2014 Report

The State of the Canadian Aerospace Industry

AIAC Aerospace Industries Association of Canada
L'Association des industries aérospatiales du Canada

Industry Canada Industrie Canada
Canada

Presentation Overview

- Context
- Canadian Aerospace Ecosystem
- Economic Impact
- Innovation (R&D)
- Aircraft Production
- Space Systems Manufacturing
- Aerospace Defence
- Investment
- Annex – Industry Definitions

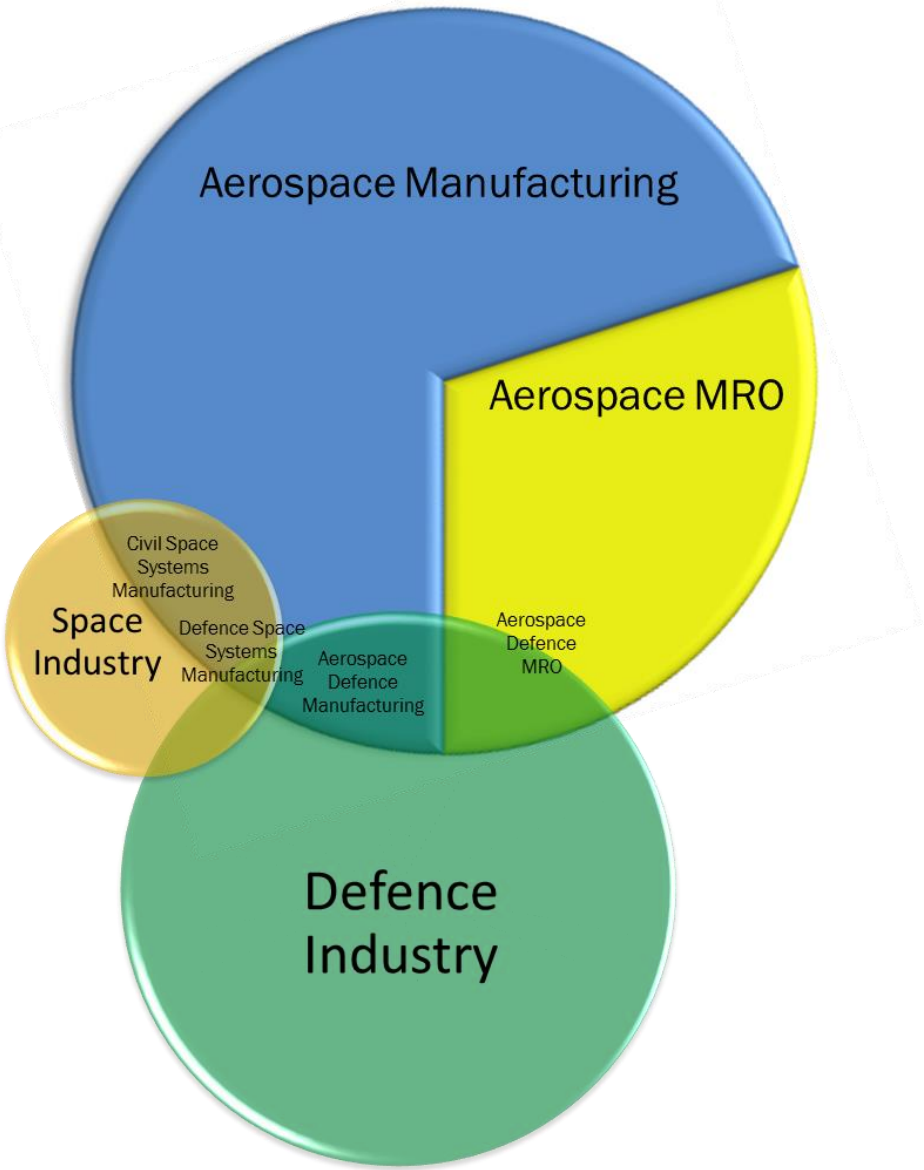
Context

Industry Canada and the Aerospace Industries Association of Canada (AIAC) agreed to leverage their respective expertise and formed a collaborative research partnership to provide the most accurate, detailed and relevant analysis to both industry and government decision makers

The two parties agreed that:

