

2015 Report

The State of the **Canadian Aerospace Industry**



Presented by



Industry
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2015 Canadian State of Aerospace Features ...

- **The Canadian Aerospace Industry Ecosystem**
- **Economic Impact**
- **Manufacturing Comparative Analysis**
- **Canada in the World**
- **Supply Chain Perspective**
- **Key Findings**
- **Annex:**
 - Main Economic Indicators
 - Industry Definitions
 - Quantitative Analysis Methodology Principles



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

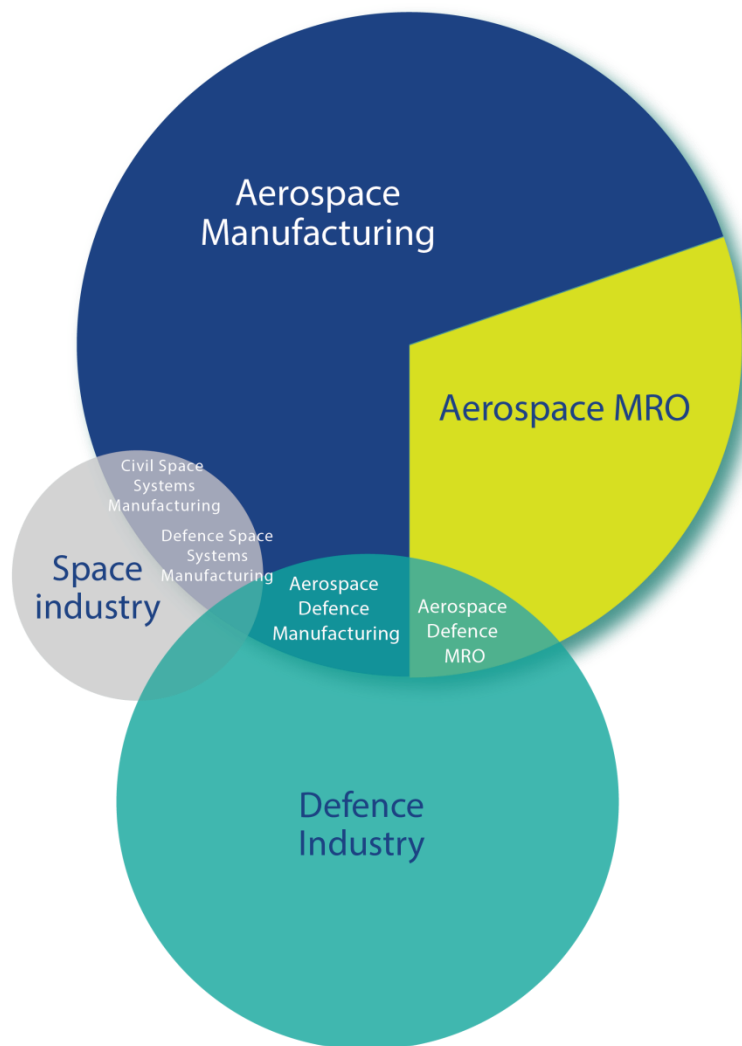


Context

- 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' data as well as from the Canadian Space Agency Annual Space Survey, 2014

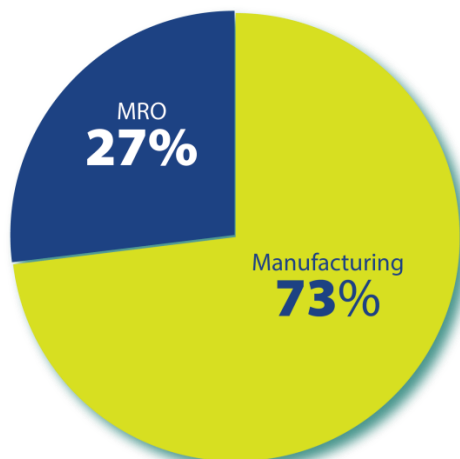
** Includes MRO activity performed by manufacturers

