



State of Canada's Aerospace Industry Report

Summer 2022



The Report Overview

- The report is a partnership:
 - Multi-year collaborative analytics agreement with the Aerospace Industries Association of Canada (AIAC) and Innovation, Science and Economic Development Canada (ISED)



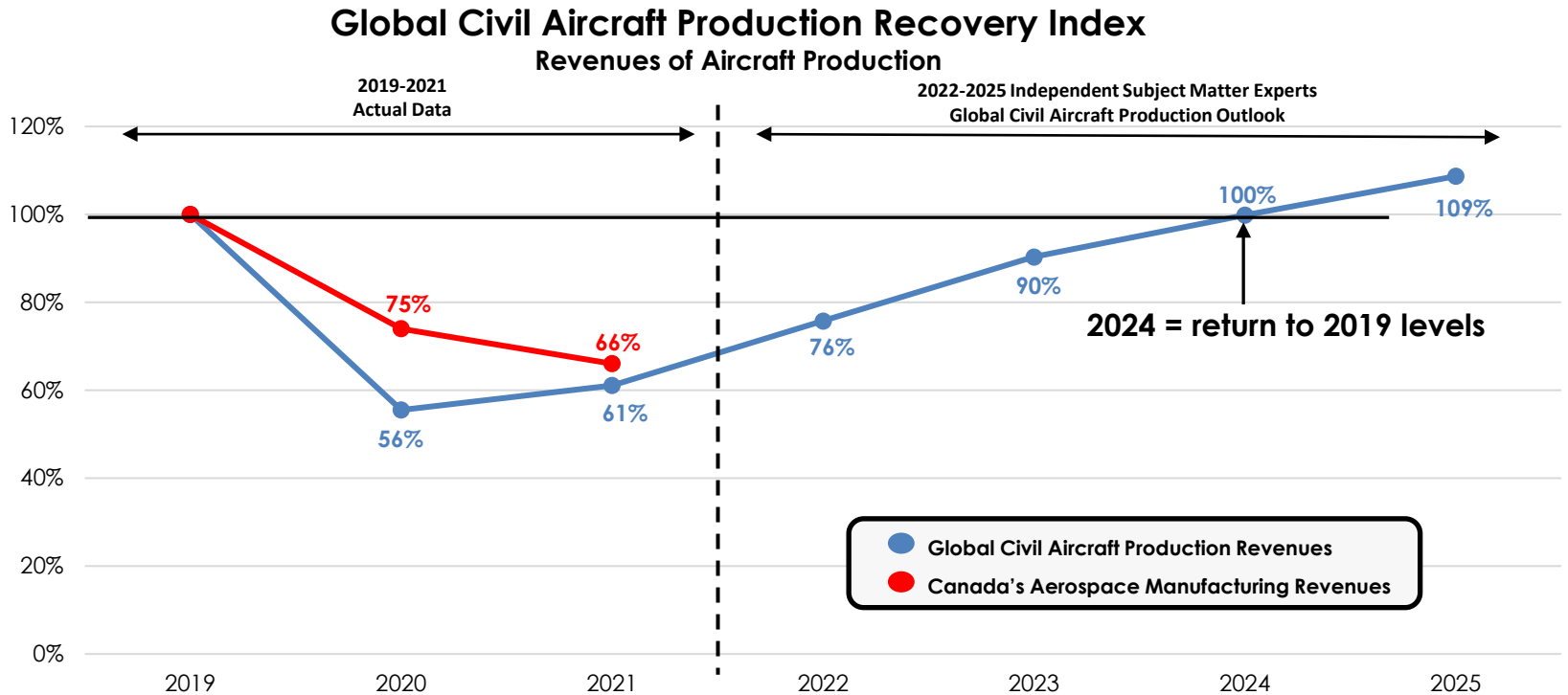
Innovation, Science and
Economic Development Canada