- Industry Canada would develop detailed economic statistics;
- AIAC would consult and validate with its network on business drivers, issues and trends; and
- The statistics, issues and trends would be jointly released on an annual basis

The Canadian aerospace industry ecosystem is interlinked with the space and the defence industries*…

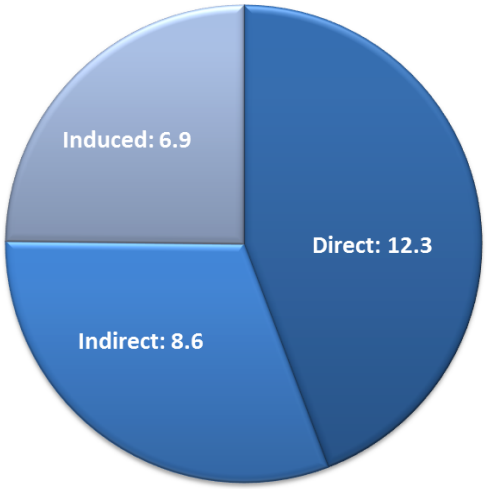


- The Canadian aerospace manufacturing industry** encompasses civil and defence activities as well as space systems manufacturing
- Beyond space systems manufacturing, the space industry includes satellite operations and value-added applications
- The Canadian aerospace maintenance repair and overhaul (MRO) industry*** includes both civil and defence aerospace MRO activities

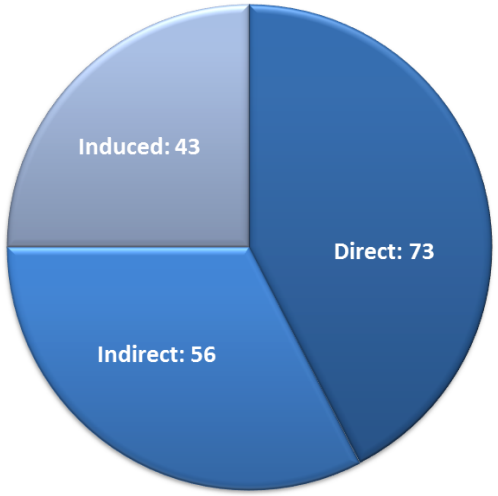
* Proportion based on economic modelling direct GDP estimates developed by Industry Canada based on different Government Statistical and Tax Agencies as well as from the Canadian Space Agency Annual Space Survey, 2014
** Include MRO activity performed by manufacturers
*** MRO industry excludes MRO activity performed by manufacturers and airlines

The Canadian aerospace industry contributed close to $28B GDP* and 172,000 FTEs to the Canadian economy** in 2013

Canadian Aerospace Industry GDP Total Economic Impact Analysis ($B- 2013)



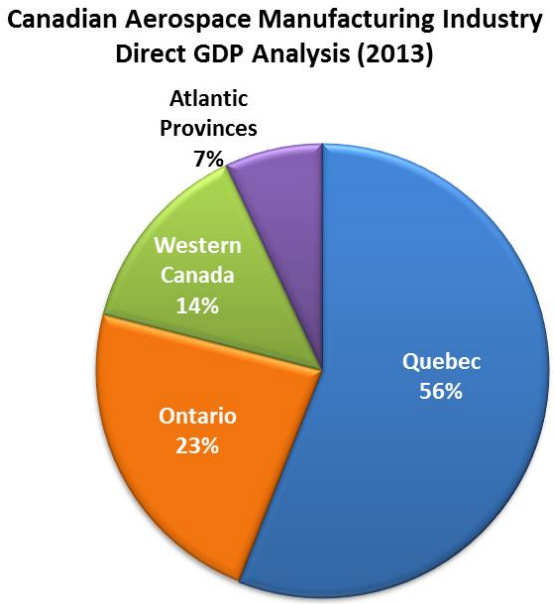
Canadian Aerospace Industry Employment Total Economic Impact (K FTEs-2013)

