -530,124,200 |
| Japan | Exports | 39,211,680 | 40,636,670 | 30,311,903 | 35,010,677 | 34,375,936 |
| | Imports | 463,584,142 | 410,371,325 | 357,317,343 | 233,973,306 | 294,091,750 |
| | Trade Balance | -424,372,462 | -369,734,655 | -327,005,440 | -198,962,629 | -259,715,814 |
| Re-Imports | Exports | - | - | - | - | - |
| (Canada) | Imports | 119,842,300 | 145.730,977 | 234,757,041 | 187,616,079 | 205,941,787 |
| | Trade Balance | -119,842,300 | -145.730,977 | -234,757,041 | -187,616,079 | -205,941,787 |
| U.S.A. | Exports | 1,595,036,189 | 1,565,397,449 | 1,718,773,478 | 1,682,807,577 | 1,731,081,777 |
| | Imports | 1,571,135,274 | 1,682,527,127 | 1,740,722,126 | 1,583,238,349 | 1,646,674,687 |
| | Trade Balance | 23,900,915 | -117,129,678 | -21,948,648 | 99,569,228 | 84,407,090 |
| France | Exports | 192,825,772 | 242,472,931 | 235,178,204 | 219,192,945 | 229,898,941 |
| | Imports | 131,143,741 | 161,628,333 | 140,480,758 | 135,571,424 | 146,096,396 |
| | Trade Balance | 61,682,031 | 80,844,598 | 94,697,446 | 83,621,521 | 83,802,545 |
| ***Italy*** | ***Exports*** | ***28,697,849*** | ***46,876,039*** | ***36,698,350*** | ***35,315,353*** | ***31,268,810*** |
| ***9th worst trade balance*** | ***Imports*** | ***29,364,947*** | ***35,698,784*** | ***49,867,227*** | ***40,477,836*** | ***48,400,079*** |
| | ***Trade Balance*** | ***-667,098*** | ***11,177,255*** | ***-13,168,877*** | ***-5,162,483*** | ***-17,131,269*** |
| TOTAL | Exports | 2,289,805,236 | 2,419,837,501 | 2,551,871,347 | 2,473,018,881 | 2,550,271,104 |
| | Imports | 3,254,977,169 | 3,683,788,078 | 3,769,451,807 | 3,255,107,314 | 3,519,235,440 |
| | Trade Balance | -965,171,933 | -1,263,950,577 | -1,217,580,460 | -782,088,433 | -968,964,336 |

**Figure 8**
**HS 8805 – Flight Simulators, Aircraft Launching Gear, Deck Arrestors and Similar Gear**
Canadian Trade Balance - Latest 5 Years (2007-2011)
Top 5 Largest Balances (+ or -) Plus Italy (In CAD$)

| Country | Trade | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|
| China | Exports | 66,510,461 | 66,084,485 | 67,721,707 | 53,290,210 | 109,448,746 |
| | Imports | 4,739 | 142,876 | 218,011 | 305,845 | 198,278 |
| | Trade Balance | 66,505,722 | 65,941,609 | 67,503,696 | 52,984,365 | 109,250,468 |
| U.S.A. | Exports | 107,745,001 | 264,333,593 | 119,767,710 | 141,329,614 | 145,966,966 |
| | Imports | 65,359,079 | 51,856,243 | 42,992,904 | 32,976,216 | 49,977,709 |
| | Trade Balance | 42,386,612 | 212,477,350 | 76,774,806 | 108,353,398 | 95,989,257 |
| ***Italy*** | ***Exports*** | ***3,396,514*** | ***21,412,869*** | ***1,938,816*** | ***2,381,409*** | ***47,461,924*** |
| ***3rd best trade balance*** | ***Imports*** | ***433,753*** | ***290,547*** | ***156,945*** | ***878,435*** | ***599,346*** |
| | ***Trade Balance*** | ***2,962,761*** | ***21,122,322*** | ***1,781,871*** | ***1,502,974*** | ***46,862,578*** |
| South Korea | Exports | 2,623,193 | 4,983,136 | 1,618,250 | 8,988,648 | 35,244,199 |
| | Imports | - | 5,528 | 166 | 75,901 | 73 |
| | Trade Balance | 2,623,193 | 4,977,608 | 1,618,084 | 8,912,747 | 35,224,126 |
| Singapore | Exports | 15,254,012 | 22,932,374 | 2,361,027 | 668,557 | 29,536,641 |
| | Imports | 119 | 2,525 | 9,094 | 5,135 | 9,764 |
| | Trade Balance | 15,253,893 | 22,929,849 | 2,351,933 | 663,422 | 29,383,871 |
| TOTAL | Exports | 533,196,382 | 766,682,110 | 499,663,878 | 495,564,258 | 626,668,292 |
| | Imports | 103,508,535 | 92,935,816 | 77,039,716 | 61,461,287 | 73,632,103 |
| | Trade Balance | 429,687,847 | 673,746,294 | 422,624,162 | 434,102,971 | 553,036,189 |

**Figure 9**
**HS 901410 – Direction Finding Compasses**
Canadian Trade Balance - Latest 5 Years (2007-2011)
Top 5 Largest Balances (+ or -) Plus Italy (In CAD$)

| Country | Trade | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|
| Mexico | Exports | 6,107 | 1,711 | 856 | 118,154 | 1,590 |
| | Imports | 146,158 | 1,298,539 | 987,430 | 1,663,550 | 23,178,958 |
| | Trade Balance | -140,051 | -1,296,828 | -986,574 | -1,545,396 | -23,177,368 |
| U.S.A. | Exports | 1,686,025 | 1,363,046 | 1,041,406 | 1,501,131 | 1,368,303 |
| | Imports | 17,011,579 | 11,336,221 | 17,541,562 | 8,027,952 | 6,740,405 |
| | Trade Balance | -15,325,554 | -9,973,175 | -16,500,156 | -6,526,821 | -5,372,102 |
| Japan | Exports | 1,199 | 3,564 | 389 | 127 | 40 |
| | Imports | 271,795 | 316,069 | 244,182 | 290,875 | 1,662,381 |
| | Trade Balance | -270,596 | -312,505 | -243,793 | -290,748 | -1,662,341 |
| Germany | Exports | 18,097 | 291,663 | 62,130 | 4,607 | 5,153 |
| | Imports | 1,032,457 | 1,570,703 | 2,744,486 | 2,061,939 | 1,318,615 |
| | Trade Balance | -1,014,360 | -1,279,040 | -2,682,356 | -2,057,332 | -1,313,462 |
| Israel | Exports | - | 1,668 | - | - | - |
| | Imports | 39,175 | - | 559 | 405,440 | 951,400 |
| | Trade Balance | -39,175 | 1,668 | -559 | -405,440 | -951,400 |
| ***Italy*** | ***Exports*** | ***29,100*** | ***6,416*** | ***1,735*** | ***1,875*** | ***1,942*** |
| ***16th worst trade balance*** | ***Imports*** | ***57,688*** | ***39,230*** | ***24,902*** | ***4,765*** | ***41,451*** |
| | ***Trade Balance*** | ***-28,588*** | ***-32,814*** | ***-23,167*** | ***-2,890*** | ***-39,509*** |
| TOTAL | Exports | 4,515,309 | 3,010,866 | 2,677,934 | 2,751,252 | 1,802,620 |
| | Imports | 23,457,911 | 18,471,794 | 26,627,552 | 15,535,929 | 36,693,947 |
| | Trade Balance | -18,942,602 | -15,460,928 | -23,949,618 | -12,784,677 | -34,891,327 |

**Figure 10**
**HS 901420 – Instruments & Appliances for Aeronautical or Space Navigation**
(Other than compasses)
Canadian Trade Balance - Latest 5 Years (2007-2011)
Top 5 Largest Balances (+ or -) Plus Italy (In CAD$)

| Country | Trade | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|
| U.S.A. | Exports | 71,267,540 | 109,891,622 | 124,936,956 | 115,234,145 | 119,264,413 |
| | Imports | 300,818,354 | 327,297,400 | 272,992,058 | 245,485,595 | 266,762,220 |
| | Trade Balance | -229,550,814 | -217,405,778 | -148,055,102 | -130,251,450 | -147,497,807 |
| France | Exports | 611,901 | 1,187,805 | 1,865,662 | 1,149,170 | 1,171,653 |
| | Imports | 56,224,602 | 65,787,035 | 70,865,954 | 74,637,423 | 54,359,797 |
| | Trade Balance | -55,612,701 | -64,699,230 | -69,000,292 | -73,488,253 | -53,188,144 |
| Germany | Exports | 1,511,749 | 877,505 | 914,445 | 910,143 | 1,229,857 |
| | Imports | 5,934,464 | 9,230,288 | 8,038,754 | 11,117,381 | 11,929,137 |
| | Trade Balance | -4,422,715 | -8,352,783 | -7,124,309 | -10,207,238 | -10,699,280 |
| Mexico | Exports | 623,512 | 1,916,975 | 1,090,826 | 360,148 | 8,481,732 |
| | Imports | 615,335 | 1,147,527 | 104,443 | 172,121 | 303,785 |
| | Trade Balance | 8,177 | 769,448 | 986,383 | 188,027 | 8,177,947 |
| U.K. | Exports | 3,888,100 | 5,223,031 | 14,848,782 | 9,874,834 | 6,925,217 |
| | Imports | 5,543,193 | 9,232,542 | 12,281,187 | 9,567,165 | 12,150,257 |
| | Trade Balance | -1,655,093 | -4,009,511 | 2,567,595 | 307,669 | -5,225,040 |
| ***Italy*** | ***Exports*** | ***1,480,967*** | ***3,134,136*** | ***1,124,037*** | ***1,072,203*** | ***1,597,612*** |
| ***9th worst trade balance*** | ***Imports*** | ***1,389,432*** | ***2,535,835*** | ***1,812,720*** | ***3,079,273*** | ***2,096,114*** |
| | ***Trade Balance*** | ***91,535*** | ***598,201*** | ***-688,683*** | ***-2,007,070*** | ***-498,502*** |
| TOTAL | Exports | 94,849,658 | 136,331,883 | 166,284,842 | 140,540,957 | 149,945,425 |
| | Imports | 381,713,119 | 427,512,894 | 379,748,149 | 359,333,969 | 358,209,312 |
| | Trade Balance | -286,863,461 | -291,181,011 | -213,463,307 | -218,793,012 | -208,263,887 |