Innovation, Sciences et
Développement économique Canada



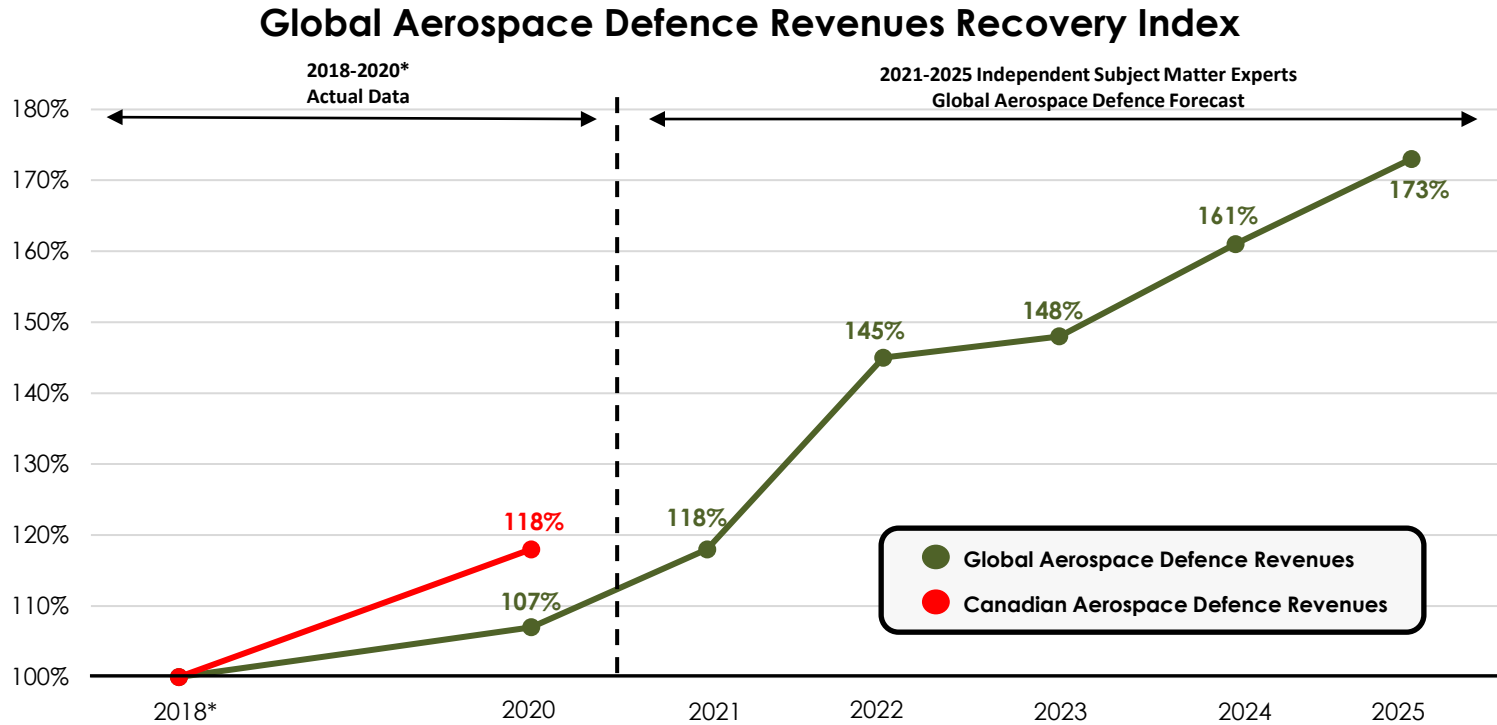
- The report is fact-based*:
 - Economic impact models and innovation indicators informed by experts from the Organisation for Economic Co-operation and Development (OECD)
 - Analysis based on government agencies, administrative data, as well as international independent subject matter experts
- This year's report focuses on the economic impacts since the start of the COVID-19 pandemic on the Canadian and global aerospace industry:
 - 2019-2021 comparative analysis
 - International comparison and global market outlook

Since the start of the pandemic, the impact on Canada's aerospace manufacturing revenues* have been similar to global civil aircraft production revenues



- Canada's aerospace manufacturing revenues continued to decline between 2020 and 2021, but at a slower rate, for a total reduction between 2019 and 2021 of 34%
- Between 2020 and 2021 global civil aircraft production revenues started to recover from the pandemic, after declining by 44% between 2019 and 2020
- According to international independent subject matter experts, global civil aircraft production revenues are forecasted to return to their 2019 levels by 2024, one year earlier than initially forecasted

