Innovation, Science and Economic Development Canada | Innovation, Sciences et Développement économique Canada

Canada

State of Canada's Aerospace Industry

2018 Report

Presented by:

Innovation, Science and Economic Development Canada and AIAC

ISED and the AIAC have partnered to provide evidence-based, relevant, quality and timely analysis to both industry and government decision makers

For the State of Canada's Aerospace Industry 2018 Report:

- Innovation, Science and Economic Development Canada (ISED) developed detailed economic models, statistics and analysis* based on Statistics Canada and global private independent research organizations' data
- Analysis reflected the latest Statistics Canada revisions of economic impact multipliers for the 2012-2017 period, including the measurement of jobs and GDP impact from the Canadian aerospace industry, its value chain, and associated consumer spending
- The Aerospace Industries Association of Canada (AIAC) consulted and validated research findings with its network on business drivers, issues and trends
- ISED and the AIAC jointly published the latest statistics

* See Annex A1 and A2 for aerospace industry definitions and economic impact methodology principles, respectively

Features of the 2018 report

Aerospace industry ecosystem

Economic indicators

Global value chain participation

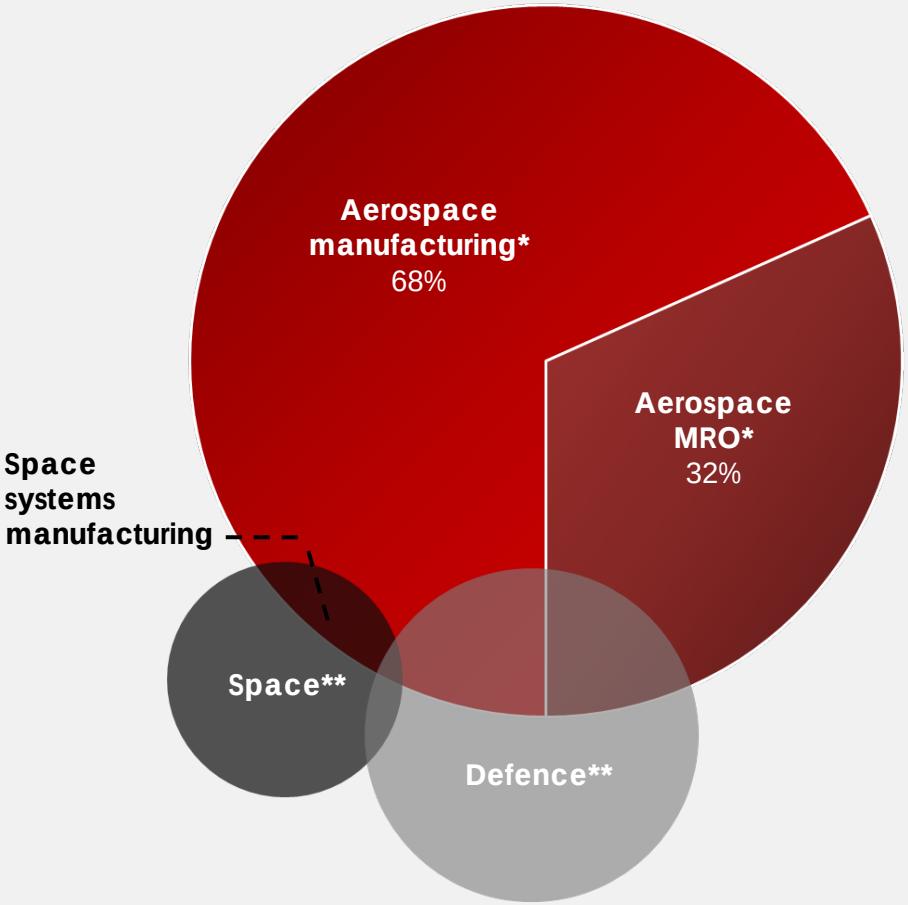
Innovation and skills

Annex

A – Definitions and economic impact methodology principles
B – Economic and industrial indicators