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

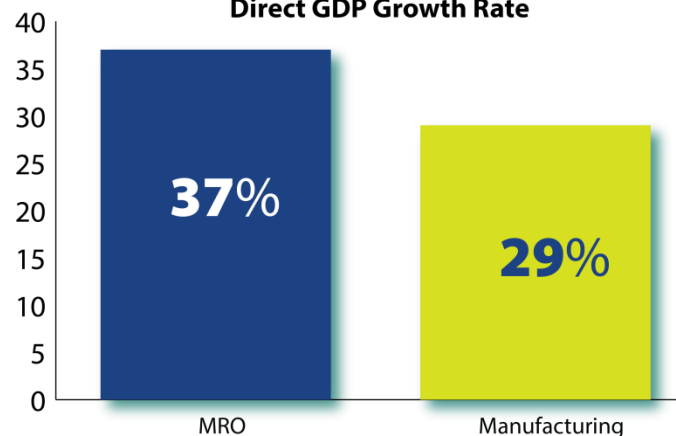


The Canadian aerospace industry contributed more than **\$29B** to GDP* and **180,000** to employment in the Canadian economy** in 2014

Canadian Aerospace Industry
Share of Direct GDP (2014)



Canadian Aerospace Industry 2004-2014
Direct GDP Growth Rate



- The industry*** directly** generated **\$27.7B** in revenues, **76,000** in direct employment and **\$13.1B** in GDP* in 2014
- Nearly **20%** of aerospace manufacturing activity is dedicated to Research & Development (R&D)****, representing a **\$1.8B investment** in 2014
- Both MRO and manufacturing experienced a period of strong economic growth (2004-2014)

* GDP better represents the activity that actually occurs within a country in contrast to revenues which includes foreign content as well as R&D, employment and revenues from outside 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

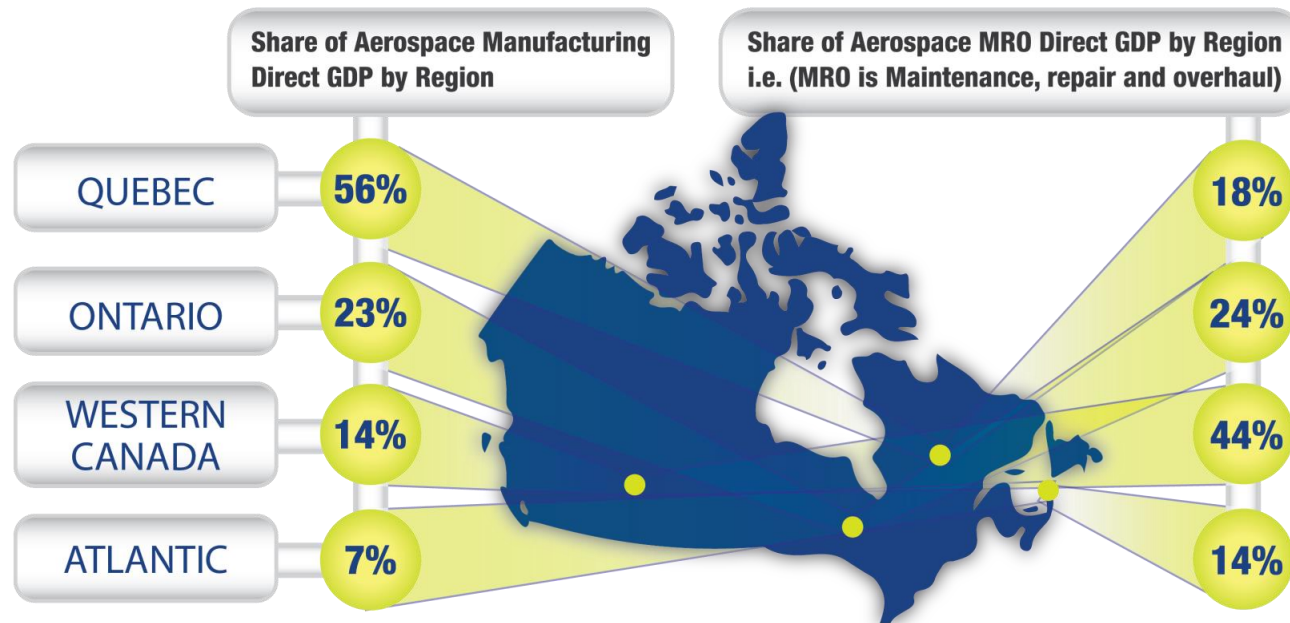
*** Firms where aerospace is their primary business activity, space systems manufacturing is included in the aerospace manufacturing sector

