

Canada – A Strategic Choice

Canada as an investment destination for aerospace



Canada's aerospace industry

Canada is a leading player in the global aerospace industry, with industry sales that have more than doubled since 1990 and now total more than \$21 billion¹ annually. The industry comprises more than 400 firms located across the country, and collectively employs more than 75,000 Canadians.

Aerospace is Canada's leading advanced technology export sector, with 85% of Canadian aerospace production destined for export markets. Canada is the fifth largest exporter of aerospace products in the world. Boeing sources more than \$1 billion of aircraft systems and parts from over 200 Canadian suppliers. Canadian firms also produce subassemblies for the Airbus A330, A340 and A380 aircraft.

Competitive strengths and capabilities

Within the global value chain, Canadian aerospace firms have developed a number of product and process-related specializations:

- **Regional and corporate aircraft.** Canadian-based Bombardier is a world leader in regional and business aircraft. The Bombardier CRJ Regional Jet has become the trusted choice for more than 35 airlines, with some 600 CRJs in service.
- **Civil helicopters.** Canada holds one quarter of the world market for civil helicopters, with leading helicopter producers in Canada including Bell Helicopter Textron and Eurocopter Canada Ltd.
- **Flight and visual simulators.** Canadian-made products hold a 70% world market share for visual simulators. Atlantis Systems International, CAE Inc., and Mechtronix Systems are among Canada's leading firms in this sector.
- **Landing gear manufacturing.** Canada holds close to one-third of the world market for landing gear, including 60% of new large aircraft landing gear. Goodrich Canada, Héroux-Devtek, and Messier-Dowty are among Canada's leading firms in this sector.
- **Gas turbine engines.** Canadian firms meet one-third of global demand for small gas turbine engines. Leading aircraft turbine engine manufacturers all have operations in Canada, including Rolls-Royce, GE, and Pratt & Whitney.
- **Unmanned Vehicle Systems.** Canada's particular areas of strength are control systems, wireless communications, avionics, navigations systems, GPS and systems integration.
- **Aircraft, engine, and component maintenance repair and overhaul (MRO).** Major MRO facilities in Canada include Magellan Aerospace, Cascade Aerospace, CHC Helicopter, IMP Group, and Standard Aero.
- **Structural assemblies.** Firms such as Avcorp Industries, Boeing, and Magellan Aerospace produce a wide range of structural assemblies in Canada.
- **Avionics.** A variety of firms in Canada produce communications, power conversion, environmental control, and in-flight entertainment systems.
- **Space technologies.** Canadian areas of special capability include space robotics, earth observation systems, communications and scientific satellites, and sounding rockets.

Leading aerospace firms operating in Canada include:

Avcorp Industries Inc.
www.avcorp.com

Bell Helicopter Textron
bellhelicopter.textron.com

Boeing Aerospace
www.boeing.com/commercial/winnipeg/

Bombardier Aerospace
www.bombardier.com

CAE Inc.
www.cae.com

Cascade Aerospace Inc.
www.cascadeaerospace.com

EADS
www.eads.com

Eurocopter Canada Ltd.
www.eurocopter.ca

GE Canada
www.ge.com

Goodrich Aerospace Canada Ltd.
www.goodrich.com

Honeywell Airframe Systems
www.honeywell.com

IMP Aerospace Limited
www.impgroup.com

L3 Communications Spar Aerospace Ltd.
www.spar.ca

Lockheed Martin Canada
www.lockheedmartin.com/canada

Magellan Aerospace Corporation
www.magellan.aero

MDA
www.mdacorporation.com

Pratt & Whitney Canada Corp.
www.pwc.ca

Rolls-Royce Canada Limited
www.rolls-royce.com

Standard Aero Ltd.
www.standardaero.com

Thales Canada
www.thalesgroup.com/canada/

¹ Includes civil and defence. All dollars are expressed in Canadian currency unless otherwise specified.