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

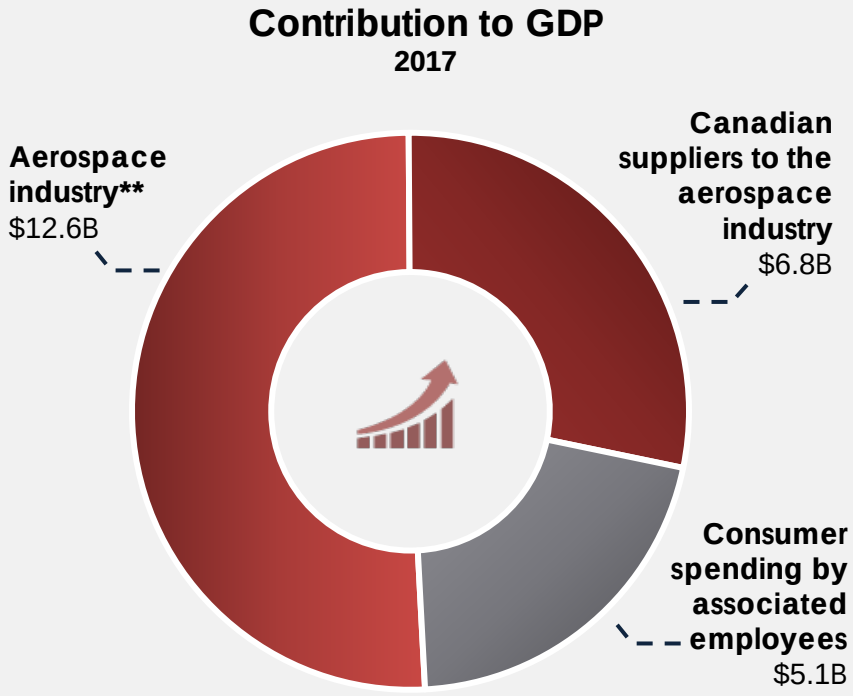
Share of GDP by Canadian aerospace industry segment
2017

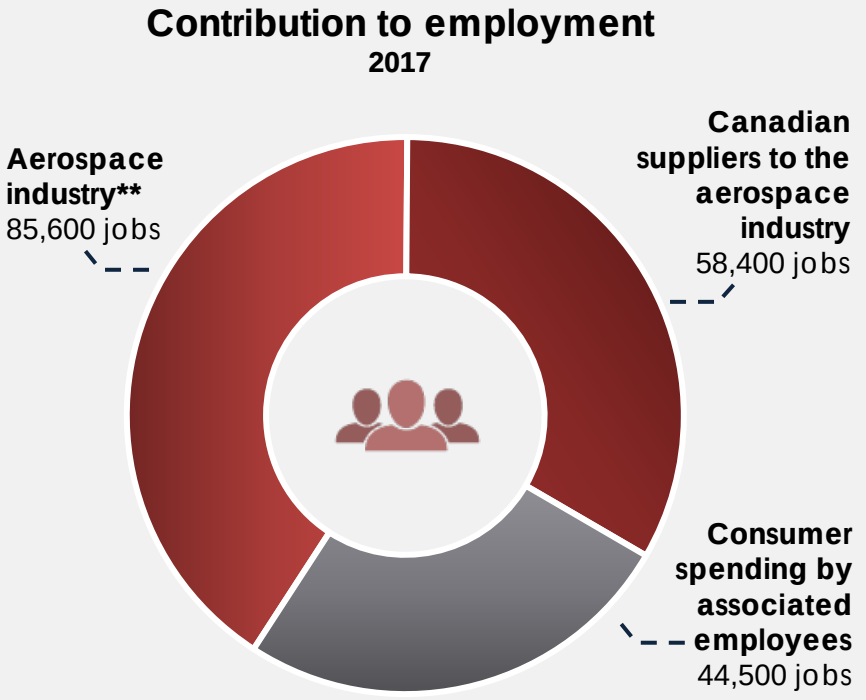


- Canadian aerospace industry sales** were made up of:
  - commercial aerospace (86%)
  - defence aerospace (12%)
  - space systems (2%)
- The space systems manufacturing industry*** in Canada was highly skills focused and civil oriented
- Among overall defence activities**, aerospace captured more than 30% of sales and close to 50% of research and development (R&D)