**** R&D activity performed by firms within their respective corporations in Canada

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



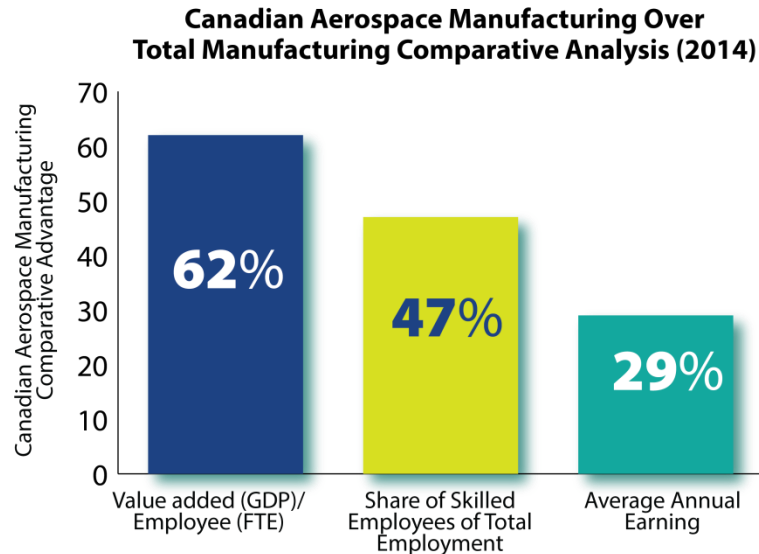
The Canadian aerospace industry is national



- Central Canada accounts for the majority of the manufacturing industry
- Western Canada plays a dominant role in terms of MRO
- Atlantic Canada was the fastest growing region in MRO over the past five years



Aerospace manufacturing is a best-in-class sector in innovation, productivity and skills indicators



- Aerospace manufacturing R&D intensity* is **5X** the total manufacturing average
- Aerospace manufacturing productivity growth** (2004-2014) is **2.5X** greater than total manufacturing

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

** Value added (GDP) / FTE

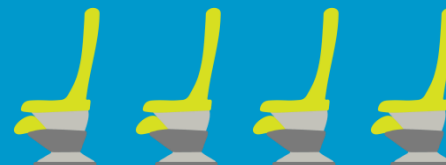


Canadian aerospace manufacturing ranks
5th in OECD countries in terms of GDP (2011)

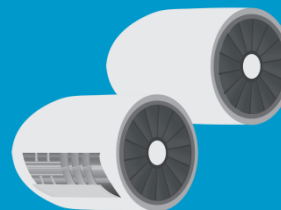


#1 in civil flight simulation (2014)

#3 in civil aircraft production (2014)
#2 in business aircraft production
#2 in regional aircraft production
#3 in general aviation* production
#5 in helicopter production



#3 in civil engine production (2014)
#1 in turboprop engine production
#1 in helicopter engine production



* General Aviation: Includes all aircraft not used in either commuter services or airline service (excluding business jets and rotorcraft)

Sources: Flight Simulation: Frost & Sullivan, Commercial Flight Training and Simulation Market, December 17, 2014