Key Canadian clusters

Montréal, Quebec is the hub of Canada's largest aerospace cluster. The Quebec aerospace sector employs approximately 39,000 people, and is home to more than half of all large aerospace firms in Canada. Montréal offers a network of institutions that support innovative design and development, including the Aerospace Manufacturing Technology Centre, the National Research Council Industrial Materials Institute, and the Consortium for Research and Innovation in Aerospace in Quebec. Montréal also hosts the head offices of the International Air Transportation Association (IATA), the International Civil Air Organization (ICAO), and the Canadian Space Agency.

Aircraft design and assembly is a major specialty for Montréal, with facilities for final assembly of Bombardier regional and corporate jets, as well as Bell commercial helicopters. Other major firms in Montréal include CAE, CMC Electronics, Messier-Dowty, Pratt & Whitney Canada, and Thales Canada.



The **Atlantic region's** aerospace industry includes clusters in Halifax, NS and Summerside, PEI. These clusters include firms specializing in maintenance, repair and overhaul, helicopter services, gas turbines, software development and system integration, as well as training and simulation. Halifax has particular strength in military maritime aviation, defence systems, composite fabrication, and electronic assemblies. Summerside firms specialize in aircraft system and component maintenance and repair. Companies located in the Atlantic region include EADS Composites, Honeywell, IMP Aerospace, Lockheed Martin Canada, MDS-Prad, Pratt & Whitney Canada, and xwave.

The **Southern Alberta** cluster offers competitive strengths in the field of unmanned vehicle systems (UVS) development, with more than 70 Alberta companies, military agencies and educational institutions engaged in research, testing and manufacturing. World leading companies such as General Dynamics Canada, Raytheon Canada, CDL Systems, Novatel and Meggitt Defence Systems have operations in the province, and the recently opened Canadian Center for Unmanned Vehicle Systems, in Medicine Hat, AB provides focus to research, development and commercialization of UVS technology throughout Canada. The sector is further supported by the province's strong geomatics and wireless communications clusters.

Toronto, Ontario represents the core of Canada's second largest aerospace cluster.

Key strengths of the Toronto cluster include aircraft parts manufacturing, aircraft systems development, and maintenance and overhaul. The Toronto area has manufacturing or development facilities owned by three of the "Big Four" global commercial aircraft builders – Boeing, EADS, and Bombardier. Other firms in the Toronto area include Goodrich Landing Gear, L-3 Communications Canada, and Magellan Aerospace Corporation.

Winnipeg, Manitoba is the largest aerospace cluster in Western Canada, and a major centre within North America for aerospace component manufacturing, and aircraft maintenance, repair and overhaul.

Winnipeg is home to one of Boeing's ten major global sites for commercial aircraft – one of only three such sites outside the US. Boeing employs 1,400 workers in Winnipeg, producing structural composites for 737, 747, 757, 767, 777, and the 787 Dreamliner aircraft. Boeing Winnipeg has design responsibility for 787 programs.

Magellan Aerospace also has 650 employees in Winnipeg, manufacturing complex components and assemblies for fixed wing and rotary wing aircraft as well as small satellites and propulsion products.

British Columbia's aerospace cluster includes firms located in Greater Vancouver, Kelowna and Victoria, all of which are in close proximity to Boeing assembly facilities in neighbouring Washington State.

The cluster's aerospace strengths include helicopter services, aircraft maintenance, repair and overhaul, space systems, advanced composite aerostructures, as well as material and information systems support for military fleets. The industry here is also supported by one of Canada's largest aerospace training centres at the British Columbia Institute of Technology. Leading BC aerospace firms include AcroHelipro Global Services, ASCO Aerospace, Avcorp Industries, Cascade Aerospace, CHC Helicopter, Kelowna Flightcraft, MDA Corp., MTU Maintenance, and Viking Air.

Aerospace investment location drivers

To understand the main investment location drivers for the aerospace industry, KPMG completed a series of in-depth interviews with senior executives from leading aerospace firms operating in North American and international jurisdictions. In these interviews, aerospace executives identified and ranked the most important location drivers considered by their firms when choosing among potential investment locations. Individual responses were then combined to determine and rank the top location drivers, as detailed below.