* See Annex A1 and A2 for aerospace industry definitions and methodology principles, respectively. MRO is maintenance, repair, and overhaul
** Based on the latest (2016) available information
*** Beyond space systems manufacturing, space activities include applications such as satellite operations, value-added applications, and space-based broadcasting
Source: ISED's economic model estimates based on latest revised data from Statistics Canada, the Canada Revenue Agency, the Canadian Space Agency and enterprise-level observations, 2018; Canadian Defence, Aerospace and Marine Industries Survey (2016), 2018

The aerospace industry contributed close to $25 billion in GDP and almost 190,000 jobs to the Canadian economy* in 2017





- Positive 5-year growth in its GDP (+6%) and jobs (+2%) contribution to the Canadian economy, despite a slight decline in both between 2016 and 2017
- Revenues of close to $29 billion with direct employment of 85,600 Canadians
- Close to 75% of aerospace manufactured products were exported in 2017

* Gross Domestic Product (GDP) is the total unduplicated value of the goods and services produced in an industry, country or region during a given period. Jobs refer to full-time equivalent employees. Economic impact indicators include the aerospace industry (direct economic impact from enterprises for which aerospace is the main activity), suppliers to the aerospace industry (indirect economic impact from enterprises for which aerospace is not the main activity), and consumer spending by associated employees (induced economic impact). See Annex B1 and B3 for detailed aerospace industry GDP and employment contributions to the Canadian economy by year (2012-2017)

** Direct economic impact from enterprises for which aerospace is the main activity

Source: ISED's economic model estimates based on latest revised data from Statistics Canada National Input-Output Multipliers (2014) adjusted to 2017 GDP and jobs (in 2007 chained dollars), 2018

The Canadian aerospace industry is national

Aerospace employment share by region

2017

- Most aerospace manufacturing activity takes place in Central Canada
- Western and Atlantic Canada captured close to 60% of MRO activities
- MRO activity grew by over 25% while manufacturing activity saw a slight contraction between 2012 and 2017*

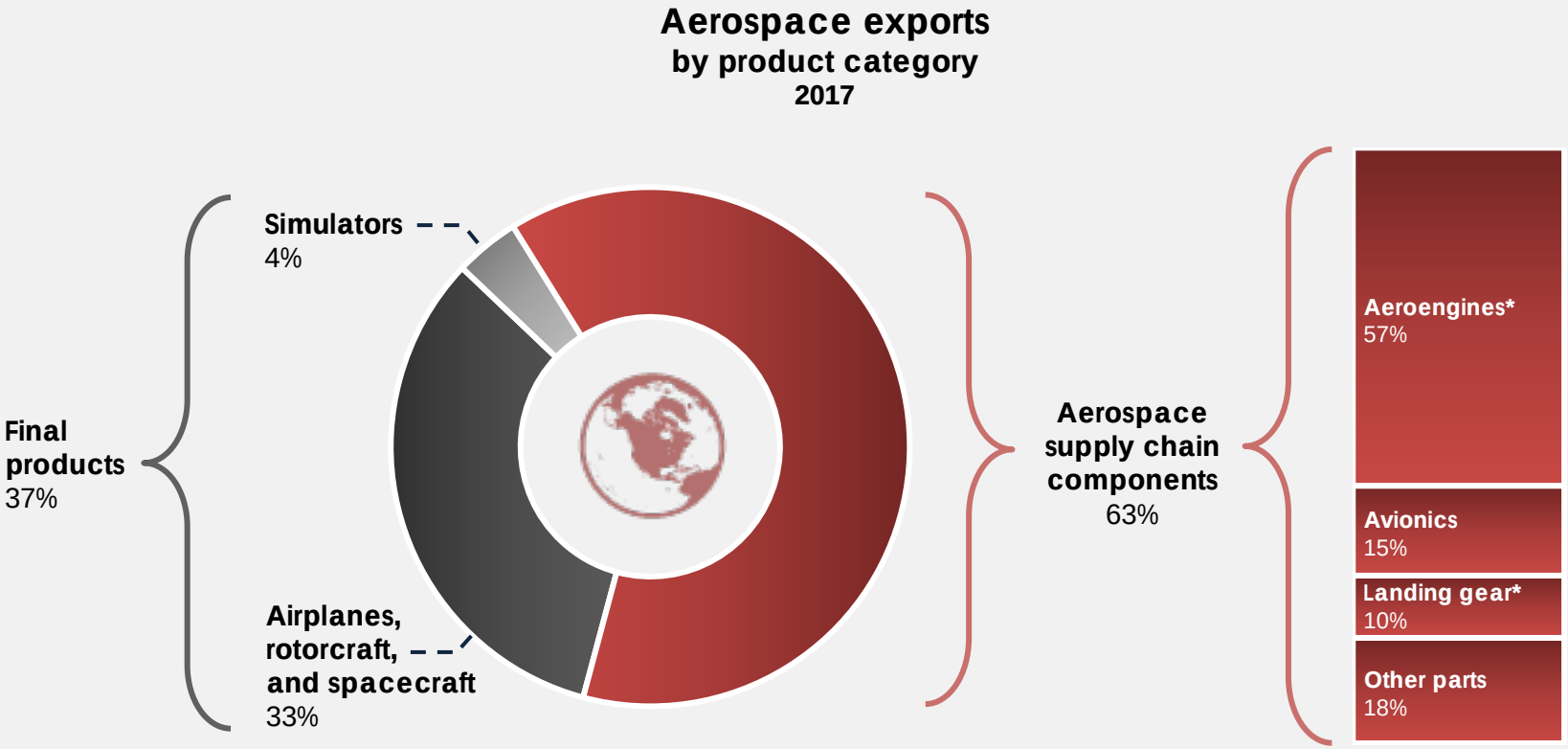
* See Annex B3 for detailed aerospace industry GDP and employment contributions to the Canadian economy by year (2012-2017)
Source: ISED's economic model estimates based on latest revised data from Statistics Canada, the Canada Revenue Agency and enterprise-level observations, 2018