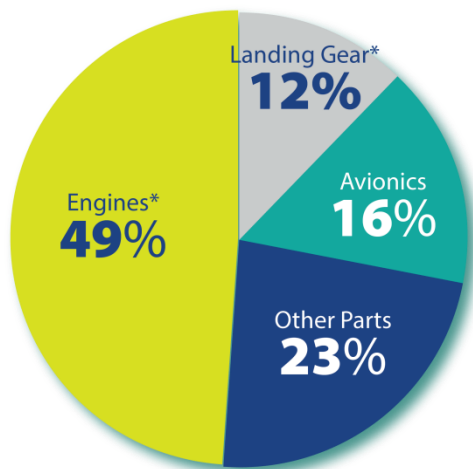
Aircraft production: Average of Forecast International and Teal Group forecasts, 2014

Engine Production: Forecast by Forecast International, 2014

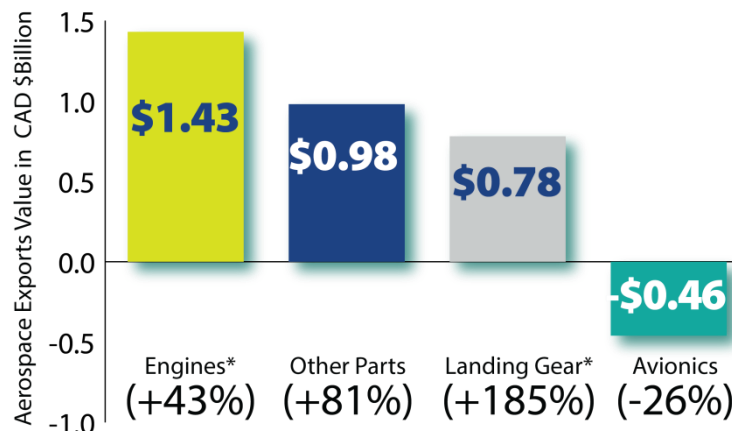


Close to **60%** of total Canadian aerospace exports are supply chain related** ...

2013 Aerospace Supply Chain Exports
by Product Category
(Excludes Aircrafts and Simulators)**



Growth in Value of Aerospace Supply Chain Exports
by Product Category (2003-2013)**



- Engines are the main supply chain export activity in terms of volume and growth in value
- Supply chain exports of landing gear are growing at a fast pace (up 185%) and account for close to 20% of the overall growth in value of exports (2003-2013)

* Engines and Landing Gear include their respective systems and components

** 57% of aerospace exports are supply chain related (engines, landing gear, avionics and other parts, excluding aircraft and helicopters as well as simulators). Aircraft and helicopters represent 39% of total aerospace exports. Simulators represent 4% of total aerospace exports

Europe **70%**

Aerospace supply chain exports* to Europe have increased by over **70%** since 2003