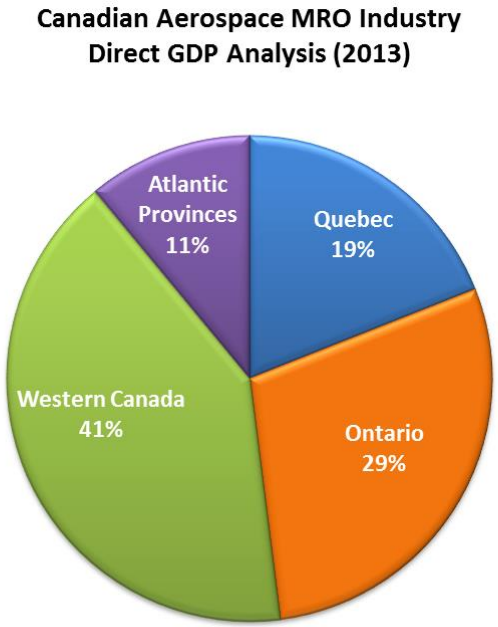


- The industry is made up of over 700 companies of all sizes that generated $25.1B in direct revenues in 2013****
- 70% of the industry's activity (GDP) is dedicated to manufacturing while MRO industry represent 30%
- Canadian aerospace manufacturers export nearly 80% of their products to highly diversified markets

* GDP better represents activity that actually occurs within a country in contrast to revenues that include foreign content as well as R&D, employment and revenues from outside of Canada (even if it was performed by a Canadian firm)
** Direct: Firms where aerospace is their main activity; Indirect: Canadian suppliers to firms where aerospace is their main activity; Induced: Offset economic impact of direct and indirect
***Space systems manufacturing is included in the aerospace manufacturing sector
**** Firms where aerospace is their primary business activity
Source: Industry Canada. Economic modelling based on data from Statistics Canada (Business Registry and Cansim), Statistics Canada National Input-Output Multipliers (2009 adjusted to 2013 GDP and employment), Canada Revenue Agency, OECD and firm level observations, 2014

The Canadian aerospace industry is active across the country…

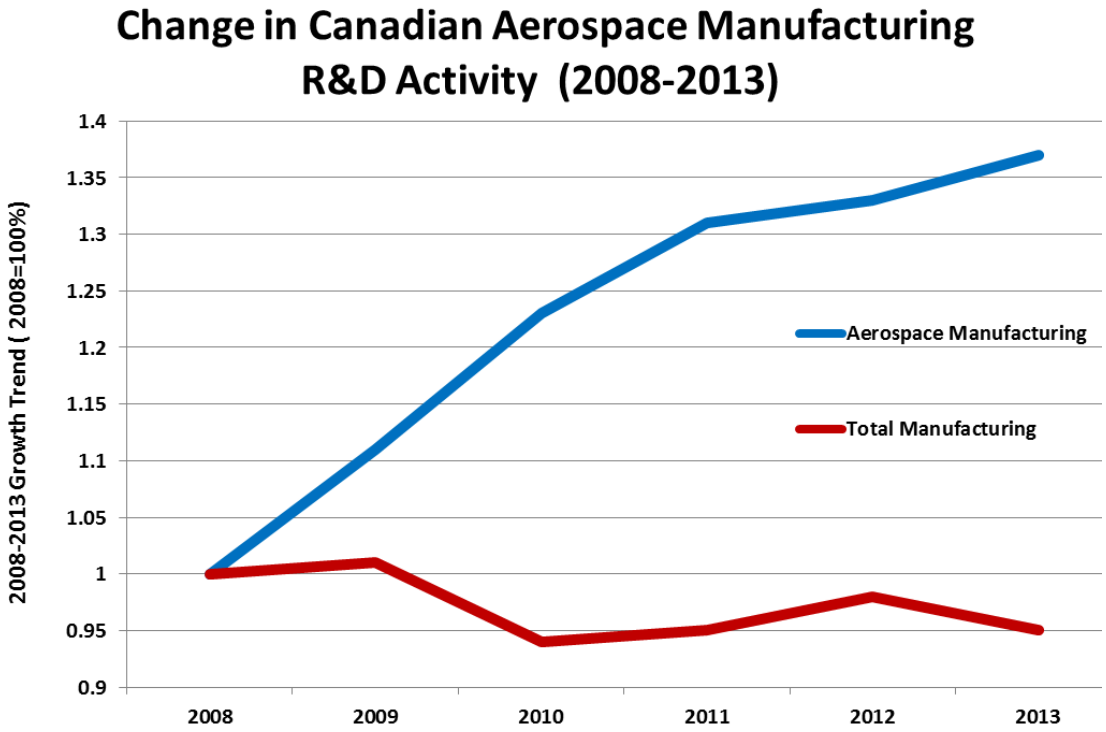




- Central Canada accounts for the majority of the manufacturing industry
- Western Canada plays a dominant role in terms of MRO industry
- Atlantic Canada was the fastest growing region in aerospace manufacturing during the 2008-2013 period