In a country comparison, Canada ranked* in the top three in terms of civil aircraft, engines, and flight simulators

Overall Rank		
1	Civil flight simulator production	#1 - Civil flight simulator production
3	Civil aircraft production	#2 - Business aircraft production #2 - Regional aircraft production #4 - Large jet production #4 - General aviation** production #5 - Helicopter production
3	Civil engine production	#1 - Turboprop engine production #1 - Helicopter engine production #4 - Turbofan engine production

* Rankings based on final production
** General Aviation: includes all aircraft not used in either commuter services or airline service (excluding business jets and rotorcraft)
Source: Flight simulation: Frost & Sullivan, Commercial Flight Training and Simulation Market (2016); Aircraft production: average of Forecast International and Teal Group (2017), 2018; Engine production: Forecast International (2017), 2018

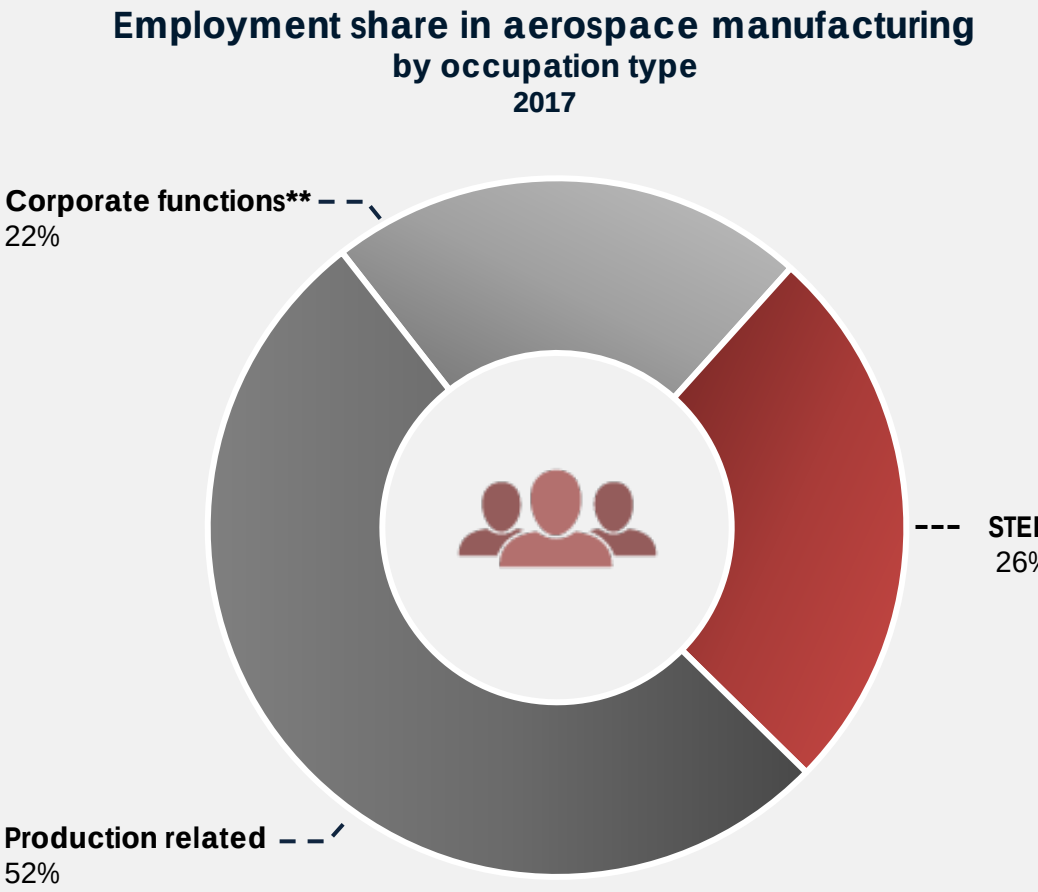
Over 60% of Canadian aerospace product exports were supply chain related