United States is the **key aerospace supply chain** export market for Canada



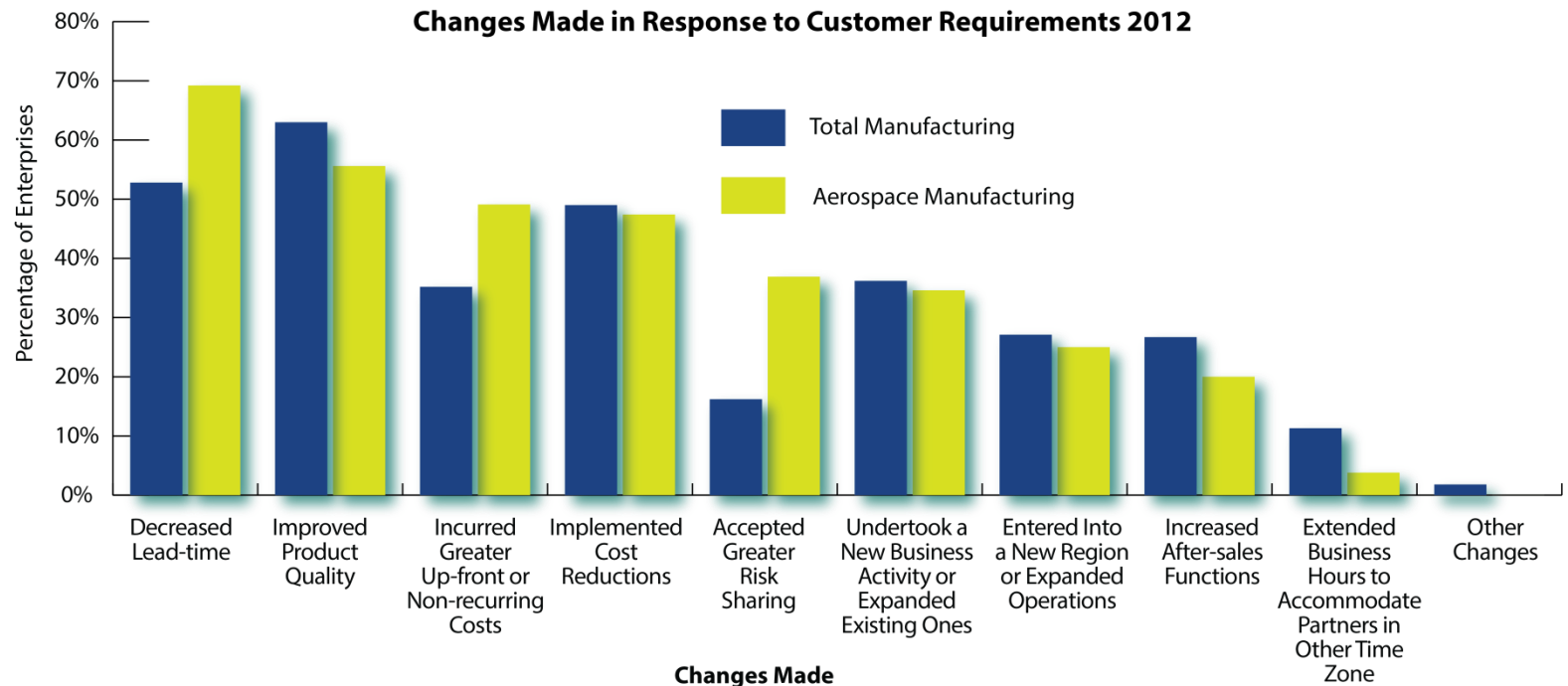
Supply chain exports to Asia Pacific are **growing at a fast pace (up 190%)** and account for close to **20%** of the overall growth in value of exports (2003-2013)



* 57% of aerospace exports are supply chain related (engines, landing gear, avionics and other parts, excluding aircraft and helicopters as well as simulators). Aircraft and helicopters represent 39% of total aerospace exports. Simulators represent 4% of total aerospace exports



In order to integrate into global supply chains, Canadian aerospace manufacturers are accepting greater risk and incurring greater up-front costs...