Source: Industry Canada. Economic modelling based on data from Statistics Canada (Business Registry and Cansim), Canada Revenue Agency and firm level observations, 2014

The Canadian aerospace manufacturing industry is one of the most R&D intensive* in the Canadian economy…

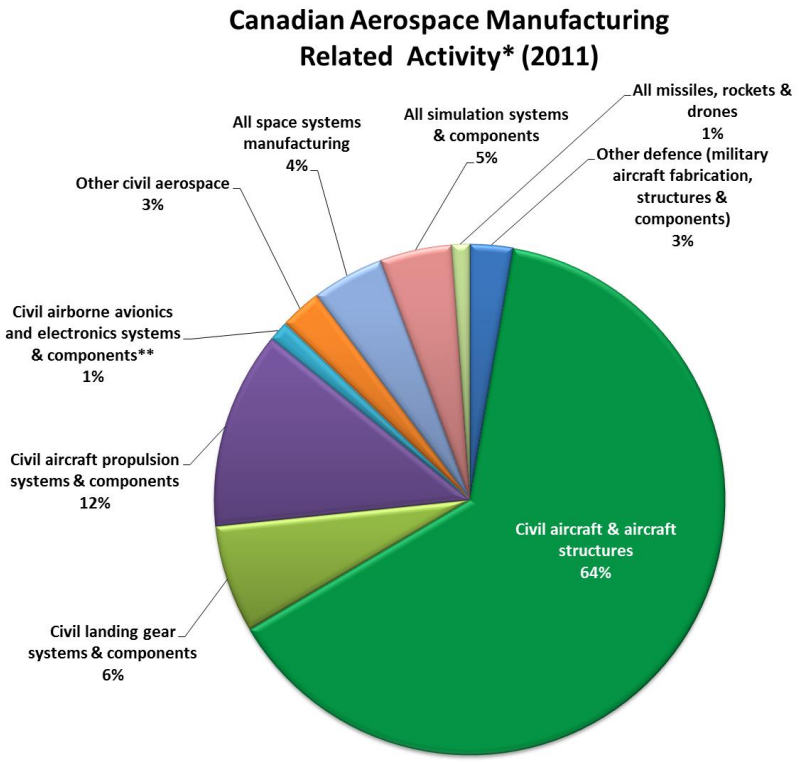


- More than 20% of the industry's activity is dedicated to R&D
- $1.7B in annual aerospace industry R&D activity in Canada
- 5X the R&D intensity of Canada's total manufacturing average with an increase of close to 40% during the last five years (2008-2013)

*R&D activity performed by firms within their respective corporations in Canada (R&D intensity: R&D investment / GDP)

Source: Industry Canada. Economic modelling based on data from Statistics Canada (Business Registry and Cansim), Canada Revenue Agency, OECD and firm level observations, 2014

The Canadian aerospace manufacturing industry encompasses multiple activities…



- Commercial aircraft/rotorcraft production and aircraft structure related activities are responsible for close to two thirds of the industry's revenues

- Aerospace defence represents close to 10% of total aerospace manufacturing across numerous activities, notably in space systems, simulation systems, and in aircraft components**

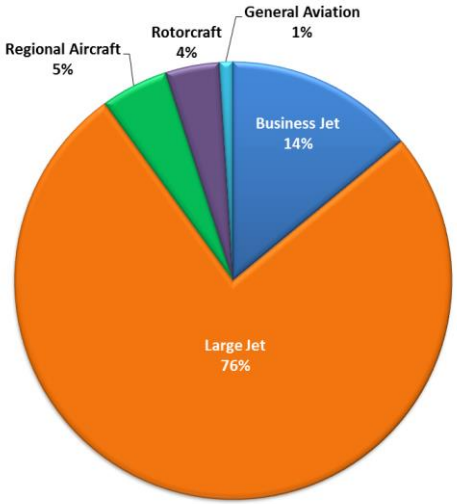
* Proportion based on revenue breakdown

** Military airborne avionics and electronics systems and components were captured under other broader survey defence categories for sensors and electronics systems, and could not be specifically split off and reported