**Figure 11**
**HS 940110 – Aircraft Seats**
Canadian Trade Balance - Latest 5 Years (2007-2011)
Top 5 Largest Balances (+ or -) Plus Italy (In CAD$)

| Country | Trade | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|
| U.S.A. | Exports | 11,368,013 | 9,284,170 | 12,887,505 | 16,242,536 | 16,816,837 |
| | Imports | 31,342,236 | 34,981,717 | 29,274,707 | 27,722,075 | 37,466,009 |
| | Trade Balance | -19,974,225 | -25,697,547 | -16,387,202 | -11,479,539 | -20,649,172 |
| U.K. | Exports | 55,428 | 92,851 | 1,310,213 | 66,222 | 335,800 |
| | Imports | 54,950,853 | 56,757,315 | 34,865,606 | 19,189,411 | 6,735,045 |
| | Trade Balance | -54,895,425 | -56,664,464 | -33,555,393 | -19,123,189 | -6,399,245 |
| France | Exports | 101,612 | 10,096 | 36,146 | 53,320 | 78 |
| | Imports | 2,056,965 | 2,992,524 | 3,711,025 | 3,944,107 | 3,592,728 |
| | Trade Balance | -1,955,353 | -2,982,428 | -3,674,879 | --3,890,787 | -3,592,650 |
| Ireland | Exports | 1,056 | - | - | - | - |
| | Imports | 800,658 | 1,776,292 | 3,367,819 | 514,450 | 1,128,573 |
| | Trade Balance | -799,602 | -1,776,292 | -3,367,819 | -514,450 | -1,128,573 |
| Germany | Exports | 31,710 | 233,169 | 82,758 | 15,517 | 598,251 |
| | Imports | 136,565 | 113,734 | 172,348 | 281,880 | 284,561 |
| | Trade Balance | -104,855 | 119,435 | -89,590 | -266,363 | 313,690 |
| ***Italy*** | ***Exports*** | ***-*** | ***-*** | ***-*** | ***2,000*** | ***70*** |
| ***14th worst trade balance*** | ***Imports*** | ***7,857*** | ***2,074*** | ***14,366*** | ***15,467*** | ***4,887*** |
| | ***Trade Balance*** | ***-7,857*** | ***-2,074*** | ***-14,366*** | ***-13,467*** | ***-4817*** |
| TOTAL | Exports | 12,861,845 | 10,295,161 | 14,905,058 | 16,490,537 | 18,264,564 |
| | Imports | 90,133,983 | 97,009,203 | 73,100,528 | 52,538,729 | 49,691,700 |
| | Trade Balance | -77,272,138 | -86,714,042 | -58,195,470 | -36,048,192 | -31,417,136 |

The following table summarizes Italy's trade balance with Canada in the aerospace sector.

**Figure 12**
**Italy's Trade Balance with Canada in the Aerospace Sector (2007-2011)**
(In CAD$)

| Commodity | Trade | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|
| HS 401130 | Exports | 153,072 | 24,898 | 37,434 | 56,153 | 83,330 |
| New pneumatic tires | Imports | 2,630 | 11,938 | - | 277 | 15,585 |
| | Trade Balance | 150,442 | 12,960 | 37,434 | 55,876 | 57,745 |
| HS 4102213 | Exports | - | - | 657 | - | - |
| Retreaded tires | Imports | - | - | - | - | - |
| | Trade Balance | - | - | 657 | - | - |
| HS 840710 | Exports | - | - | - | - | - |
| Aircraft engines | Imports | 30,588 | 5,112 | 14,696 | 48,425 | 32,621 |
| | Trade Balance | -30,588 | -5,112 | -14,696 | -48,425 | -32,621 |
| HS 840910 | Exports | 85 | 540 | 55,470 | 2,285 | - |
| Parts for aircraft engines | Imports | 72,732 | 98,126 | 148,668 | 91,171 | 48,253 |
| | Trade Balance | -72,647 | -97,586 | -93,198 | -88,886 | -48,253 |
| HS 8411 | Exports | 137,129,015 | 179,108,470 | 162,950,305 | 103,147,282 | 137,253,877 |
| Turbo-jets, etc. | Imports | 55,906,463 | 71,224,567 | 60,579,927 | 43,271,901 | 65,021,511 |
| | Trade Balance | 81,222,552 | 107,883,903 | 102,370,378 | 59,875,380 | 72,232,366 |
| HS 8802 | Exports | 324,375,477 | - | 64,157,963 | 30,245,260 | - |
| Helicopters, planes etc. | Imports | 22,740,751 | 11,442,864 | 16,563,946 | 59,800,279 | 15,938,514 |
| | Trade Balance | 301,634,726 | -11,442,864 | 47,594,017 | -29,555,019 | -15,938,514 |
| HS 8803 | Exports | 28,697,849 | 46,876,039 | 36,698,350 | 35,315,353 | 31,268,810 |
| Parts for Hel., planes, etc. | Imports | 29,364,947 | 35,698,784 | 49,867,227 | 40,477,836 | 48,400,079 |
| | Trade Balance | -667,098 | 11,177,255 | -13,168,877 | -5,162,483 | -17,131,269 |

| Commodity | Trade | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|
| HS 8805 | Exports | 3,396,514 | 21,412,869 | 1,938,816 | 2,381,409 | 47,461,924 |
| Flight simulators etc. | Imports | 433,753 | 290,547 | 156,945 | 878,435 | 599,346 |
| | Trade Balance | 2,962,761 | 21,122,322 | 1,781,871 | 1,502,974 | 46,862,578 |
| HS 901410 | Exports | 29,100 | 6,416 | 1,735 | 1,875 | 1,942 |
| Dir. finding compasses | Imports | 57,688 | 39,230 | 24,902 | 4,765 | 41,451 |
| | Trade Balance | -28,588 | -32,814 | -23,167 | -2,890 | -39,509 |
| HS 901420 | Exports | 1,480,967 | 3,134,136 | 1,124,037 | 1,072,203 | 1,597,612 |
| Navigation Instruments | Imports | 1,389,432 | 2,535,835 | 1,812,720 | 3,079,273 | 2,096,114 |
| | Trade Balance | 91,535 | 598,201 | -688,683 | -2,007,070 | -498,502 |
| HS 940110 | Exports | - | - | - | 2,000 | 70 |
| Aircraft Seats | Imports | 7,857 | 2,074 | 14,366 | 15,467 | 4,887 |
| | Trade Balance | -7,857 | -2,074 | -14,366 | -13,467 | -4817 |
| **Totals** | | | | | | |
| **TOTAL Italian/Canadian Trade Balance In Aerospace** | **Exports** | **495,262,979** | **250,563,368** | **266,964,767** | **172,223,820** | **217,667,565** |
| | **Imports** | **110,006,841** | **121,349,077** | **129,183,897** | **147,667,829** | **132,198,361** |
| | **Trade Balance** | **385,256,138** | **129,214,291** | **137,780,870** | **24,555,991** | **85,469,204** |
| **TOTAL Overall Canadian Trade Balance in Aerospace** | **Exports** | **15,220,471,250** | **15,274,308,940** | **15,639,232,680** | **14,229,753,170** | **14,162,275,500** |
| | **Imports** | **11,947,305,910** | **12,452,729,770** | **11,270,204,140** | **10,008,779,470** | **10,074,294,680** |
| | **Trade Balance** | **3,273,165,340** | **2,821,579,170** | **4,369,028,540** | **4,220,973,700** | **4,087,980,820** |
| **Italian/Canadian Trade as % of Total Trade** | **Exports** | **3.25%** | **1.64%** | **1.70%** | **1.21%** | **1.54%** |
| | **Imports** | **0.92%** | **0.97%** | **1.15%** | **1.48%** | **1.31%** |

In summary, over the most recent five year period (2007-2011), **Italian – Canadian trade** in the aerospace sector has resulted in a positive trade balance in favour of Canada in every year measured, but with imports from Italy generally rising over this period while exports from Canada declined significantly, **thus narrowing the trade balance from $385 Million in Canada's favour in 2007 to just $85 Million by 2011, a reduction of over 80%**.

In terms of the **total Canadian trade balance** in the aerospace sector, Canada has enjoyed a substantial net positive trade balance over the entire 2007-2011 period, ranging from a low of $ 2.8 Billion in 2008, to a high of $ 4.2 Billion in 2010.

In terms of percentages**, Italian aerospace imports accounted for 1.31% of total imports into the Canadian aerospace sector in 2011**, while Canadian exports to Italy accounted for 1.54% of all of its exports in the aerospace sector.

In general, Canadian aerospace exports to Italy have been trending downward and Italian exports to Canada have been trending upward over the 2007 to 2011 period.