Top-ranked Investment Location Drivers	Canada's Value Proposition	Investor Benefits
1. Labour costs	<ul style="list-style-type: none"> • Very competitive labour costs among G7 countries • Significantly lower labour costs than US aerospace centres 	<ul style="list-style-type: none"> • Significant savings on total labour costs (including benefits) relative to US aerospace operations
2. Availability of skilled labour	<ul style="list-style-type: none"> • Existing skilled aerospace workforce of more than 75,000 • Canadian universities and colleges produce approximately 3,000 aerospace graduates annually 	<ul style="list-style-type: none"> • Ability to recruit both experienced and entry-level workers
3. Corporate tax rates	<ul style="list-style-type: none"> • Over a decade of cuts to Canadian federal and provincial corporate taxes • Corporate tax rates that are now generally lower than US rates 	<ul style="list-style-type: none"> • Corporate tax savings in most jurisdictions • Improved net profit after tax
4. Tax incentives and exemptions	<ul style="list-style-type: none"> • Federal and provincial R&D tax incentives that are among the most generous in the world • R&D credits may be refundable for some locations and/or firms 	<ul style="list-style-type: none"> • Lower after-tax cost of R&D • Refundable tax credits improve overall cashflow during critical start-up years
5. Proximity to major markets	<ul style="list-style-type: none"> • Major global manufacturers with very large Canadian operations • Seamless access under the North American Free Trade Agreement (NAFTA) to US-based customers 	<ul style="list-style-type: none"> • Immediate access to major firms for collaboration and delivery • Less travel time and lower travel and communication costs
6. Training programs	<ul style="list-style-type: none"> • Aerospace related programs offered at 19 technical colleges • Advanced degrees in aerospace offered by 11 universities 	<ul style="list-style-type: none"> • Highly educated and productive workforce
7. Highway accessibility	<ul style="list-style-type: none"> • Coast-to-coast major highway network serving all major clusters • Direct integration to US Interstate system at border crossings 	<ul style="list-style-type: none"> • Flexible road freight options for movement of parts and products
8. Accessibility to a major airport	<ul style="list-style-type: none"> • International airports exist in all major Canadian aerospace clusters • Major dedicated aerospace facilities proximate to these airports 	<ul style="list-style-type: none"> • Reduced travel time and costs • Convenient direct access to international locations • Excellent aerospace manufacturing and testing facilities

Canada as an investment destination

The rapid growth, current size, and innovation of Canada's aerospace sector speaks to Canada's attractiveness as an investment destination. What value proposition does Canada provide to global investors in the aerospace industry?

The following sections present Canada's value proposition for aerospace firms by comparing Canada's leading aerospace clusters – Montréal, Toronto and Winnipeg – to the leading US clusters located in Seattle and Wichita, as well as key European clusters in France, Germany and the United Kingdom.

1. Labour costs

In a recent survey, aerospace industry executives ranked labour costs as the most important factor in comparing locations for aerospace operations.

A KPMG comparison of aerospace manufacturing costs has found that Canada's labour costs are competitive with those in France, and are significantly lower than in leading US clusters such as Wichita and Seattle (see chart at right). Savings vary by location, but the Canadian aerospace clusters offer labour savings of up to 32%.

A significant component of Canada's cost advantage relative to the United States is the lower cost of providing employee benefits in Canada, due mainly to Canada's publicly-funded healthcare system.

2. Availability of skilled labour

Canada offers aerospace firms an existing base of more than 75,000 aerospace employees, with over 40% of these employees being highly trained engineers or specialized skilled technicians. Greater Montréal represents the world's second-ranked aerospace industry cluster in terms of aerospace jobs per capita.

The World Economic Forum's 2005-2006 *Global Competitiveness Report* also recognizes Canada's availability of skilled labour, ranking Canada 8th in the availability of scientists and engineers, ahead of the US (13th), Germany (18th), and the UK (41st).