- The share of supply chain exports has increased by almost 50% over the past 15 years (2003-2017)

* Aeroengines and landing gear include their respective systems and components
Source: Global Trade Atlas (2017), 2018

Share of STEM* employment in aerospace manufacturing was almost 3X the manufacturing average

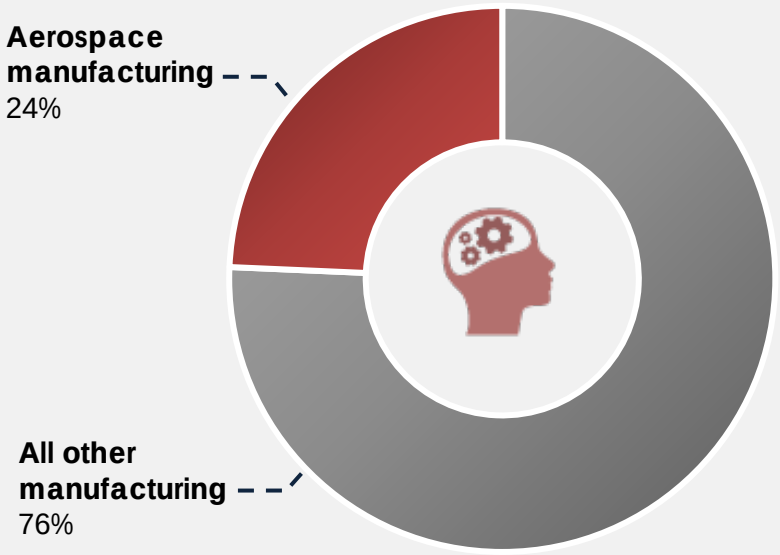


Women made up close to a quarter of those employed in STEM occupations – an increase of over 100% between 2012 and 2017

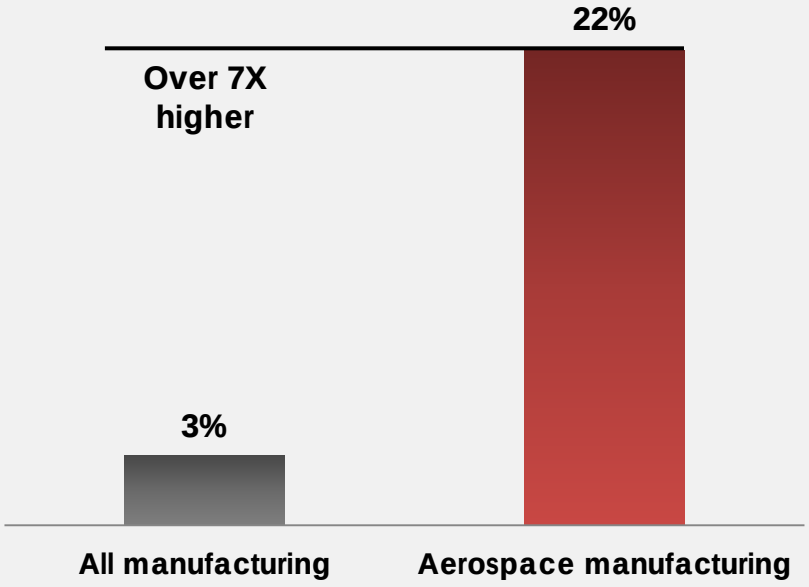
* Science, technology, engineering, and mathematics
** Includes management, administration, marketing, and unspecified occupations
Source: Statistics Canada's special tabulation of occupation by industry, 2018