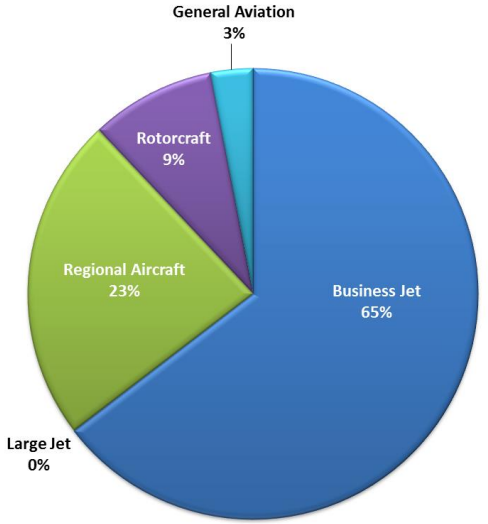
Source: Canadian Commercial Aerospace, Defence, Commercial and Civil Marine and Industrial Security Sector Survey (2011), 2013

The segment mix of Canadian aircraft production differs from that of global aircraft production*…

Forecasted 2014 Global Aircraft Production



Forecasted 2014 Canadian Aircraft Production



- Business jets are the main sources of aircraft production revenue for Canada in contrast to large jets for the global market
  - *Canada is expected to enter the large jet market in 2015 which is forecasted to represent close to 20% of its aircraft production revenue in 2021*

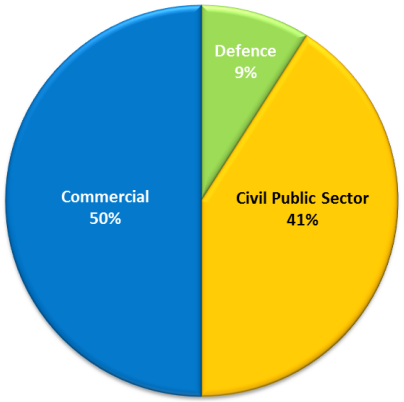
- According to leading independent international research firms, Canada ranks third in terms of global civil aircraft production revenues and is forecasted to grow 2X faster than the global market during the 2014-2021 period
  - *The vast majority of the forecasted growth in Canada is expected to come from new platforms entering the market during the 2014-2021 period*

* Proportion based on revenue breakdown

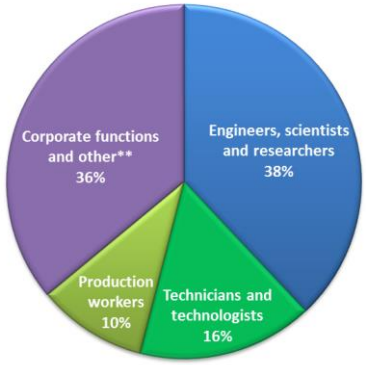
Source: Average of Forecast International and Teal Group's forecasts by value for 2014-2021 period - latest year available (General aviation forecast is from Forecast International only), 2014

Space systems manufacturing is a highly skilled, innovative, diversified and export oriented sector…

Canadian Space Systems Manufacturing Market Analysis* (2011)



Canadian Space Systems Manufacturing Employment Analysis (2011)



- Canadian space systems manufacturing is export oriented (U.S. and Europe are the key markets) with 50% of its revenues derived from commercial activities
- More than 50% of employment is comprised are engineers, researchers, scientists and technicians
- SMEs*** have higher R&D intensity than larger firms and account for a quarter of the total Canadian space systems manufacturing R&D investment
    - *Close to 30% of the space systems manufacturing activity (GDP) is dedicated to R&D, more than 6X the total manufacturing average#*