## 4.2 Production

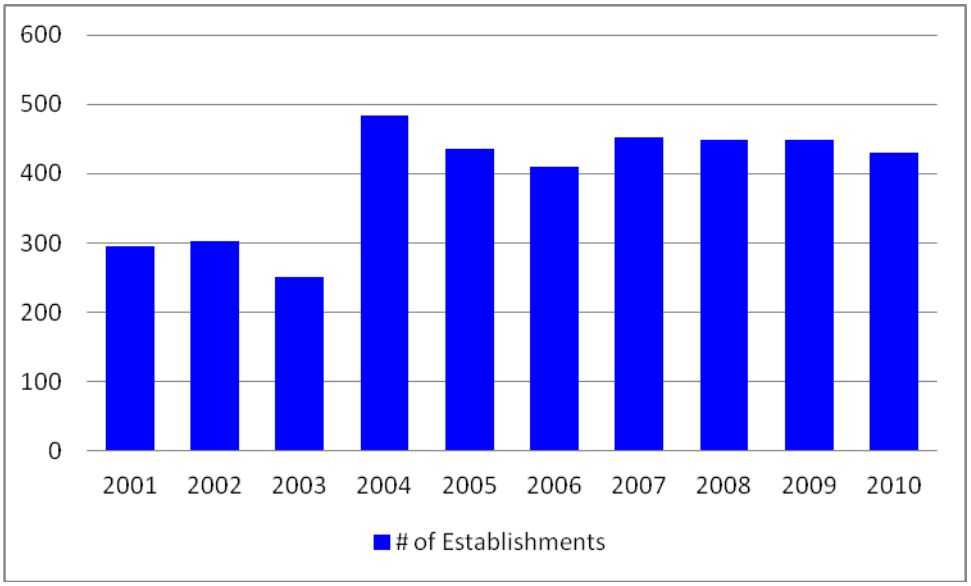
Information on production in the Canadian aerospace sector was obtained from Industry Canada, utilizing their standard North American Industry Classification System definition of the Aerospace Product and Parts Manufacturing sector (NAICS 3364).

The industry is defined as "comprising establishments primarily engaged in manufacturing aircraft, missiles, space vehicles and their engines, propulsion units, auxiliary equipment and parts thereof. Also, the development of prototypes is classified in this industry, as is the factory overhaul and conversion of aircraft and propulsion systems." There are some exclusions to this definition – see footnote.[8]

### 4.2.1 Number of Establishments

Following is the number of establishments in the Aerospace Product and Parts Manufacturing Sector, over the 2001-2010 time period, as measured by Statistics Canada's Annual Survey of Manufacturers.

**Figure 13**
**Number of Establishments in Canada: 2001-2010**
**Aerospace Products and Parts Manufacturing (NAICS 33641)**




*Source: Statistics Canada (2012)*

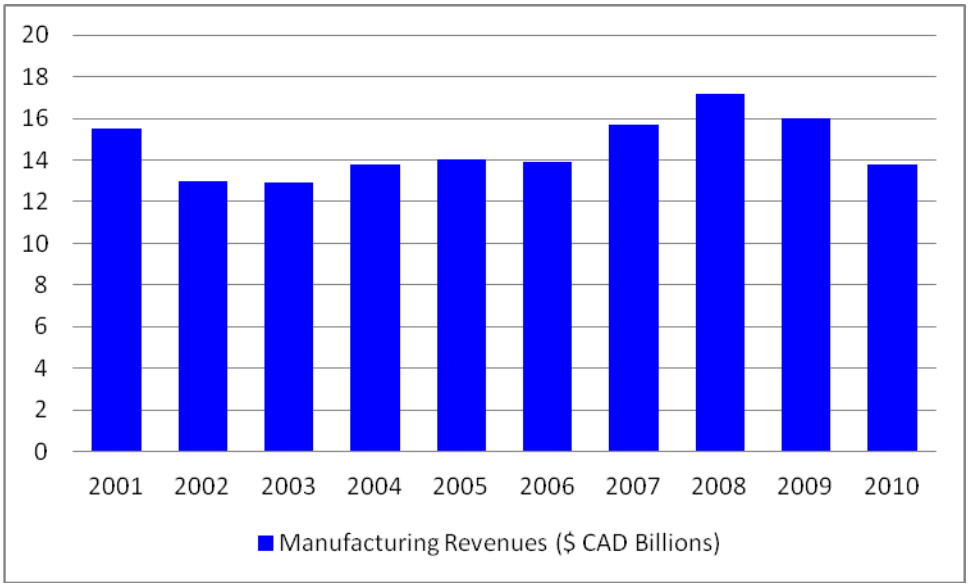
Based on the Statistics data, the chart shows that the number of aerospace establishments changed from 298 in 2001 to 430 in 2010, representing an average annual increase of 4.2%. Over the most recent year available, the number of establishments decreased by -3.6%.

[8] There are some exclusions in NAICS 3364, including aircraft fluid power assemblies, fluid power pumps, communications satellites, aeronautical instruments, aircraft intake and exhaust valves and pistons, aircraft seating, aircraft repair, except on a factory basis, and aircraft R&D.

### 4.2.2 Manufacturing Production

The following chart examines the aerospace product and parts manufacturing industry (NAICS 33641) in Canada, from 2001 through 2010, as measured by the total value of manufacturing revenues of the industry, which is the value of goods produced by its establishments, including custom and repair work, as well as goods made under contract, measured in current Canadian dollars.

**Figure 14**
**Manufacturing Production in Canada: 2001-2010 ($ CAD Billions)**
**Aerospace Products and Parts Manufacturing (NAICS 33641)**




*Source: Statistics Canada (2012)*

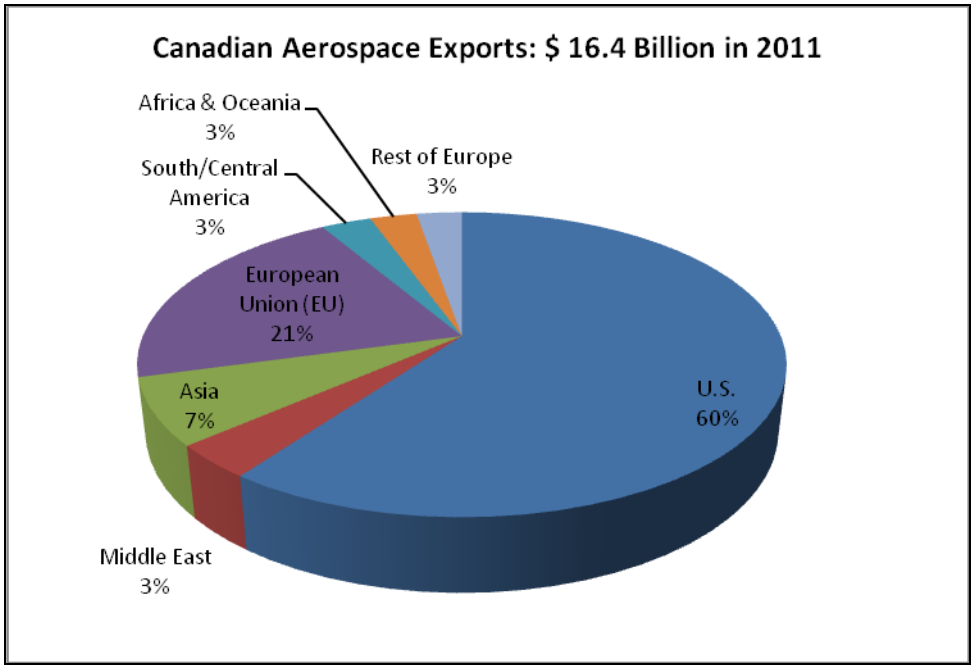
According to Statistics Canada, manufacturing in the Canadian aerospace industry decreased from $15.5 Billion in 2001 to $13.8 Billion in 2010, or at a compounded annual growth rate (CAGR) of -1.3%. Between 2009 and 2010, manufacturing revenues decreased by 13.8%.

In comparison to the total Canadian manufacturing sector, the aerospace sector's revenue performance was below the 2001-2010 average. For all industries, manufacturing revenues decreased by 0.4% annually and decreased by 6.8% from 2009 to 2010.

## 4.3 Foreign Trade

The Canadian aerospace industry is largely export-based, with an estimated $16.4 Billion in revenue (or 73% of total aerospace revenues) generated from sales to foreign markets in 2011. Overall, the largest foreign market for Canadian aerospace products and services is the U.S. accounting for an estimated $9.9 Billion in revenues (or 60.1% of total industry exports). The following graph illustrates the geographic composition of Canadian aerospace exports to foreign markets.

**Figure 15**
**Distribution of 2011 Canadian Aerospace Exports**
**By Final Market**




Source: AIAC (2012)

In terms of foreign direct investment (FDI), cumulative FDI in Canada's transportation equipment manufacturing industry reached an accumulated $ 23.6 Billion by 2011.[9] Canada is currently the fifth leading location worldwide for foreign direct investment in the aerospace industry. Over 50 foreign companies established Greenfield FDI projects in Canada's aerospace industry between 2003 and 2011.[10]

For additional information on individual countries and their trade balances in specific aerospace commodity categories, please see section 4.1.

[9] Foreign Affairs and International Trade Canada, Trade and Economic Statistics 2011
[10] fDi Markets Database, fDi Intelligence from the Financial Times Ltd., 2012

# 5.0 INDUSTRY STRUCTURE – MAJOR SECTORS

According to the Aerospace Industries Association of Canada (AIAC), the largest industry sector is **Aircraft, aircraft parts and components**, comprising 49.1% of the Canadian aerospace industry in 2011, or $11.0 Billion. The division of Canadian aerospace industry by industry subsector, by order of revenue, is as follows:

**Figure 16**
**Canadian Aerospace Industry**
**Revenues by Subsector**

| Subsector | Percentage | Revenues in 2011 |
|---|---|---|
| • Aircraft, aircraft parts and components | 49.1% | $ 11.0 Billion |
| • Maintenance, repair & overhaul (MRO) | 15.9% | $ 3.56 Billion |
| • Aircraft engines & engine parts | 13.0% | $ 2.91 Billion |
| • Avionics & electronic systems | 8.5% | $ 1.91 Billion |
| • Simulation & training | 4.4% | $ 0.99 Billion |
| • Space[11] | 4.0% | $ 0.90 Billion |
| • Other | 5.0% | $ 1.12 Billion |
| **TOTAL** | **100.0%** | **$ 22.4 Billion** |

## 5.1 Aircraft, Aircraft Parts & Components

Canada's early leadership in commercial aviation in the post-World War II period has resulted in a highly competitive Canadian aircraft systems and aircraft parts industry that is a global force. The value of its output in 2011 was $11.0 Billion.