Aerospace was the number one R&D player among all Canadian manufacturing industries

Canadian manufacturing industry R&D
2017



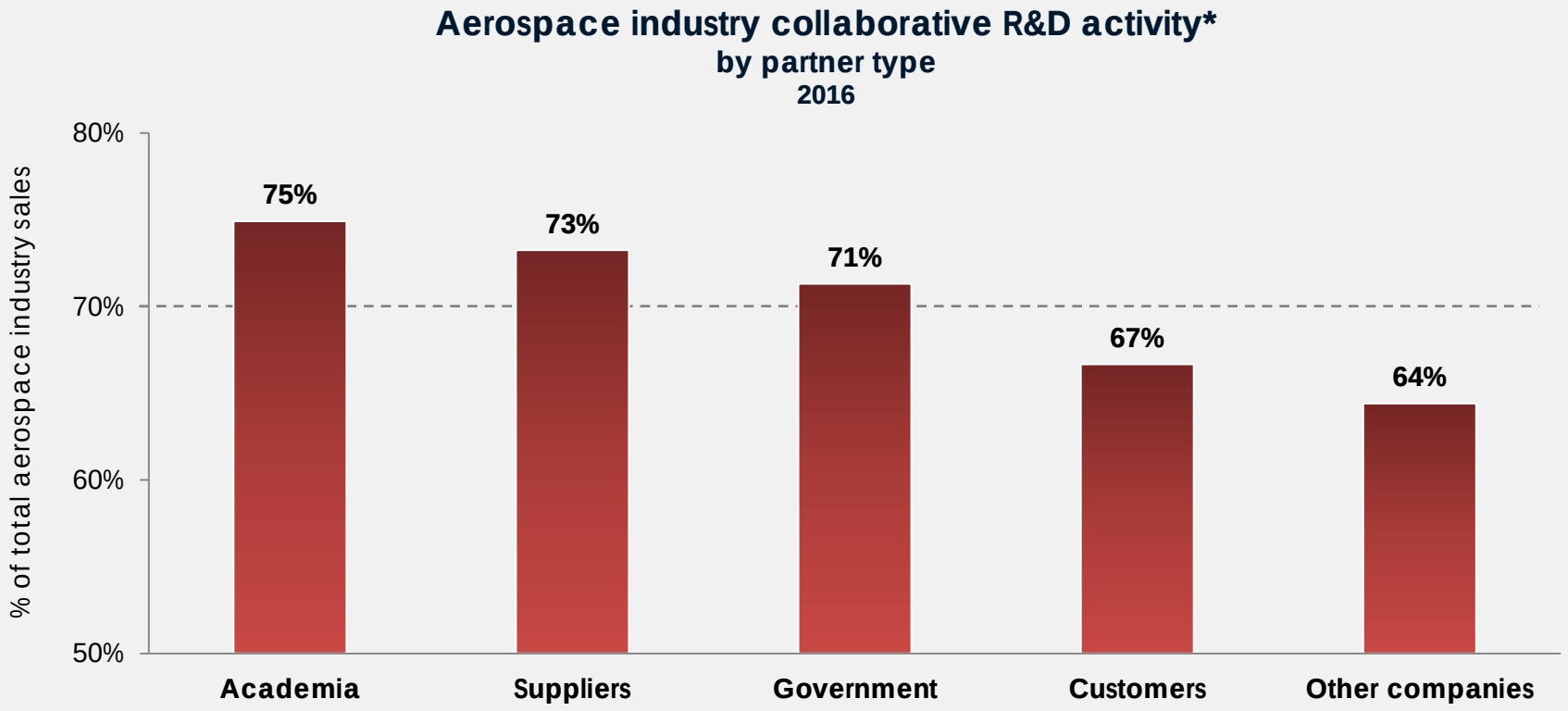
Manufacturing industry R&D intensity*
2017