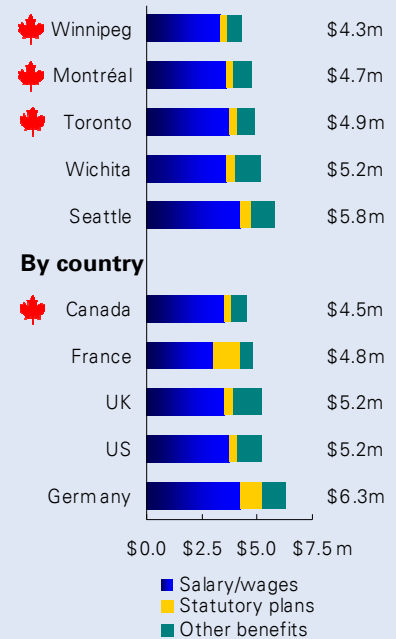
Canada also produces more than 3,000 aerospace graduates annually from its 11 universities and 19 technical colleges that specialize in aerospace training. These graduates ensure a steady supply of highly-qualified and productive new entrants to the aerospace workforce.

3. Corporate tax rates

Progressive reductions in both federal and provincial tax rates in Canada over the last decade mean that effective corporate income tax rates are now generally lower in Canada than in the United States.

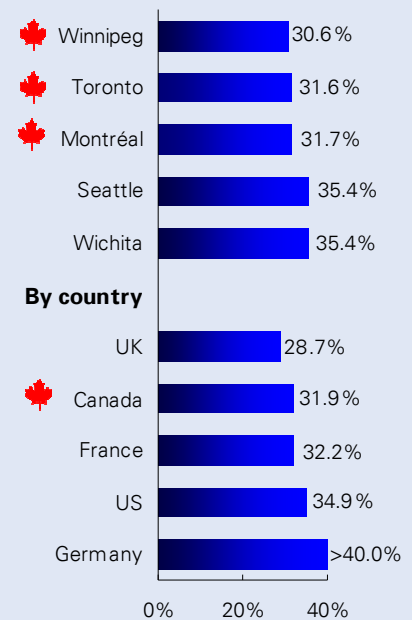
In a comparison of effective income tax rates for aerospace manufacturing by KPMG's *Competitive Alternatives 2006* study (see chart at right), Canada's major aerospace clusters were found to offer lower corporate tax rates than competing clusters in the United States, France, and Germany. Average corporate income tax rates in the three Canadian clusters examined were 4.1 percentage points below the comparable US clusters examined.

**Aerospace manufacturing
Annual labour costs – US\$m¹**



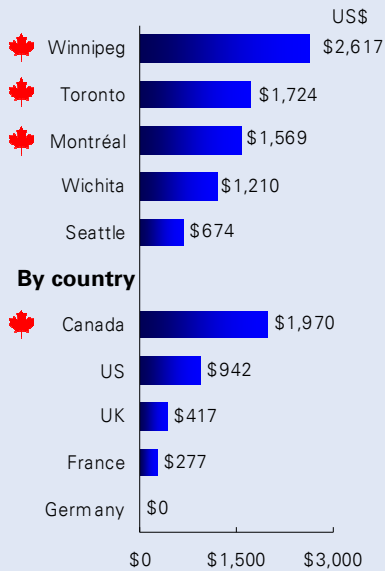
1: *Competitive Alternatives*, KPMG LLP, 2006. Figures represent total annual labour costs for a representative aerospace parts manufacturing plant of 85 employees.