By specializing in the production of certain types of aircraft systems and aircraft parts, Canadian firms have become world-leading suppliers in particular market niches. Many of these firms have exploited commonalities in design and manufacturing to diversify into military and non-aerospace markets.

The industry draws its strength from a combination of large, domestically-owned firms, subsidiaries of multinationals and an extensive number of smaller firms with niche expertise.

Exports represent over 70% of the Canadian aircraft systems and parts industry revenues. Most of the aircraft systems and parts produced by Canadian firms are purchases by the United States, which accounts for over 80% of Canadian aircraft systems and airplane parts exports. The Boeing Company alone annually sources over $ 1 Billion worth of aircraft systems and parts from more than200 Canadian suppliers. Increasingly though, Canadian firms are penetrating the European market. Their continuing success in winning work packages on the Airbus A380 program will help Canada continue to export its leading products around the world.[12]

In terms of complete aircraft, Canadian aerospace companies are global market leaders in regional aircraft, business jets and commercial helicopters. Canadian companies that produce aircraft include Bombardier Aerospace and Bell Helicopter Textron (see Section 6 of this report for brief corporate profiles).

In terms of key components, Canadian suppliers such as Goodyear, Messier-Bugatti-Dowty, Héroux-Devtek and Liebherr Group meet close to 30% of the world demand for landing gear, including

[11] Only selected companies and sub-sectors from the space industry are included in the AIAC analysis of the Canadian aerospace industry. The entire space sector generated revenues of $ 3.4 Billion in 2010.
[12] AIAC, November 2012

manufacturing 60% of the landing gear for large aircraft.[13]

**Regional Aircraft**: Since entering service in 1992, the Bombardier CRJ Regional Jet has revolutionized air travel, becoming the aircraft of choice in the regional jet sector. Today, with some 600 in service and another 1,500 on order or option, the CRJ has become the most successful regional jet in history.

Bombardier's Q-Series Dash 8 family of regional turboprops has an enviable reputation among the world's leading airlines. Designed for high passenger comfort, reliability, maintainability and low operating costs, the Dash 8 is the market leader in the 20 to 90 seat turboprop class.

**Business Jets**: Bombardier leads the global jet business with a range of products that include the light and midsize Learjet family, the wide-body Challenger 604 and the ultra-long range Global Express. Newer additions include the Challenger 300 and the Global 5000 Super-Large Business Jet.

**Commercial Helicopters**: Bell Helicopter Textron is the world's leading producer of rotary wing aircraft. Bell's Commercial Helicopter Division is responsible for the design, manufacturing and after-sales support for all Bell's commercial helicopters. In total, Canada produces over 20% of global civil turbine helicopters through forms such as Bell Helicopter Textron.[14]

## 5.2 Maintenance, Repair & Overhaul (MRO)

Canadian MRO companies generate more than $3.5 Billion in annual revenues and employ 17,000 highly skilled workers. According to the Government of Canada[15], Canada's strengths include business, regional and narrow-body aircraft MRO, helicopter MRO, business aircraft interiors, special mission modifications, and gas turbine engine and landing gear MRO. Canada has a uniquely comprehensive engine MRO capability, ranging from small turboshafts and turboprops to large turbofan engines.

Major facilities include Pratt & Whitney, Rolls-Royce, Magellan Aerospace, Standard Aero and Vector Aerospace. Canada also has a network of specialist companies in inspection and repair services and specialized IT support systems.

## 5.3 Aircraft Engines & Engine Parts

Canada has earned an excellent reputation as a supplier of aircraft engines, aircraft engine parts, engine systems and components, with a focus on small turbofan, turboprop and turboshaft engines. Canadian-built airplane engines power a broad range of business, regional and utility aircraft and helicopters, and Canadian engines are currently operating in nearly 200 countries around the word.[16]

Aircraft engines and engine part sales and service currently account for 13% of total Canadian aerospace output and exports comprise 80% of total sales. The United States is the single largest destination of Canadian aircraft engines and engine parts, followed by Europe and then Asia. Annual R&D investment in the Canadian aeroengine segment averages nearly 15% of total sales.

The Canadian aerospace industry currently supplies 30% of the global demand for small gas-turbine engines.[17] Major global investors include Pratt & Whitney, Rolls-Royce and GE Aviation.

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[13] **Aerospace – Canada's Competitive Advantages,** Invest in Canada, Government of Canada http://investincanada.gc.ca/eng/industry-sectors/aerospace.aspx, Page 6

[14] **Aerospace – Canada's Competitive Advantages,** Invest in Canada, Government of Canada http://investincanada.gc.ca/eng/industry-sectors/aerospace.aspx, Page 6

[15] **Aerospace – Canada's Competitive Advantages,** Invest in Canada, Government of Canada http://investincanada.gc.ca/eng/industry-sectors/aerospace.aspx, Page 6

[16] AIAC, November 2012

[17] Area Development, **Canada: An Economy You Can Count On**, 2012

Canadian aeroengine specialists apply the highest quality standards to ensure reliability and safety. Manufacturing and repair certifications and authorizations include Transport Canada, United States FAA, European JAA and those of other national regulatory bodies. ISO 9000 certification is widespread throughout the Canadian aeroengine industry.

## 5.4 Avionics & Electronic Systems

Canada's aerospace companies produce market-proven avionics products and avionics mission systems that incorporate the latest technology. These companies offer world-class civil aircraft avionics suites, military aircraft command and control systems, visualization imagery devices, airborne surveillance devices, and air navigation management aids.

Canada's avionics and mission system capabilities are concentrated in about a dozen large firms. Most are subsidiaries of foreign aerospace multinationals. In many cases, these Canadian subsidiaries have been given world mandates doe their avionics products and systems. As a result, the Canadian segment of the global industry enjoys strong intra-firm business relationships that transcend national borders.

According to the AIAC, the value of the Canadian avionics and electronic systems subsegment is $1.9 Billion.

## 5.5 Flight Simulation & Training

The Canadian aerospace industry is a global market leader in flight simulation and training, with industry revenues of $1 Billion in 2011. Canadian aerospace companies lead the world in the design and manufacture of large flight simulators, visual systems and flight training devices. This strength is complemented by firms that specialize in meeting the growing customer demand for smaller-scale innovative aviation training solutions built around interactive devices and computer-aided learning systems.

Canadian-made products from companies such as CAE and Mechtronix hold a 70% share of the world market for full flight simulators and related services.[18]

Canada is at the forefront of the design and manufacture of commercial full-flight simulators. Canadian-made flight simulators provide training on a wide range of aircraft types, including the latest models of Airbus, Boeing, Bombardier and Embraer. Canada also holds down the number one spot in producing systems that replicate the visual environments in which both commercial and military pilots operate.

In addition, the global aircrew training market is roughly 20 times the size of the simulator market itself. Building upon its core business, Canadian simulator producers have now entered the simulator market to provide customers with total training solutions.

## 5.6 Satellite, Robotics & Space-Based Services

Canada's space technology companies are among the best in the world. Building on the skills of over 5,000 highly skilled workers, nearly 2,000 of whom are engineers and scientists , there are over 200 Canadian space firms, research organizations, universities and governmental departments and agencies that have acquired world-leading capabilities in satellite-based communication services, space robotics and earth observation.

Telecommunications is the largest space technology subsector in Canada. Canada's space industry is the second-largest provider of global navigation satellite systems equipment, following the U.S. More than

[18] Area Development, **Canada: An Economy You Can Count On**, 2012

80 Canadian firms manufacture and service electronics products for aviation and space navigation. And they also provide specialized expertise in GIS applications, wireless solutions, GPS and inertial navigation systems, and satellite distribution systems.

Canada's space industry, working in partnership with the Canadian Space Agency, has achieved world recognition for expertise in space robotics and automation beyond that of any other nation. This leadership is shown specifically by the U.S. Space Shuttle's Canadarm and its successor on for the International Space Station (ISS).

According to the AIAC, revenues for this subsector in 2011 among selected companies account for approximately $1 Billion, with the complete sector, including the government/public and academic segments, accounting for revenues of $3.4 Billion. Over the past five years, total revenues generated by the Canadian space sector have increased by 38%, or $ 938 Million. The Compound Annual Growth Rate (CAGR) from 2006 through 2010 was 6.6%.

# 6.0 SOME MAJOR AEROSPACE MANUFACTURERS IN CANADA

According to the Aerospace Industries Association of Canada (AIAC), there are over 500 aerospace firms located in Canada, collectively employing over 87,000 Canadians. The following section briefly highlights 14 of the larger and most important corporate players in the Canadian aerospace sector:

## 6.1 Avcorp Industries Inc.

Avcorp designs and builds major airframe structures for some of the world's leading aircraft manufacturers. It produces high-strength interior panels, fuel tanks and structural wing components, as well as fully integrated vertical and horizontal stabilizers, is providing primary flight structures for the Cessna Sovereign and Citation CJ3 business jets. Avcorp supplies outboard wings to the Joint Strike Fighter (JSF) program.

Over the past 50 years, it has partnered with and supplied our customers with tail structures, wing structures and other aircraft structures for their business, regional and commercial jets. It has new partnerships to supply wing structures for defence and advanced jets. It has a proven track record for applying the latest lean manufacturing principles and engineering design solutions to provide the highest quality, reliable delivery and target cost for our customers.