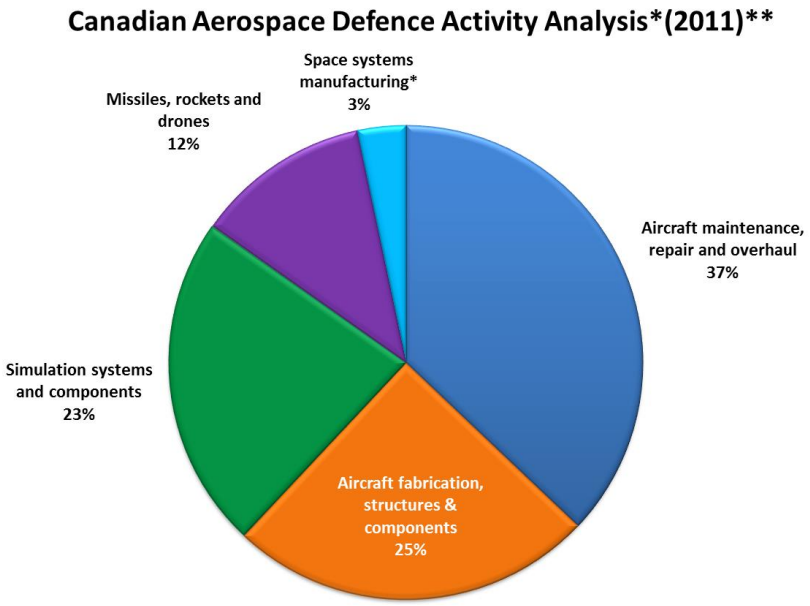
* Proportion based on revenue breakdown

** Corporate functions include activities such as senior management, market research/marketing, operation management, supply chain management and customer relationship management

*** Firms with 1 to 249 FTEs

Source: Canadian Commercial Aerospace, Defence, Commercial and Civil Marine and Industrial Security Sector Survey (2011) and custom tabulations from the Canadian Space Agency (2012), 2013 # Industry Canada. Economic modelling based on data from Statistics Canada (Business Registry and Input/Output Tables) and CSA State of the Canadian Space Sector Survey 2012, 2014

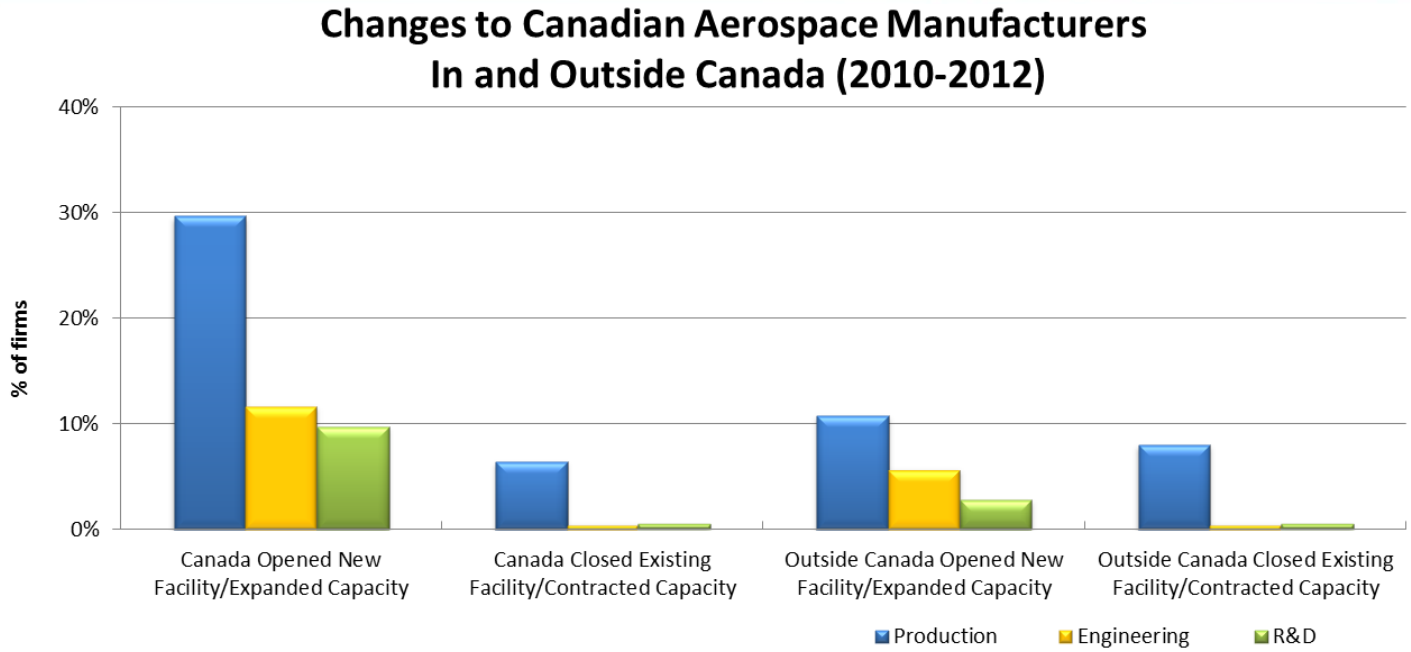
Aerospace defence manufacturing is R&D intensive, export oriented and very active in global value chains…