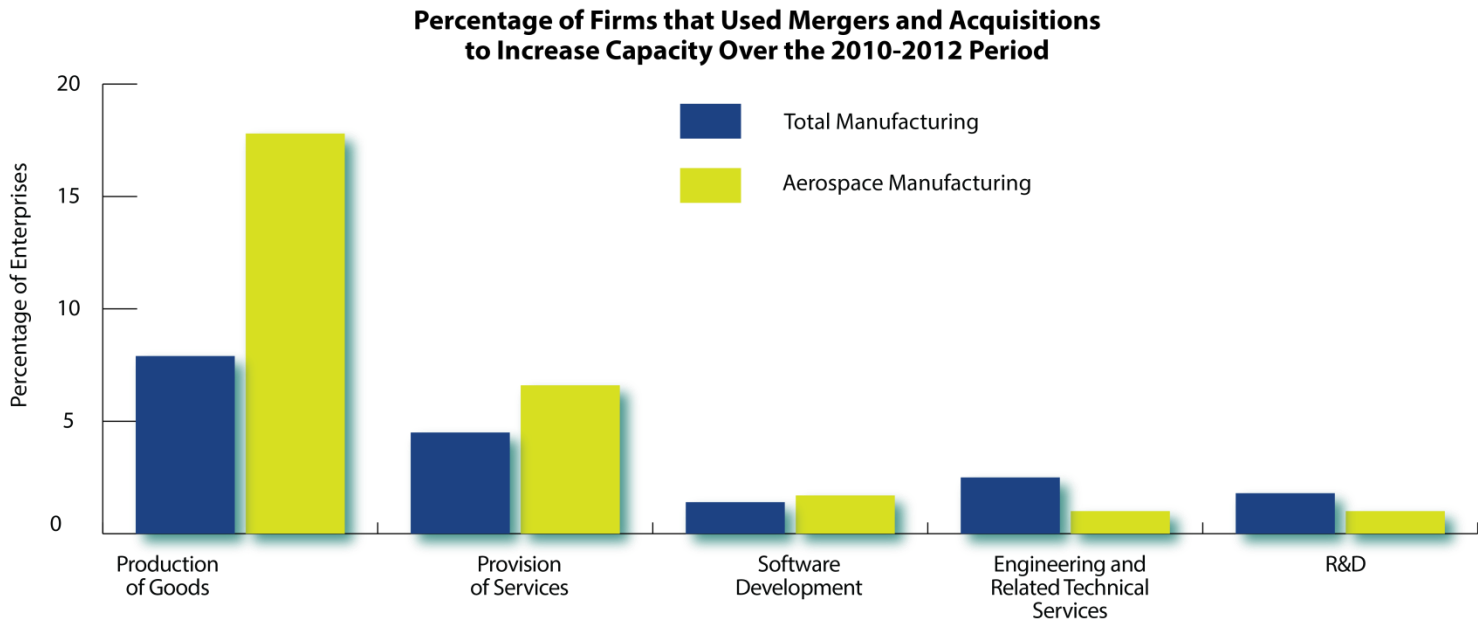


- Accepting greater risk sharing limits opportunities for smaller firms to integrate into aerospace supply chains*
- A large number of aerospace manufacturers are taking steps to decrease lead-time in response to supply chain pressures

* Industry validation



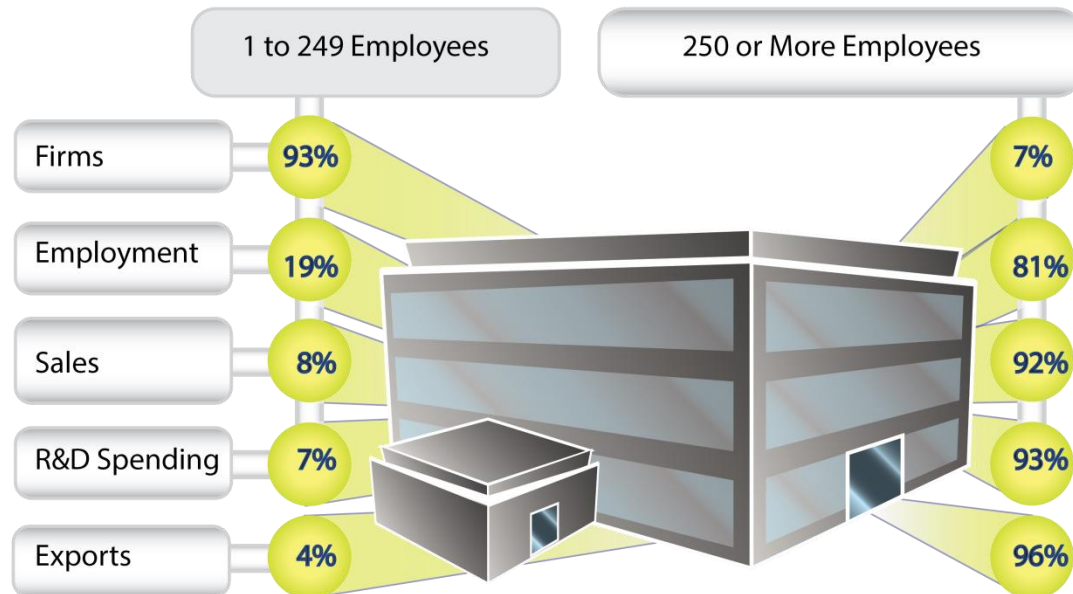
The merger and acquisition rate in aerospace manufacturing is twice that of total manufacturing for production related activities...