In contrast to civil aerospace, the global and the Canadian aerospace defence revenues have been growing since the start of the pandemic

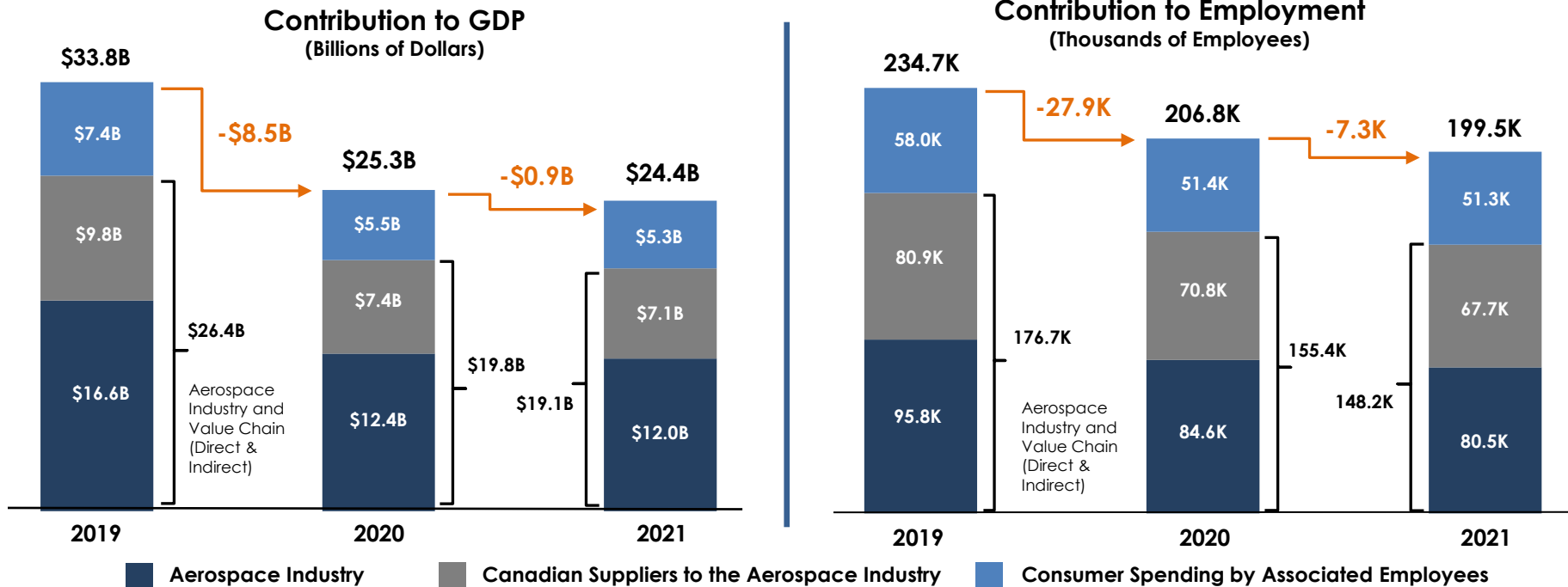


- Defence activity represented 17% of total Canadian aerospace revenues in 2020, with Canada's aerospace defence revenues outperforming the global sector between 2018-2020
- According to international independent subject matter experts, global aerospace defence revenues are forecasted to grow by over 45% between 2021-2025

* 2019 data is not available for comparative analysis purposes
Source: Jane's Group UK Limited, Markets Forecast, 2022; Statistics Canada's Canadian Defence, Aerospace, Marine and Cybersecurity Industries Survey (2020), 2022

In 2021, the Canadian aerospace industry contributed over \$24B in GDP and close to 200,000 jobs to the Canadian economy*

Aerospace Industry Contribution to the Canadian Economy (2019, 2020 and 2021)