- MRO/In-Service Support (ISS) activity accounts for close to 40% of the Canadian aerospace defence industry**
- Canada is a world leader in defence simulation systems which makes up almost 25% of the Canadian aerospace defence industry
- A high proportion of Canadian defence aerospace manufacturing SMEs perform R&D and export

* Proportion based on revenue breakdown
** Military airborne avionics and electronics systems and components were captured under other broader survey defence categories for sensors and electronics systems, and could not be specifically split off and reported
Source: Canadian Commercial Aerospace, Defence, Commercial and Civil Marine and Industrial Security Sector Survey (2011), 2013

Aerospace manufacturers expanded their production and innovation capacity in Canada between 2010 and 2012…



- More aerospace manufacturers increased capabilities in R&D and production in Canada than reduced capabilities*
- Canadian aerospace manufacturers are investing in production, engineering and R&D in Canada to enhance their advanced manufacturing capabilities **
- A limited number of Canadian aerospace manufacturers have expanded capacity outside Canada, especially in R&D and engineering

* Same firms can expand and contract the same activity during the 2010-2012 period
** Industry validation
Source: Industry Canada, Foreign Affairs and International Trade Canada and Statistics Canada. Survey of Innovation and Business Strategy 2012, 2014

Key findings…

- The aerospace manufacturing industry is one of Canada's most R&D and export intensive industries
- Canada ranks 3rd in terms of global civil aircraft production and is a world leader in civil and defence simulation systems
- The composition of Canadian aircraft production will change significantly as Canada enters the large jet market
- The Canadian aerospace defence industry has a strong MRO capability and its manufacturing activities are well integrated into global value chains
- Space systems manufacturing employment is concentrated in innovation and corporate functions
- Aerospace manufacturers are expanding their production and innovation capacity in Canada

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Annex – Industry Definitions

Definitions of the Canadian Aerospace Manufacturing and the MRO Service Industries

Aerospace Manufacturing Industry*	MRO Service Industry**
Main activities: • Aircraft assemblies, subassemblies and parts • Aircraft engines and engine parts • Aircraft fuselage, wing, tail and similar assemblies • Tail and wing assemblies and parts (empennage) • Flight simulator • Developing and producing prototypes for aerospace products • Space vehicle, parts and propulsion units, guided missile and space vehicle engines • Telecommunication satellites and components • Avionics • Helicopters, propellers and parts	Main activities: • Aircraft heavy maintenance, servicing and repairing • Aircraft engines maintenance, servicing and repairing • Aircraft components and other systems maintenance, servicing and repairing • Aircraft line maintenance (aircraft servicing at airports – excluding sales of fuel revenues) • Aircraft ferrying service • Aircraft inspection service • Aircraft testing services • Aircraft upholstery repair

* Include MRO activity performed by manufacturers, **MRO industry excludes MRO activity performed by manufacturers and airlines

Definitions of Canadian Aerospace Civil Activities

Aircraft and Aircraft Structures: This category includes all structural elements, accessories, components, systems and sub-systems which form part of an aircraft with the exception of avionics, propulsion and defence electronic systems. It includes civil aircraft components and assemblies at every level of complexity (e.g. from machined composite and sheet metal parts and fully integrated mechanical assemblies to flight control surfaces and aircraft and helicopter fuselages, etc.).

Rockets and Drones: This category includes all structural elements, accessories, components, systems and sub-systems which form part of a rocket and a drone (used in civil applications only).