**Aerospace manufacturing
Effective corporate income tax rate¹**



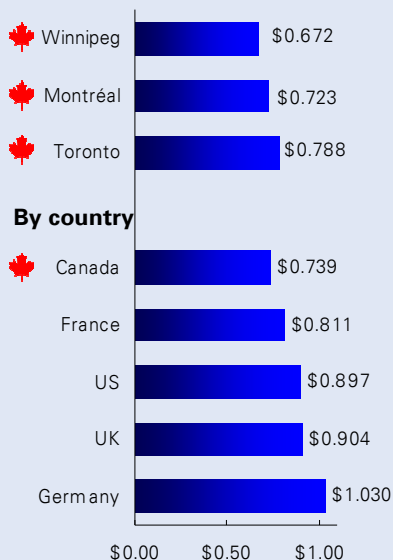
1: *Competitive Alternatives*, KPMG LLP, 2006. Figures represent combined federal/regional/local taxes as % of pre-tax income.

Aerospace manufacturing Non-discretionary tax incentives¹



1: *Competitive Alternatives*, KPMG LLP, 2006.
Non-discretionary tax incentives per job (US\$), after estimated tax effects, for a representative aerospace parts manufacturer.

After-tax cost of R&D B-index¹



1: The OECD-standard B-index measure represents the present value of before-tax income that a firm needs to generate to cover a \$1 (after tax) investment in R&D activities. B-index of less than 1.00 indicates that the tax system is subsidizing the cost of R&D. Rates shown are applicable to large corporations. *Canada's R&D Tax Advantages, An International Comparison*, JPW Innovation Associates Inc., 2007.

4. Tax incentives and exemptions

Tax incentives and exemptions also figure highly in aerospace investment decisions. Canada's competitive tax environment is complemented by a number of relevant incentives for manufacturing investment, R&D, and export sales.

Manufacturing tax incentives

Tax incentives for aerospace manufacturing are significantly higher in Canadian aerospace clusters than in comparable international clusters (see chart at left). New incentives for Canadian manufacturers will further benefit aerospace firms:

- The rate of depreciation allowed on manufacturing buildings has recently been increased from 4% to 10% – a significant benefit for all manufacturers, but especially for large aerospace firms requiring extensive assembly or maintenance and repair facilities.
- The rate of depreciation allowed on manufacturing equipment has recently been accelerated from 30% to 50% for new manufacturing machinery and equipment purchased before 2009.

Research and development incentives

Canada has a long-established tax credit program for research and development activities that is among the most generous in the world (see chart at left). Provincial R&D tax credits also apply in most Canadian jurisdictions. To the extent that an aerospace firm is undertaking R&D expenditures, the Canadian corporate tax rate advantage will be significantly enhanced.

Public funding of aerospace R&D presents another strong incentive for Canadian aerospace investment. In early 2007, the Canadian government announced a new \$900 million Strategic Aerospace and Defence Initiative (SADI), designed to support aerospace R&D in Canada over the next five years. These funds complement firms' private R&D funding, and support their research and development activities.

Export sales financing

The Canadian government also supports export sales in the aerospace industry by providing export sales financing for aerospace and defence products through Export Development Canada (EDC).

5. Proximity to major markets

Canada's aerospace industry includes an impressive group of global original equipment manufacturers (OEMs)—Boeing, EADS, Bombardier, Bell Helicopter, Rolls Royce, GE, Pratt & Whitney, and many others. Participation in the Joint Strike Fighter Program represents another major market opportunity for Canadian firms.

In addition to the global OEMs, major maintenance repair and overhaul facilities in Canada, suppliers of major aircraft system components, and a highly active space and defence industry all increase the range of customers present in Canada for products and services across all levels of the aerospace value chain.

Proximity to this range of customers provides benefits in terms of immediate access to major firms for collaboration and delivery, ability to integrate with suppliers, and reduced travel time and costs.

Canada's capabilities to supply major markets are proven by the range of aircraft programs in which Canadian suppliers are involved, including the Airbus A320, A330, A340, and A380, the Boeing 737, 747, 767, 777, and 787, and the Bombardier CRJ.