Avcorp is a Canadian public company with more than 50 years of experience, 550 skilled employees and 354,000 square feet of facilities.

**Avcorp Industries Inc.**
10025 River Way
Delta, British Columbia
Canada V4G 1M7

Tel: 604-582-6677
Fax: 604-582-2620
Web: www.avcorp.com

## 6.2 Bell Helicopter Textron Canada Ltd.

Bell Helicopter Textron Canada Limited (BHTCL), located in Mirabel, Quebec, is a division of Bell Helicopter Textron Inc. (BHTI), whose head office is located in Fort Worth, Texas. Bell Helicopter is a world leader in the manufacturing of commercial and military helicopters. More than half the helicopters flying over the globe are Bell helicopters.

Inaugurated in 1986, the Mirabel plant has the exclusive mandate for the production of Bell Helicopter's commercial aircraft. It spreads out over 61,000 square meters and employs a young and dynamic manpower totalizing approximately 2,400 people. To date, it has built over 4,000 helicopters for delivery worldwide and its annual production averages 200 helicopters.

Production consists of the Bell 206L-4 LongRanger, and 407 single-engine aircraft, the world's newest civil helicopter, the light twin engine Bell 429 and the 412P in the medium class.

Each year, a significant amount of BHTCL's total payroll is invested into training. Each employee receives an average of 40 hours of training every year.

**Bell Helicopter Textron Canada Ltd.**
12 800 rue de l'Avenir
Mirabel, Quebec
CANADA J7J 1R4

Tel: 450-437-3400
Web: www.bellhelicopter.com

## 6.3 Bombardier Inc.

Bombardier, Inc. manufactures transportation solutions, from commercial aircraft and business jets to rail transportation equipment, systems and services. The company operates in two manufacturing segments: Aerospace and Transportation. Its revenues in 2011 were $ 18.3 Billion USD.

The aerospace segment engages in the design and manufacture of aviation products and is a provider of related services for the business, commercial, amphibious and specialized aircraft markets. Aerospace has 10 manufacturing and engineering sites and an international service and support network, with a presence in 23 countries. In the aerospace segment the company's principal customers are located in approximately 100 countries and are primarily civil owner-operators or aviation service providers. They consist primarily of corporations and high net worth individuals for business aircraft, and airlines and leasing companies for commercial aircraft.

The transportation segment operates in the rail industry. Transportation has 50 production and engineering sites and 21 service centres in 24 countries. Additionally, Transportation operates approximately 40 service centers at customers' premises across the world. Transportation segment has customers in 60 countries.

Bombardier is the world's third largest civil aircraft manufacturer, and is a leader in the design and manufacture of innovative aviation products/services for business, commercial and amphibious aircraft markets. Bombardier Aerospace has manufacturing facilities in Canada, the U.S., the U.K. and Mexico.

**Bombardier Inc.**
800 René-Lévesque Boulevard West,
Montréal, Quebec
Canada H3B 1Y8

Tel: 514-861-9481
Fax: 514-861-7769
Web: www.bombardier.com

## 6.4 CAE Inc.

CAE Inc. (formerly Canadian Aviation Electronics) is a leading provider of simulation technologies, modelling technologies and integrated training services to airlines, aircraft manufacturers, and defense customers worldwide. The company has annual revenues in excess of $1.6 Billion, with manufacturing operations and training facilities in 30 countries on five continents. It was founded in 1947.

CAE has sold over 1,000 simulators and training devices to more than 130 airlines, aircraft manufacturers and training centres. It licenses its simulation software to various market segments and has a professional services division assisting customers with a wide range of simulation-based needs. The simulators range from basic, desktop version such as CAE Simfinity (TM) all the way to full-motion, complete solutions such as the CAE 5000 & 7000. These simulators are available for commercial and uses, for a wide range of aircraft.

CAE conducts pilot training on over 210 full flight simulators in its more than 42 aviation training centres, serving approximately 3,500 airlines, aircraft operators and manufacturers across the globe. In the US, the firm is a major supplier of initial and recurring training for non-airline based companies, including charter and cargo operators too small to offer in-house training. CAE trains approximately 100,000 crew members every year at 29 civil aviation and military training centers.

**CAE Inc.**
8585 Cote de Liesse
Montreal, Quebec
Canada H4T 1G6

Tel: 514-341-6780
Fax: 514-341-7699
Web: www.cae.com

## 6.5 CMC Electronics Inc.

CMC Electronics is a world leader in the design, manufacture, sales and support of high-technology electronics products for the aviation and global positioning markets. The company's principal locations are in Montreal, Quebec; Ottawa, Ontario; and Chicago, Illinois. Formerly known as Canadian Marconi Company, CMC Electronics has been designing and building innovative communication and electronics systems since 1903.

CMC Electronics' business strategy is to gain a leadership position in growing niche markets where products and systems of the utmost quality, highest reliability and most innovative features are required. The company is a major supplier to the aerospace and high-technology industries, airlines, military agencies and government customers around the world.

CMC Electronics has two primary operating business units: Avionics Products, and Cockpit System Integration. The NavComm business unit is Canada's largest distributor of marine electronics. According to its 2009 corporate presentation, 50% of the company's sales go to the USA, 19% to Canada, and 31% to overseas customers. It has an approximate 50/50 split between commercial sales and military sales.

CMC is a wholly owned subsidiary of Esterline Corporation (NYSE:ESL, www.esterline.com), a specialized aerospace and defense company headquartered in Bellevue, Washington. Esterline employs over 10,000 people worldwide.

**CMC Electronics Inc.**
600 Dr. Frederik Philips Boulevard
Saint-Laurent, Québec
Canada H4M 2S9

Tel: 514-748-3148
Fax: 514-748-3100
Web: www.cmcelectronics.cs

## 6.6 Composites Atlantic Ltd.

Composites Atlantic Ltd. (CAL) is a leading aerospace company in Atlantic Canada, and is recognised as a fast-growing leader in the design, testing, certification and manufacturing of advanced composites for the aerospace, space, defence and commercial industries. CAL's main facility consists of 150,000 square foot (14,000 $M^2$) dedicated to operations and administration. Composites Atlantic Limited (CAL) is a subsidiary of EADS Sogerma.

CAL has earned a reputation as a leader in the design, development and manufacturing of advanced composites for the aeronautic, space and defense industries. It has been present in both the national and international market since 1988. Its team of over 300 personnel serves our customer base with experience in project management, engineering, design, development, testing, procurement, quality assurance and manufacturing.

Through the support of various strategic investments from the Government of Canada, CAL continues to advance its technologies and extend its market breadth in the aerospace and defence industries. Programs such as the Atlantic Innovation Fund provide CAL the opportunity to further its advanced composites innovation and technology development.

Composite Atlantic's top ten customers are: Bombardier, EADS Sogerma, Spirit Aerosystems, Boeing Winnipeg, Boeing USA, Honeywell-Grimes, Northrop-Grumman, Goodrich, Vought and Short Brothers.

**Composites Atlantic Ltd.**
71 Hall Street, P.O. Box 1150
Lunenburg, Nova Scotia
B0J 2C0

Tel: 902-634-8448
Fax: 902-634-8398
Web: www.compositesatlantic.com

## 6.7 Honeywell Canada Aerospace

Honeywell Canada Aerospace activities are composed of several lines of business: Electric Power, Electronic Control Systems; In Flight Communication Systems; In Flight Data Networking Solutions; Repair & Overhaul Services; and Aftermarket Services

Honeywell aerospace products and services are used globally on virtually every commercial and business aircraft operating today as well as for defence and space applications. The company provides integrated avionics, engines, systems, and service solutions, listening carefully to our customers and focusing on the technologies that best meet their needs to make flying safer, more reliable, more efficient, and more cost effective.

Honeywell's 330,000 square foot Mississauga, Ontario facility supports the global Aerospace marketplace in the design, development, manufacture and aftermarket support of a comprehensive Electronic Controls and Electric Power Generation, Distribution and Conversion portfolio. Honeywell Aerospace also has a site in Ottawa, ON, and a Repair and Overhaul/Aftermarket Services site in Winnipeg, MB.

Honeywell is a Fortune 100 company that invents and manufactures technologies to address tough challenges linked to global macro-trends such as safety, security and energy. With approximately 122,000 employees worldwide, including more than 19,000 engineers and scientists, Honeywell has an unrelenting focus on quality, delivery, value and technology in everything it makes and does.

**Honeywell Canada Aerospace**
3333 Unity Drive
Mississauga, ON
L5L 3S6

Tel: 905-608-6000
Web: www.honeywell.com

## 6.8 Héroux-Devtek

Headquartered in Longueil, Québec, Canada, Héroux-Devtek is a globally active company serving the Aerospace markets from eight production facilities in North America. The Company's 65 year longevity, flexibility, and track record for the development and implementation of innovative production systems have distinguished it as a leader in the Landing Gear market.

Héroux-Devtek is a long-trusted Landing Gear supplier to the most significant producers of aircraft worldwide. In both the commercial and military sectors, Héroux-Devtek provides a production capacity for programs of any size to Original Equipment Manufacturers or Tier 1 players. Its offerings cover the full spectrum, from design to manufacturing, from new landing gear to spare parts, including repair and overhaul services. Over 1,000 employees, including 75 professionals in its design engineering team focused on innovation work in the Company's eight landing gear facilities in Quebec, Ontario, and Ohio. The Company's emphasis on Research & Development, its systems integration accomplishments, and its engineering prowess are increasingly making Héroux-Devtek a preferred partner for the design, qualification and manufacture of complete landing gear systems.

Héroux-Devtek supplies door-locking mechanisms to the Joint Strike Fighter (JSF) program.