Landing Gear Systems and Components: This category includes all structural elements, accessories, components, systems and sub-systems which form part of a landing gear fabrication (e.g. the structure that supports an aircraft on the ground). It generally includes wheels and shock absorbers. It can also include skis (for snow), floats (for water) and pontoons (helicopter).

Aircraft Propulsion Systems and Components: This category includes all structural elements, components, accessories, systems and sub-systems which form part of the propulsion system of a civil aircraft. It includes primary propulsion systems and related systems and components (e.g. gas turbine engines, compressors, fuel systems and onboard auxiliary power plants for aircraft, etc.).

Airborne Avionics and Electronics Systems and Components: This category includes all structural elements, accessories, components, systems and sub-systems which are included in aviation electronics (e.g. avionics) and airborne electronics used in civil aviation. It includes all avionics systems, cockpit and cabin display devices, and flight instruments intended for use in a civil aircraft (e.g. control, monitoring, communication, navigation, weather and anti-collision systems, etc.).

Simulation Equipment Systems and Components: This category includes all structural elements, accessories, components, systems and sub-systems which are included in civil simulation equipment. It includes all components of flight simulators, visual systems and flight training devices.

Maintenance, Repair and Overhaul Services: This category includes maintenance, repair and overhaul activities carried out under contract. It includes maintenance, repair and overhaul (MRO) services for civil aircraft, engines and accessories. It does not include maintenance, repair and overhaul activities carried out by airlines or aircraft operators for their own account.

Definitions of Canadian Space Manufacturing Systems Activities

Commercial Space Systems Manufacturing: This category includes sales related to production as well as research, development, design, engineering, testing and evaluation services for primarily commercial clients and applications, of systems deployed in space (e.g. satellites, spacecraft, and space robotic systems) and their sub-systems and components; as well of space launch vehicles. Also included are related design, engineering and production of earth-based systems used for the operation and control of space launch vehicles and systems deployed in space (e.g. ground stations, satellite tracking systems, and launch facilities).

Government Non-Military Space Systems Manufacturing : This category includes sales to government organisations relating to production as well as research, development, design, engineering, testing and evaluation services for systems deployed in space for primarily non-military civil applications (e.g. satellites, spacecraft, and space robotic systems) and their sub-systems and components, as well of space launch vehicles. Also included are related design, engineering and production of earth-based systems used for the operation and control of space launch vehicles and systems deployed in space (e.g. ground stations, satellite tracking systems, and launch facilities).

Military Space Systems Manufacturing: This category includes sales related to production as well as research, development, design, engineering, testing and evaluation services relating to primarily military systems deployed in space (e.g. satellites, spacecraft, and space robotic systems) and their sub-systems and components; as well of space launch vehicles. Also included are related design, engineering and production of earth-based systems used for the operation and control of space launch vehicles and systems deployed in space (e.g. ground stations, satellite tracking systems, and launch facilities).

Definitions of Canadian Aerospace Defence Activities

Military Aircraft Fabrication, Structures and Components: This category includes sales related to production as well as research, development, design, engineering, testing and evaluation services relating to structural elements, accessories, components, systems and sub-systems of manned military aerial platforms, and complete manned military aerial platforms intended for use in combat and military transport. This also includes landing gear (e.g. wheels, shock absorbers and related parts for the retraction and extension of aircraft landing gear, helicopter pontoons etc.) and propulsion systems and components for military aircraft (e.g. aircraft gas turbine engines, compressors, fuel systems, etc.).

Military Missiles, Rockets and Drones: This category includes sales related to production as well as research, development, design, engineering, testing and evaluation services relating to military missile systems, unmanned aerial vehicles, rockets (excluding space launch vehicles); and advanced anti-ballistic missile systems (e.g. tracking systems, guidance systems, course data, radio and satellite links, control systems, flight data storage, instrumentation design, navigation systems, etc.).

Military Simulation Systems and Components: This category includes sales related to production as well as research, development, design, engineering, testing and evaluation services for the hardware and software technologies used by military and security forces to develop, experiment and test operational doctrines and to train personnel using situational scenarios (e.g. intelligent software, visual systems, network simulations, real-time simulators, etc.).

Military Aircraft Maintenance, Repair and Overhaul Services: This category includes maintenance, repair and overhaul activities related to military aircraft, engines and accessories.