6. Training programs

Canada produces more than 3,000 new aerospace graduates annually from its universities and technical colleges. Aerospace related programs are offered at 19 technical and vocational colleges, and advanced degrees in aerospace are offered by 11 universities. Nine universities offer masters and/or PhD level specializations in aerospace engineering. Collaborating R&D partnerships with industry are available at many institutions, including the University of Toronto Institute for Aerospace and the Ryerson Institute for Aerospace Design.

Other specialized programs are offered at several universities and technical colleges across Canada, including bachelors degrees in electrical, mechanical and automated production engineering with majors in aeronautics, technical training in avionics, aircraft maintenance, composite materials, as well as aerospace mechanics and sheet metal work.

In the World Economic Forum's 2005-2006 *Global Competitiveness Report*, Canada is ranked in the top ten (of 177 countries) for local availability of specialized research and training services.

With a highly skilled and well trained workforce, labour productivity in the Canadian aerospace industry has been increasing in recent years. Canadian labour productivity is now very close to US levels (see chart at right), and is significantly higher than in France, Germany and the UK.

7. Highway accessibility

Canada's coast-to-coast major highway network serves all of the country's main aerospace clusters. This highway network provides direct integration to the US Interstate highway system at Canada/US border crossings, and provides firms with flexible road freight options for movement of parts and products.

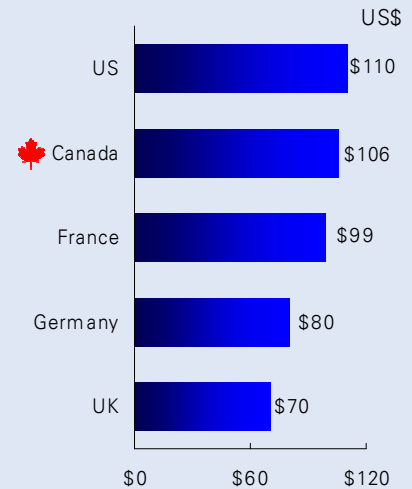
8. Accessibility to a major airport

All major Canadian aerospace clusters are located close to international airports that offer frequent and quality air service. Based on statistics from IMD 2007 World Competitiveness Online (see chart at right) Canada ranks ahead of Germany and France in terms of number of air passengers per capita, and ranks ahead of the UK and France for quality of air transportation.

In addition to passenger services, specific airport-based industrial facilities available in Canadian aerospace clusters include:

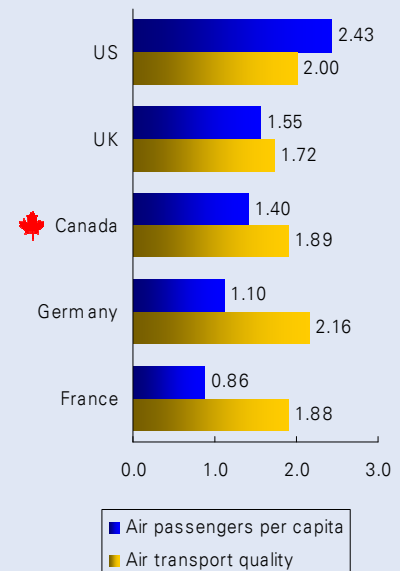
- Quebec has a major airport and aerospace facility at Mirabel (near Montréal), providing space for test flights, as well as manufacturing facilities.
- Toronto's Downsview airport is used as a testing and manufacturing facility by Bombardier and others.
- Winnipeg's Airport Business Park provides modern facilities for aircraft maintenance, aerospace training, and other activities.

**Gross value added per worker
Aerospace industry¹**



1: UK Department of Trade and Industry (DTI). Derived from OECD STAN Database and Groningen Growth and Development Centre. Aerospace is defined as international standard industrial classification 353.

**Air transportation
Quantity and quality¹**



1: Air passengers per capita = Number of passengers carried by main companies (IMD World Competitiveness Online, 2005, and ICAO) divided by national population (World Bank, 2005).
Air transport quality = Executive survey rating of "Quality of air transportation encourages business development" (IMD World Competitiveness Online, 2007) rescaled to an index scale of 0 (very poor) to 2.5 (very good).

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