**Héroux-Devtek**
1111 Saint-Charles Street W.
Suite 658, East Tower,
Complexe Saint-Charles, Longueil, QC
J4K 5G4

Tel: 450-679-3330
Web: www.hereouxdevtek.com

## 6.9 Magellan Aerospace Corp.

Magellan has over 80 years of collective knowledge and experience in the aerospace industry. The organization officially adopted the name “Magellan Aerospace Corporation” in 1996; deriving it from the intrepid explorer Ferdinand Magellan. His global exploits at the turn of the 15th century established a number of firsts. Magellan’s vision was to carry this same legacy into the future of the aerospace industry.

Magellan Aerospace Corporation designs, manufactures and repairs aeroengine and aerostructure components and assemblies in addition to advanced products for military and space markets. Based in Canada, the U.S. and the United Kingdom, with a processing centre in India, Magellan provides its global original equipment manufacturers (OEMs) and tier-one customers with the solutions they need. Magellan Aerospace is an integrated leader selling products and services in the global aerospace industry. We develop emerging market supply chains to support manufacturing participation in assisting our customer’s market development.

Magellan supplies primary flight and propulsion structures to the Joint Strike Fighter (JSF) program.

Magellan’s current focus is centered in Asia with supply development in India and China.

**Magellan Aerospace Corporation**
3160 Derry Road East
Mississauga, Ontario
Canada L4T 1A9

Tel: 905-677-1889
Fax: 905-677-5658
Web: www.magellan.aero

## 6.10 Mechtronix Inc.

Mechtronix Inc. is a leading Canadian company in the global flight simulation and training market specializing in the design and manufacture of flight simulation training devices (FSTD) for commercial, general and business aviation.

Founded in 1987, the company currently 200 employees and is based out of Montreal in Canada's aviation hub with a customer base in the Americas, Europe, the Middle-East and Asia. The company’s products range from full flight simulators (FFS) to flight training devices (FTD). They have technical support centers strategically located around the globe to support worldwide customers that include major airlines, training centers and training organizations.

Mechtronix has a worldwide track record with airlines, training centers and flight schools in commercial aviation, general aviation and business aviation sectors.

Commercial customers include: ATR Training Centre, CSA Czech Airlines, Copa Airlines, Lufthansa Flight Training, Malév Hungarian Airlines, Northwest Airlines and TACA Airlines. General and business aviation customers include: Boeing Training & Flight Services, Cargair, Centre Québécois de Formation Aéronautique, Civil Aviation Flight University of China, Flight Training Europe, Oxford Aviation Academy, International Flight Training Center(IFTC), University of North Dakota.

**Mechtronix Systems Inc.**
6767 Cote de Liesse
St. Laurent, Québec
Canada

Email: info@mechtronix.com
Tel: 514 342-0800
Fax: 514 342-0701
Web: www.mechtronix.com

## 6.11 Messier-Dowty

Messier-Dowty is an aerospace parts manufacturer specializing in landing gear and landing systems. Situated in Ajax, Ontario, near Toronto, Messier-Dowty's 19,000 $m^2$ Canadian facility employs more than 500 people. Like the Gloucester and Bidos facilities, the Toronto facility has been manufacturing landing gears for over 50 years. Activities include a total capability from concept to in-service support including design, development, test, manufacture, assembly, sales, marketing and product support.

Core competencies include the design and development of fully integrated landing gear systems that comprise not only the main and nose landing gear components, but ancillary systems such as steering control, landing gear control & indication, emergency control, brake control, wheels, brakes, tires, door mechanisms and electrical harnesses. The manufacture of critical landing gear components remains a principal activity and the facility also has a state-of-the-art final assembly area where landing gear systems for a variety of aircraft programs are fully assembled and tested prior to delivery.

Programs include Boeing 787, Bell/Agusta BA609, Bell-Boeing V-22 Osprey, Boeing F/A-18E/F, Bombardier's Global and Challenger families, the CRJ200 and Dash 8 Q100, Q200 & Q300, Dassault Falcon 7X, Raytheon 800 XP and Hawker 4000.

In addition**,** 35 people at Toronto are dedicated to the maintenance and repair of small to medium landing gears and related hydraulic components in the Americas.

**Messier-Dowty Inc.**
574 Monarch Ave
AJAX, Ontario, L1S 2G8

Tel: 905-683-3100
Fax: 905-686-2914
Web: www.safranmbd.com

## 6.12 Pratt & Whitney Canada Corp.

Pratt & Whitney Canada Corp. (P&WC), based in Longueil, Quebec, is a global aerospace leader, shaping the future of business, helicopter and regional aviation with new generation engines. The company also offers advanced engines for industrial applications. P&WC's operations and service network span the globe. It powers the largest fleet of business and regional aircraft and helicopters – 49,000 engines in more than 200 countries. It employs approximately 9,000 people around the world including approximately 6,200 in Canada.

P&WC is a leader in the development of green technologies and a true innovator with an unmatched record of over 70 new engines introduced into production over the last 17 years. The company's new generation engines surpass ICAO standards for low emissions and low noise. The company manufactures 13 distinct engine families: JT15D, PT6A, PT6B, PT6C, PT6T, PW100, PW150, PW200, PW210, PW300, PW500, PW600 and PW800.

According to the company, P&WC is the No. 1 research & development investor in Canadian aerospace. It invests over $400 million per year in R&D, and works with approximately 20 Canadian universities and the National Research Council to develop new technologies and processes. It has committed $1.5 billion over a 5 year period to create the next generation of green technologies in its research and manufacturing facilities across Canada and around the world. P&WC is a subsidiary of United Technologies Corporation, a high-technology company based in Hartford, Connecticut.

**Pratt & Whitney Canada Inc.**
1000 Marie-Victorin Blvd.
Longueil, Quebec
J4G 1A1 Canada

Tel: 450-677-9411 (Non-customer general enquiries)
Fax: 450-647-3620
Web: www.pwc.ca

## 6.13 StandardAero

Founded in 1911, StandardAero is one of the largest independent MRO and aviation service businesses in the world, providing comprehensive services for business and general aviation, air transport, and military aircraft. Part of Dubai Aerospace Enterprises (DAE) Engineering division, it brings global customers the unique knowledge and expertise they expect from an industry leader. 2011 sales are approximately $ 1.5 Billion.

StandardAero's strength comes from over 4,200 employees working out of 12 primary facilities in the United States, Canada, Europe, Singapore and Australia (1,400 of them in Canada), with an additional 14 regionally located service and support locations. Serving customers in over 80 countries**,** StandardAero is among the largest small-turbine engine maintenance and repair companies in the world, providing MRO services for General Electric, Rolls-Royce, Honeywell and P&WC engines.

StandardAero has experienced continued, significant success and has been consistently recognized as one of the top growing companies in Western Canada in recent years. With the help of its longstanding relationship with the Department of National Defence / Canadian Forces, StandardAero has been able to grow significantly and build its international profile, as well as facilitate technological advancements in aerospace that may potentially provide significant financial returns to Canada.

**StandardAero**
Business Unit: Helicopter Programs
130-6080 Russ Baker Way,
Richmond, BC. V7B 1B4

Tel: 604.273.6040
Web: www.standardaero.com

## 6.14 Thales Canada Inc.

Thales Canada has 1,300 employees in Montreal, Quebec City, Ottawa, Toronto and Vancouver working in Transportation, Defence & Security, and Aerospace. Sales across Thales operations in Canada were $500 million (CAD) for 2011 to a range of customers including urban rail service providers, civil aviation companies, and military and security agencies. Globally in 2010 the company generated revenues of $18 billion and employed 68,000 people in 50 countries.

Since 1967, Thales has provided the Navy with the largest supply of sensors and is currently delivering 71 C2 systems to the Navy and Coast Guard under IMIC3. The selection of its shipbuilding partner, Seaspan, for the non-combat National Shipbuilding Procurement Strategy contracts, establishes Thales Canada as a key systems integrator for the Coast Guard and the Navy. Through the long term LCSS partnership with the Army, Thales Canada provides the Army with the core of its command and control system and is a key partner in DND's development of future Joint systems. Thales is also a Prime Contractor for the Royal Canadian Air Force delivering a turnkey communications system on the CP 140 Communications Management Systems (CMS) program, and a complex mission system and radar under the Tactical Control Radar (TCR) program.

Since 1997, Thales Canada also provides all of its driver vision enhancement and thermal imaging systems. In partnership with DRDC, Thales Canada has also developed the next generation Counter IED system and will be exporting that capability in 2012. Thales Canada has developed a comprehensive organic training and simulation expertise which it is leveraging in all elements of its business.

**Thales Canada Inc.**
1 Chrysalis Way
NEPEAN, Ontario
K2G 6P9

Tel: 613-723-7000
Fax: 613-723-5600
Email: inquiries@ca.thalesgroup.com
Web: www.thalesgroup.com/canada

# 7.0 KEY INDUSTRY PLAYERS

## 7.1 Associations

According to Deloitte and Touche, as of 2010, the national trade association representing the interests of about 500 Canadian aerospace manufacturing and services companies, the Aerospace Industries Association of Canada (AIAC) has 79 direct members, with most other aerospace-related companies belonging to aerospace industry provincial associations. Figure X below shows the distribution of these companies in Canada.