- R&D performed by aerospace manufacturing totalled $1.7 billion in 2017
- The aerospace manufacturing industry contributed close to a quarter of total manufacturing R&D in Canada and was over seven times as R&D intensive as the manufacturing average

* R&D intensity is calculated using the ratio of R&D to GDP based on Statistics Canada's CANSIM tables
Source: ISED's economic model estimates based on latest revised data from Statistics Canada, the Canada Revenue Agency and enterprise-level observations, 2018

The Canadian aerospace industry was actively engaged in R&D collaboration with a variety of partners



- Firms capturing more than 70% of the aerospace industry's activity* collaborated on R&D with academia, government, and suppliers

* Any R&D collaborative activity that may have occurred between 2014 and 2016. Values represent the enterprises' share of total aerospace industry revenues. ISED estimates based on the survey data and activity among firms that more fully responded to the collaborative business practices questions
Source: Canadian Defence, Aerospace and Marine Industries Survey (2016), 2018

Key Findings*

The Canadian aerospace industry is:

- A national industry that contributed close to $25 billion in GDP and almost 190,000 jobs to the Canadian economy
- The number one R&D player among Canadian manufacturing industries, with large-scale, multi-year innovation initiatives that lead to high-volume and diversified export activities
- Skills focused, with a STEM employment share 3X higher than the manufacturing average, and its share of women working in STEM doubling over the past five years
- Actively collaborating on R&D with academia, industry, and government in order to achieve commercial success

* According to the latest data

Annex A

Annex A1 – Definitions of the Canadian aerospace manufacturing and MRO service industries

Annex A2 – Economic impact methodology principles

Annex A1 – Definitions of the Canadian aerospace manufacturing and MRO service industries

Aerospace manufacturing industry	Aerospace 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 simulators • Developing and producing prototypes for aerospace products • Space systems • 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 services • Aircraft inspection services • Aircraft testing services • Aircraft upholstery repair

* Excludes MRO activity performed by manufacturers and airlines

Annex A2 – Economic impact methodology principles

- Aerospace industry data is compiled from various government agencies such as Statistics Canada, the Canada Revenue Agency, and the Canadian Space Agency, with firm-level adjustments to capture all key industry firms and segments*
- Economic impact analysis based on gross domestic product (GDP)** and full-time equivalent employees
- In 2018, the economic impact estimates of the State of Canada's Aerospace Industry Report were based on Statistics Canada economic impact multipliers reflecting a comprehensive revision of the Canadian system of macroeconomic accounts
- This revision contributed to updated ISED estimates***:
  - 2016 GDP impact estimate of $25.0B (compared to $27.7B, pre-revision), and a jobs impact of 191.1K jobs (compared to 207.6K, pre-revision)
- Using the latest Statistics Canada Input-Output multipliers compared to the previously available multipliers resulted in a difference**** of 10% of GDP and 8% of jobs impacts to the Canadian economy

* Inclusion of key firms in space manufacturing, avionics manufacturing, flight simulator manufacturing and MRO service providers
** GDP better represents activity that actually occurs within Canada 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)
*** Economic model estimations are not comparable to older estimates in previously published reports as Statistics Canada's Input-Output framework has been updated for all industries in April 2018
**** The difference relates to 2016 estimates that are based on the 2014 multipliers released in April of 2018 (the most current available) versus initial estimates that were based on 2011 multipliers

Annex B

- **Annex B1 – Economic impact indicators (2017)**
- **Annex B2 – Industrial indicators (2017)**
- **Annex B3 – Industrial indicators (2012-2017)**

Annex B1 – Economic impact indicators (2017)*

	Impact on Canadian GDP ($ millions)				Impact on Canadian employment (jobs)			
	Aerospace industry	Suppliers to aerospace industry	Consumer spending by associated employees	Total**	Aerospace industry	Suppliers to aerospace industry	Consumer spending by associated employees	Total**
Aerospace manufacturing	8,613	3,511	3,081	15,204	53,588	26,645	25,011	105,244
Aerospace MRO	4,025	3,251	2,034	9,310	31,998	31,705	19,379	83,082
Aerospace total	12,638	6,762	5,115	24,514	85,586	58,350	44,391	188,327