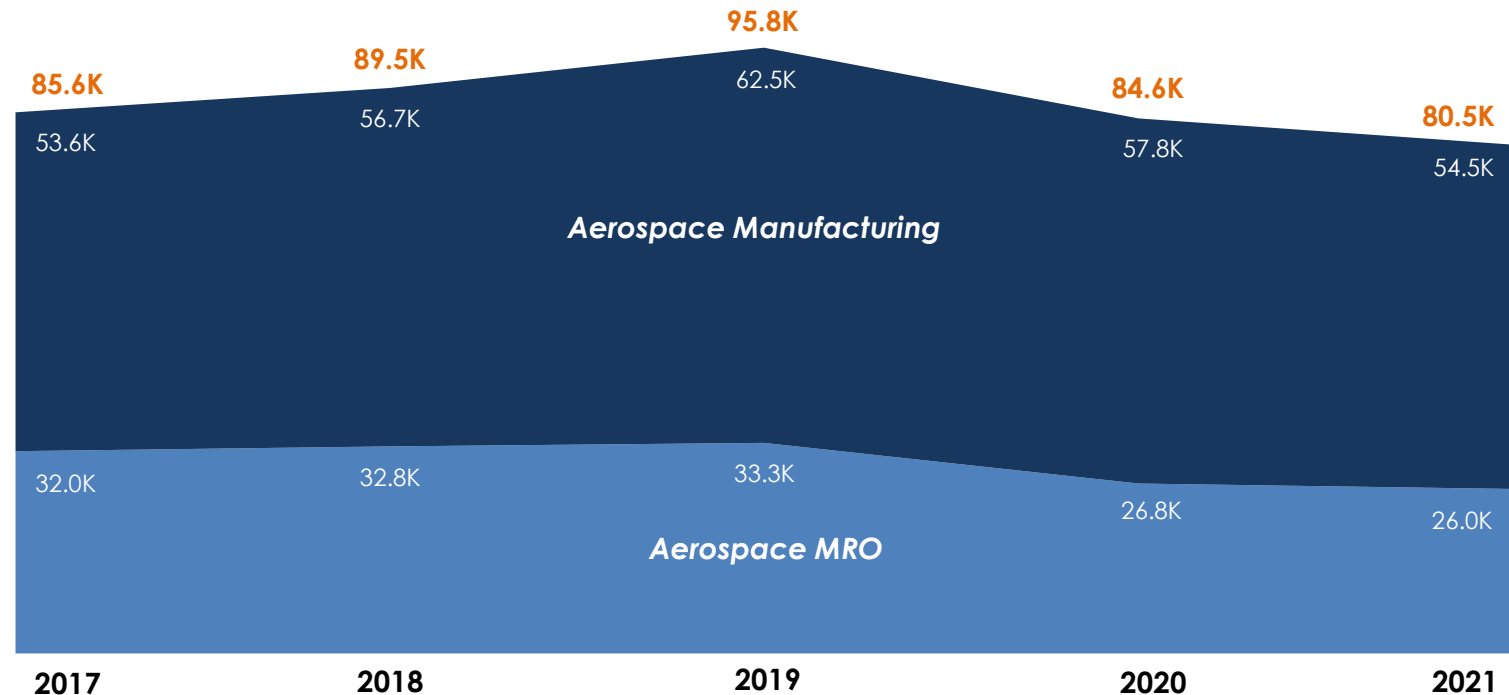
- The aerospace's industry's contribution to the Canadian economy declined by \$0.9B in GDP and 7,300 jobs between 2020 and 2021
- Overall, between 2019 and 2021, the aerospace industry's contribution to the Canadian economy declined by \$9.4B in GDP and 35,200 jobs

* 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 5 for detailed aerospace industry GDP and employment contributions to the Canadian economy by year (2017-2021)

Source: ISED's economic model estimates (GDP in 2012 chained dollars) based on the latest Statistics Canada National Input-Output Multipliers (2017, 2018), 2022; ISED's economic model estimates based on latest revised data from Statistics Canada (2020, 2021), 2022

Since the start of the pandemic, both aerospace manufacturing and MRO activities in Canada were highly impacted