- Approximately 25% of medium and large aerospace manufacturing firms (100+ FTE) have increased production capacity by merger and acquisition compared to 12% for small firms
- R&D, engineering and software development capacity is mainly increased from within the enterprise



Year after year, close to **5%** of firms in the Canadian aerospace manufacturing sector increase in size...



- Most aerospace manufacturing firms* increasing in size** are moving within the 100-499 employment size range
 - Few firms are decreasing in size
- Large firms are more active in R&D and exports than others
- The United States shows similar patterns to Canada in the characteristics of aerospace manufacturing enterprises based on size

* Based solely on the total aerospace enterprises from the preceding year

** Increase in full time equivalents (FTEs)

Key Findings ...

The Canadian aerospace industry is **fast growing** and **innovative**



Canada is a leader in terms of civil flight simulation, aircraft production and engine production



Close to **60%** of total Canadian aerospace exports are supply chain related

In order to integrate into global supply chains, Canadian aerospace manufacturers are **accepting greater risk, incurring greater up-front costs and reducing lead-time**

Aerospace manufacturing is a **best-in-class sector** in innovation, productivity and skills indicators



Aerospace supply chain exports to Europe have increased by over **70%** since 2003



Contact: *Philippe Richer*
Industry Canada
philippe.richer@ic.gc.ca
(613) 852-3018

Iain Christie
Aerospace Industries Association of Canada (AIAC)
iain.christie@aiac.ca
(613) 760-4562



Annex



Economic and Employment Impact of Aerospace Manufacturing and MRO (2014)

Economic and Employment Impact of Aerospace Manufacturing and Maintenance, Repair and Overhaul (2014)								
	GDP - Economic Impact				Employment - Economic Impact			
	Direct	Indirect	Induced	Total*	Direct	Indirect	Induced	Total*
Aerospace Manufacturing (2014)	\$ 9,537	\$ 4,918	\$ 4,007	\$ 18,462	45,943	33,741	27,415	107,099
MRO (2014)	\$ 3,520	\$ 4,053	\$ 3,167	\$ 10,740	30,242	24,620	18,103	72,966
Total*	\$ 13,057	\$ 8,971	\$ 7,174	\$ 29,202	76,185	58,362	45,518	180,065

* Totals may not add up due to rounding

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



Canadian Aerospace Industry Economic Breakdown

	2014 Canadian Aerospace Manufacturing (2014-2013 Comparative Analysis (%))	2014 Canadian Aerospace MRO (2014-2013 Comparative Analysis (%))	2014 Total Canadian Aerospace (2014-2013 Comparative Analysis (%))
GDP (M)	\$ 9,537 (+7%)	\$ 3,520 (+5%)	\$ 13,057 (+6%)
Employment (FTE)	45,943 (+5%)	30,242 (+5%)	76,185 (+5%)
Revenues (M)	\$ 20,276 (+13%)	\$ 7,401 (+4%)	\$ 27,677 (+10%)
R&D (M)	\$ 1,764 (+2%)	\$ 40 (N/A)	\$ 1,804 (+2%)

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



Breakdown of Canadian Aerospace Exports by Product Category*

2013 Canadian Aerospace Exports by Product Category	
Product Category	Share of Canadian Exports
Canadian Aerospace Exports	
Aircraft & Rotorcraft	39%
Simulators	4%
Canadian Aerospace Supply Chain Exports*	
Engines	28%
Other Parts	13%
Avionics	9%
Landing Gear	7%

* 57% of aerospace exports are supply chain related (engines, landing gear, avionics and other parts, excluding aircraft and helicopters as well as simulators). Aircraft and helicopters represent 39% of total aerospace exports. Simulators represent 4% of total aerospace exports.