* National Input-Output Multipliers (2014) adjusted to 2017 GDP (in 2007 chained dollars) and employment
** Includes the aerospace industry (direct economic impact from enterprises for which aerospace is the main activity), suppliers to the aerospace industry (indirect economic impact from enterprises for which aerospace is not the main activity), and consumer spending by associated employees (induced economic impact)
Note: Due to rounding, numbers presented may not add up precisely to the totals provided
Source: ISED's economic model estimates based on latest revised data from the Statistics Canada Business Registry and CANSIM, the Canada Revenue Agency, and enterprise-level observations, 2018

Annex B2 – Industrial indicators (2017)*

	Aerospace manufacturing	Aerospace MRO	Aerospace industry total
GDP ($ millions)	8,613	4,025	12,638
Employment (jobs)	53,588	31,998	85,586
Revenues ($ millions)	21,151	7,831	28,982
R&D** ($ millions)	1,744	42	1,786
Exports*** ($ millions)	15,069	N/A***	15,069***

* National Input-Output Multipliers (2014) adjusted to 2017 GDP (in 2007 chained dollars) and employment. Revenues and R&D are in current annual dollars
** Several aspects of the Statistics Canada Annual Survey of Research and Development in Canadian Industry have been redesigned since 2016, including concepts, methodology, the collection method and the data processing system. The concepts and definitions employed in the collection and dissemination of R&D data are provided in the Frascati Manual 2015: Guidelines for Collecting and Reporting Data on Research and Experimental Development (Organisation for Economic Cooperation and Development (OECD), 2015). According to this definition: "R&D comprises creative and systematic work undertaken in order to increase the stock of knowledge – including knowledge of humankind, culture and society – and to devise new applications of available knowledge"
*** Export figures are sourced from Trade Data Online (2017), 2018. Export data for aerospace MRO is not available
Note: Due to rounding, numbers presented may not add up precisely to the totals provided
Source: ISED's economic model estimates based on latest revised data from the Statistics Canada Business Registry and CANSIM, the Canada Revenue Agency, and enterprise-level observations, 2018

Annex B3 – Industrial indicators (2012-2017)*

	Industry	2012	2013	2014	2015	2016	2017	% change from 2012 to 2017
GDP ($ millions)	Aerospace manufacturing	8,974	9,474	10,325	9,787	9,167	8,613	-4.0%
	Aerospace MRO	3,195	3,247	3,520	3,664	3,802	4,025	+26.0%
	Aerospace total	**12,169**	**12,722**	**13,845**	**13,452**	**12,969**	**12,638**	**+3.9%**
	Aerospace contribution to Canadian economy**	**23,231**	**24,236**	**26,369**	**25,753**	**24,976**	**24,514**	**+5.5%**
Employment (jobs)	Aerospace manufacturing	56,648	58,079	60,140	57,648	55,725	53,588	-5.4%
	Aerospace MRO	28,541	28,695	30,242	31,314	31,457	31,998	+12.1%
	Aerospace total	**85,190**	**86,773**	**90,382**	**88,961**	**87,182**	**85,586**	**+0.5%**
	Aerospace contribution to Canadian economy**	**185,362**	**188,570**	**196,635**	**194,523**	**191,119**	**188,327**	**+1.6%**
Revenues ($ millions)	Aerospace manufacturing	15,860	17,397	20,863	22,550	20,234	21,151	+33.4%
	Aerospace MRO	6,985	7,022	7,401	7,663	7,698	7,831	+12.1%
	Aerospace total	**22,845**	**24,420**	**28,264**	**30,214**	**27,932**	**28,982**	**+26.9%**
R&D* ($ millions)**	**Aerospace total**	**1,843**	**1,993**	**2,052**	**2,003**	**1,825**	**1,786**	**-3.1%**

* National Input-Output Multipliers (2014) adjusted to 2017 GDP (in 2007 chained dollars) and employment. Revenues and R&D are in current annual dollars

** Includes aerospace industry (direct economic impact from enterprises for which aerospace is the main activity), suppliers to the aerospace industry (indirect economic impact from enterprises for which aerospace is not the main activity), and consumer spending by associated employees (induced economic impact)

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Canada