**Figure 17**
**Membership of Canadian Aerospace Industry Associations**

| | Website | Province | Members |
|---|---|---|---|
| Aerospace Industries Association of Canada | www.aiac.ca | All | 79 |
| Ontario Aerospace Council | www.theoac.ca | Ontario | 130 |
| Aerospace Quebec Association | www.aqa.ca | Quebec | 135 |
| Aerospace & Defence Ind. Assoc. of Nova Scotia | www.adians.ca | Nova Scotia | 22 |
| Aerospace & Defence Ind. Assoc. of Newfoundland & Labrador | www.adianl.ca | Newfoundland & Labrador | 14 |
| SASK Aerospace & Defence Inc. | www.enterprisesask.ca | Saskatchewan | 6 |
| Aerospace Industry Association of B.C. | www.aiabc.com | British Columbia | 40 |
| Aviation Alberta | www.aviationalberta.com | Alberta | 34 |
| Manitoba Aerospace | manitoba-aerospace.mb.ca | Manitoba | 29 |
| New Brunswick Aerospace & Defence Assoc. | www.nbada.ca | New Brunswick | 30 |
| Aerospace Prince Edward Island | www.aerospacepei.com | P.E.I. | 8 |

### 7.1.1 AIAC – Aerospace Industries Association of Canada

The AIAC is the national voice of Canada's aerospace industry. Its mission is to understand, build consensus and provide leadership on aerospace policy issues of interest to the industry. It also works to increase Canada's profile on the world stage by communicating Canada's air and space accomplishments and by promoting Canadian aerospace companies in foreign markets.

AIAC's committees support and assist the development of specific aerospace industry segments or topics. Its committees include:

- Defence Committee
- Space Committee
- Suppliers Development Committee
- Civil Aviation Committee
- International Exhibitions Committee
- Public Affairs Committee

**Aerospace Industries Association of Canada (AIAC)**
Claude Lajeunesse, President and Chief Executive Officer
Suite 1200, 60 Queen Street
Ottawa, Ontario K1P 5Y7
Telephone: 613-232-4297
Fax: 613-232-1142
Website: http://www.aiac.ca/

### 7.1.2 ATAC – Air Transport Association of Canada

The Air Transport Association of Canada (ATAC), founded in 1934, represents over 95 percent of commercial aviation in Canada. ATAC membership includes MROs, approved maintenance organizations and OEMs, as well as operator members such as major international airlines, international charter airlines, regional airlines, cargo airlines, air taxi operators, helicopter operators and flight training schools.

**Air Transport Association of Canada (ATAC)**
J.C. (Cliff) Mackay, President and Chief Executive Officer
Suite 1100, 255 Albert Street
Ottawa, Ontario K1P 6A9
Telephone: 613-233-7727
Fax: 613-230-8648
Website: http://www.atac.ca/

### 7.1.3 Provincial Aerospace Associations

There are aerospace industry associations in every Canadian province. According to the Government of Canada, the current contact coordinates for the various provincial associations are as follows:

**Aerospace & Defence Industry Association of Newfoundland and Labrador (ADIANL)**
Sharon Beattie - General Manager
90 O'Leary Avenue
St. John's, Newfoundland and Labrador A1B 2C7
Telephone: 709-772-7340
Fax: 709-772-6090
Website: http://www.adianl.ca/pages/home.php

**Aerospace & Defence Industries Association of Nova Scotia (ADIANS)**
Catherine MacDonald - Managing Director
Suite 705, 1800 Argyle Street
Halifax, Nova Scotia B3J 3N8
Telephone: 902-425-0070
Fax: 902-424-0964
Website: http://www.adians.ca/

**Aerospace Industry Association of British Columbia (AIABC)**
David Fox - President
102-211 Columbia Street
Vancouver, British Columbia V6A 2R5
Telephone: 604-638-1477
Fax: 604-681-4545
Website: http://www.aiabc.com

**Aerospace PEI**
Mark Booth - President
175 Greenwood Drive
Summerside, Prince Edward Island C1N 5X6
Telephone: 1-800-811-6311
Fax: 902-888-2088
Website: http://www.aerospacepei.com/

**Aviation Alberta**
Don Matthews - President and Chief Executive Officer
Calgary International Airport
Box 112, 2000 Airport Road North East
Calgary, Alberta T2E 6W5
Telephone: 403-717-2272
Fax: 403-735-1281
Website: http://www.aviationalberta.com/

**Manitoba Aerospace Association (MAA)**
Vic Gerden - Executive Director
38 Lindenwood Place
Winnipeg, Manitoba R3P 1M3
Telephone: 204-471-9979
Fax: 204-489-7024
Website: http://www.manitoba-aerospace.mb.ca/

**New Brunswick Aerospace and Defence Association (NBADA)**
Cheryl Woods - Director
570 Queen Street
Post Office Box 787, Postal Station A
Fredericton, New Brunswick E3B 5B4
Telephone: 506-622-3299
Website: http://www.nbada.ca

**Ontario Aerospace Council (OAC)**
Rodney I. Jones - Executive Director
549 Mill Park Drive
Kitchener, Ontario N2P 1V4
Telephone: 519-895-2442
Fax: 519-895-2452
Website: http://www.ontaero.org/

**Quebec Aerospace Association (AQA)**
Jacques Saada, President – General Manager
5145 Decelles Avenue, NRC, Room 424
Montréal, Québec H3T 2B2
Telephone: 514-596-2388
Fax: 514-596-3395
Website: http://www.aqa.ca/

**SASK Aerospace & Defence Inc.**
Stu McIntosh - President, Saskatchewan Aerospace & Defence Inc.
Tel: (306) 694-2701
206 15 Innovation Blvd, Saskatoon, SK S7N 2X8

## 7.2 Unions

Across Canada as of January 2011, 4,625,777 workers were covered by collective agreements. This corresponds to a union coverage rate (union coverage as a percentage of non-agricultural paid workers) of 30.2%, practically unchanged since 2003.

Following are some of the key unions and associations in the Canadian aerospace sector:

- **Air Canada Pilots Association (ACPA)** is the federally certified bargaining agent for pilots employed at Air Canada. The Association was founded to further the best interests of the Air Canada pilots and is organized and directed by the membership, for the benefit of the membership. The ACPA represents approximately 3,200 pilots.

- **Air Line Pilots Association, International (ALPA)** is the largest airline pilot union in the world and represents nearly 51,000 pilots at 35 U.S. and Canadian airlines. Founded in 1931, the Association is chartered by the AFL-CIO and the Canadian Labour Congress. Known internationally as US-ALPA, it is a member of the International Federation of Air Line Pilot Associations.

- **Canadian Auto Workers (CAW)**: The Canadian Auto Workers' union is the largest private sector union in Canada with over 200,000 members from coast to coast. The CAW has several union locals organized within the aerospace sector, including: Pratt and Whitney – Local 510, Bombardier/de Havilland – Local 112, Boeing Canada – Local 1967, CAW Local 2169, CMC Electronics, IMP Group, Magellan Aerospace/Bristol – Local 3005, and Cascade Aerospace Inc - CAW Local 114.

- **Canadian Airline Dispatchers Association (CALDA).** CALDA is a professional association representing the Flight Dispatchers of four major airlines in Canada.

- **Canadian Flight Attendant Union (CFAU)**. Its 1,000 members are responsible for the safety of 30,000 passengers they carry every day on nearly 800 departures through Canada and North America.

- **Canadian Union of Public Employees (CUPE)** represents approximately 6,700 Air Canada flight attendants.

- **International Association of Machinists and Aerospace Workers (IAMAW)** The IAMAW has over 8,600 members and is Air Canada's largest union.

# 8.0 REGULATORY ENVIRONMENT

## 8.1 Customs & Tariff Rules, Regulations & Non-Tariff Barriers

### 8.1.1 Customs & Tariff Rules

In terms of Tariffs, according to the Canada Customs and Revenue Agency, the MFN Tariff (Most Favoured Nation – which applies to Italy), is as follows:[19]

| | | Tariff |
|---|---|---|
| • **HS 401130** | New pneumatic tires – for aircraft | Free |
| • **HS 401213** | Retreaded tires – for aircraft | Free |
| • **HS 840710** | Aircraft engines | Free |
| • **HS 840910** | Parts for aircraft engines | |
| • **HS 8411** | Turbo-jets, turbo-propellers and other gas turbines | Free |
| ○ 841111 | Turbo-jets – thrust not exceeding 25 KN | Free |
| ○ 841112 | Turbo-jets – Thrust exceeding 25 KN | Free |
| ○ 841121 | Turbo-propellers – Power not exceeding 1,100 KW | Free |
| ○ 841122 | Turbo-propellers – Power exceeding 1,100 KW | Free |
| ○ 841181 | Gas turbines NES – Power not exceeding 5,000 KW | Free |
| ○ 841182 | Gas turbines NES – Power not exceeding 5,000 KW | Free |
| ○ 841191 | Parts of turbo-jets or turbo-propellers | Free |
| ○ 841199 | Parts of gas turbines NES | Free |
| • **HS 8802** | Helicopters, airplanes and spacecraft | |
| ○ 880211 | Helicopters of an unladen weight (2,000 Kg or less) | Free |
| ○ 880212 | Helicopters of an unladen weight (more than 2,000 Kg) | Free |
| ○ 880220 | Airplanes of an unladen weight (2,000 Kg or less) | Free |
| ○ 880230 | Airplanes of an unladen weight (2,000 – 15,000Kg) | Free |
| ○ 880240 | Aircraft NES of an unladen weight (more than 15,000 Kg) | Free |
| ○ 880260 | Spacecraft (including satellites) and Spacecraft Launch Vehicles | 6.5% |
| • **HS 8803** | Parts of Helicopters, airplanes, balloons, dirigibles and spacecraft | |
| ○ 880310 | Propellers, rotors and parts thereof – for aircrafts | Free |
| ○ 880320 | Under-carriages and parts thereof – for aircrafts | Free |
| ○ 880390 | Parts of balloons, dirigibles and spacecraft nes | Free |
| • **HS 8805** | Flight simulators, aircraft launching gear, deck arrestors & similar gear | |
| ○ 880510 | Aircraft launching gear, deck arrestors and similar gear | Free |
| ○ 880520 | Flight simulators (ground flying trainers) and parts | Free |
| ○ 880521 | Air combat simulators and parts | Free |
| ○ 880529 | Other ground flying trainers (incl. flight simulators) nes & parts | Free |
| • **HS 901410** | Direction finding compasses | Free |
| • **HS 901420** | Instruments/appliances for aeronautical/space navigation | Free |
| • **HS 940110** | Aircraft seats | Free |