Source: Global Trade Atlas (based on Statistics Canada), 2014



Breakdown of Canadian Aerospace Exports by Region

2013 Canadian Aerospace Exports by Region*						
Product Category	United States	Europe	Asia Pacific	South and Central America**	Middle East	Africa
Canadian Aerospace Exports	57%	21%	14%	4%	2%	2%
Aircraft & Rotorcraft	56%	20%	17%	3%	1%	2%
Simulators	16%	13%	54%	1%	12%	2%
Canadian Aerospace Supply Chain Exports***	62%	23%	8%	4%	2%	1%
Engines	54%	29%	10%	4%	1%	2%
Other Parts	65%	17%	7%	6%	2%	2%
Avionics	64%	18%	11%	3%	2%	3%
Landing Gear	80%	17%	2%	1%	1%	0%

* Percentages may not total 100 due to rounding

** South & Central America includes Mexico

*** 57% of aerospace exports are supply chain related (engines, landing gear, avionics and other parts, excluding aircraft and helicopters as well as simulators). Aircraft and helicopters represent 39% of total aerospace exports. Simulators represent 4% of total aerospace exports.

Source: Global Trade Atlas (based on Statistics Canada), 2014



Definitions of the Canadian Aerospace Manufacturing and the MRO Service Industries

Aerospace Manufacturing Industry*	MRO Service Industry**
<p>Main activities:</p> <ul style="list-style-type: none"> • 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 simulators • Developing and producing prototypes for aerospace products • Space vehicles, parts and propulsion units, guided missiles and space vehicle engines • Telecommunication satellites and components • Avionics • Helicopters, propellers and parts 	<p>Main activities:</p> <ul style="list-style-type: none"> • Aircraft heavy maintenance, servicing and repair • Aircraft engine maintenance, servicing and repair • Aircraft components and other systems maintenance, servicing and repair • Aircraft line maintenance (aircraft servicing at airports – excluding sales of fuel revenues) • Aircraft ferrying services • Aircraft inspection services • Aircraft testing services • Aircraft upholstery repair

* Includes MRO activity performed by manufacturers

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



Quantitative Analysis Methodology Principles

- Data is compiled from Government agencies' information based on tax returns* (as opposed to data based on sampling) with firm-level adjustments in order to capture all key sector firms and segments**
- Economic impact and intensity analysis based on GDP***
- Industry specific economic multiplier to estimate total economic impact****
 - *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
- R&D***** investments / intensity*** and other international comparative analysis based on OECD internationally recognised definitions

* Confidence intervals estimated at +/- 2.5%

** Addition of key firms in space manufacturing, avionics manufacturing, flight simulator manufacturing and MRO service providers

*** GDP better represents activity that actually occurs within a country in contrast to revenues which includes foreign content as well as R&D, employment and revenues from outside Canada (even if it was performed by a Canadian firm)

**** Economic multiplier developed by Statistics Canada based on input-output model and other key economic variables

***** Research and Development (R&D) is the systematic investigation carried out in the natural and engineering sciences by means of experiment or analysis to achieve a scientific or technological advance. Research is original investigation undertaken on a systematic basis to gain new knowledge. Development is the application of research findings or other scientific knowledge for the creation of new or significantly improved products or processes. If successful, development will usually result in devices or processes which represent an improvement in the state of the art and are likely to be patentable.

Canada