Canada is also the first G-20 country to offer a tariff-free zone for industrial manufacturers, a major initiative that will see tariffs on all manufacturing inputs, machinery and equipment reduced to zero by 2015.[20]

[19] http://www.cbsa-asfc.gc.ca/trade-commerce/tariff-tarif/2012/01-99/01-99-2012-05-eng.pdf

[20] **Aerospace – Canada's Competitive Advantages,** Invest in Canada, Government of Canada http://investincanada.gc.ca/eng/industry-sectors/aerospace.aspx, Page 7

### 8.1.2 Regulations

According to Industry Canada, the following regulations apply to the Canadian aerospace industry:

- Canadian Aviation Regulations (CARs)
  The Canadian Aviation Regulations are a compilation of regulatory requirements designed to enhance safety and the competitiveness of the Canadian aviation industry.
- Canadian Defence Policy
  To formulate and manage all aspects of defence policy.
- Defence Development Sharing Agreement Between Canada and The United States of America
  This Memorandum of Understanding complements the U.S./Canadian Defence Production Sharing Program by establishing a cooperative agreement in defense research and development between the United States Department of Defense (DoD) and the Canadian Department of Defence of Production (CDDP), called the Defense Development Sharing Program.
- General Agreement on Trade in Services (GATS) — Transportation Services
- International Trade Agreements and Local Government
  World Trade Organization (WTO) General Agreement on Trade in Services (GATS).
- International Transportation Links
  Provides information on international transportation-related organizations and subjects.
- Transport Canada — Acts and Regulations
  The latest consolidated Acts and Regulations to ensure safe, secure, efficient and clean transportation.

### 8.1.3 Standards

According to Industry Canada, the following standards apply to the Canadian aerospace industry:

- Bureau de normalization du Québec
  Standards development, certification, system registration and laboratory assessment.
- Canadian General Standards Board
  This government organization offers client-centred, comprehensive standardization services in support of economic, regulatory, procurement, health, safety and environmental interests.
- Canadian Standards Association (CSA)
  A not-for-profit membership-based association working in Canada and around the world to develop standards that address real needs.
- International Organization for Standardization (ISO)
  A non-governmental network of the national standards institutes of 150 countries whose mission is to promote the development of standardization and related activities around the world.
- Standards Council of Canada (SCC)
  A federal Crown corporation with the mandate to promote efficient and effective standardization.

## 8.2 Government Policies Affecting the Sector

### Taxes

Canada's combined federal-provincial statutory corporate income tax of 26% is more than 13% below the U.S. and among the lowest when compared to the G-7 countries.[21]

### Key Governmental Policies & Programs

Following are some key government and industry policies and programs that affect the Canadian aerospace sector:

- Scientific Research and Experimental Development (SR&ED) provides income tax credits of eligible R&D activity in Canada. Canada offers some of the most generous R&D tax incentives in the industrialized world, with combined federal and provincial tax credits that can currently save foreign investors, on average, up to 30 cents on the dollar invested in R&D in Canada. Canada also has the G-7's lowest costs in R&D intensive sectors (up to 10% lower than in the U.S.).

- National Research Council Aerospace (NRC Aerospace) supports the Canadian aerospace community by undertaking and promoting research and technology development that touches on all major concerns in aerospace, including safety, weight, cost and the environment.

- Green Aircraft Research and Development Network (GARDN) is a four-year (2009-2013) business-led network of centres of excellence which promotes R&D projects focussed on environmental aerospace technologies.

- The Natural Sciences and Engineering Research Council of Canada (NSERC) invested $20.3 Million in aerospace research in 2010 and 2011. NSERC is Canada's largest federal funding agency for university and college-based research in the natural sciences and engineering.

- Canadian Networking Aeronautics Program for Europe (CANNAPE) aims to increase engagement between the Canadian and EU aeronautics R&D communities.

- The Strategic Aerospace and Defense Initiative (SADI) provides repayable loans to companies for their aerospace and defence research initiatives.

- Export Development Corporation (EDC) provides Canadian government support for export competitiveness ranging from inbound investment to export market financing of aircraft sales.

[21] Department of Finance Canada and the OECD Tax database 2012

# 9.0 TRADE PROMOTION & MARKETING

## 9.1 Trade Promotion Agencies

***Invest in Canada*** is responsible for promoting, attracting and retaining foreign direct investment in Canada. As part of the federal government's **Department of Foreign Affairs and International Trade**, we deliver the market intelligence; connections and support that foreign investors need to identify and capitalize on opportunities in Canada.

Invest in Canada's Global Investment Network of investment officers located in 150 cities worldwide is there to provide you with comprehensive, confidential and free services to guide you through every step of the investment process -- from pre-investment information and advice to aftercare once you are established in Canada.
Some of our key services include:

- Detailed, sector-specific market intelligence and value propositions
- Customized business cases
- Opportunity leads
- Access to the right contacts at the federal, provincial and municipal levels
- Site selection support including assistance in setting up exploratory visits
- Information and advice on doing business in Canada, incentives, regulations and taxation
- Referrals to professional associations (lawyers, bankers, accountants, etc)

Aerospace is one of the 14 key industries promoted by ***Invest in Canada***. For information on Invest in Canada's aerospace sector promotion efforts, please see http://investincanada.gc.ca/eng/industry-sectors/aerospace.aspx

Industry Associations such as the national ***Aerospace Industries Association of Canada (AIAC)*** and its various provincial counterparts also play a major role in industry trade promotion. (see Section 7)

## 9.2 Industry Trade Fairs, Exhibitions – Upcoming in 2013 & 2014

Following is a listing, in chronological order, of Canada aerospace industry fairs and exhibitions currently listed as upcoming in 2013 and 2014.

### AEROMART MONTREAL 2013

Date: April 23-25, 2013
Location: Montreal, QC
Venue: Palais de Congrès de Montréal

AEROMART MONTREAL 2013 will use our long time and renowned expertise to provide you with outstanding networking opportunities for business and partnership development in the North American aerospace market.

Over the two day event, suppliers and contractors participate in a dynamic program including: One-to-One Business Meetings, Conferences, Thematic Sessions / Technology & Product Workshops, Do Business with Sessions.

In 14 years AEROMART has become a must-attend event. By alternating between Toulouse, Tianjin and Montreal AEROMART delivers an excellent business platform manufacturers, tier 1 suppliers, subcontractors, service providers and clusters from around the globe. AEROMART helps aerospace actors explore new markets (China, India, Russia, Mexico, etc.); create more awareness about new programs and trends (green aviation, composites, etc.). Most importantly AEROMART gives a remarkable opportunity to identify new partners and business contacts and better plan for the future.

### AERO 13 – CASI 60th Aeronautics Conference & AGM

Date: April 30 – May 2, 2013
Location: Toronto, ON
Theme: *Aerospace Clusters: Where Are We Headed?*
Venue: Fairmont Royal York Hotel
Conference room rate: $159 single/double

AERO'13 will feature a rich technical program with six Symposia:

- Aerodynamics
- Aerospace Manufacturing Technologies
- Aerospace Structures and Materials -
- Aircraft Design and Development
- Human Factors
- Propulsion

Speakers for the Opening Plenary Panel have been invited from a variety of international cluster groups. In other plenaries senior representatives of Canadian and offshore organizations will explore the concept of AMT and the future role of aerospace clusters.

On Monday April 29 workshops will be offered in Multidisciplinary Design Optimization and on the Canadian IRB program as it applies to multiple platforms. Tuesday evening will feature the Women in Aerospace Reception sponsored by Pratt & Whitney Canada.

Sponsorship and Exhibiting Opportunities: http://www.casi.ca/aero is the link to a wide variety of effective ways to elevate profile at AERO'13, and leverage the participation of those presenting papers or participating in panel discussions.

### SWIFT 2013 Conference and Trade Show

Date: September 9 – 12, 2013
Location: Ottawa, ON
Venue: Westin Ottawa

Billed as the World's Premier Airfield Conference, this event will be a unique opportunity for the exchange of technical information between hundreds of representatives from airports, industry and government organizations. Visit www.swiftconference.org

Past conferences have included international representatives from Canada, United States, Germany, Denmark, England, France, Russia, China, Argentina, Finland, Sweden and Japan.

Canadian Airfield Pavement Technical Group (CAPTG) works closely with SWIFT and hosts the pre conference workshop - http://www.captg.ca/

### SAE 2013 AeroTech Congress & Exhibition

Date: September 24-26, 2013
Location: Montreal, QC

Biennially, thousands of the world's top aerospace professionals gather at the SAE AeroTech Congress & Exhibition - the essential aerospace event where the aerospace community prepares for future challenges and opportunities. This is an invaluable opportunity for you to renew and develop important business relationships within the international aerospace industry.

Put your brand, products and services in front of the leading technical authorities from government, industry, and academia as they explore the regulation, legislation, and technologies impacting the future. It's a vital, policy-shaping, once-a-year exhibit and sponsoring opportunity you can't afford to miss. Visit www.sae.org/events/atc/exhibit/ for more information.

**Who Exhibits**

- Aerospace Operations
- Aircraft Systems
- Automated Fastening/Assembly and Tooling
- Aviation Cyber-Physical Security
- Avionics
- Business/Economics
- Electronics
- Environmental Impact
- Flight Sciences
- Maintenance, Repair and Overhaul
- Manufacturing
- Materials/Structures
- Power Systems
- Propulsion
- Safety
- Systems Engineering
- Unmanned Aerial Systems
- Vehicle Systems Architecture

### SWIFT 2014 Conference and Trade Show

Date: September 15-18
Location: Vancouver, B.C.

# 10.0 APPENDIX

## 10.1 References

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