Canadian Aerospace Industry Employment*
Thousands of Employees, 2017-2021

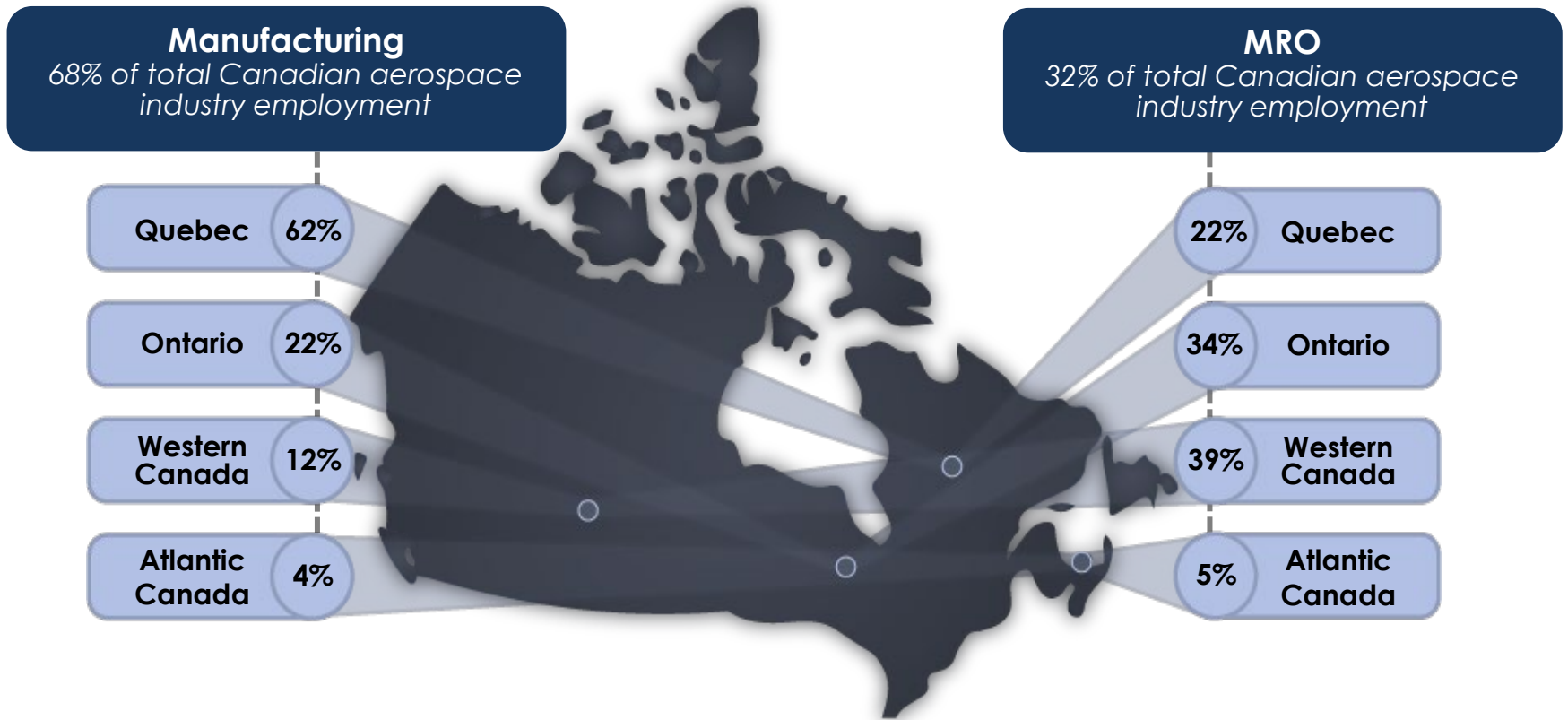


- Between 2019 and 2021, decreases in employment were seen across both manufacturing (8,000) and MRO (7,300) activities
 - MRO was significantly less impacted between 2020-2021 (-3% in 2020-2021 versus -20% in 2019-2020)
 - Manufacturing activities decreased by 8% and 6% in 2019-2020 and 2020-2021 respectively

*Employment refers to full-time equivalent employees. Economic impact indicators include the aerospace industry's direct economic impact from enterprises for which aerospace is the main activity. See Annex 5 for detailed aerospace industry employment contributions to the Canadian economy by year (2017-2021)
Source: ISED's economic model estimates based on latest revised data from Statistics Canada, the Canada Revenue Agency, and firm administrative data (2021), 2022

Between 2020-2021, all regions maintained their relative employment market share in terms of aerospace manufacturing and MRO

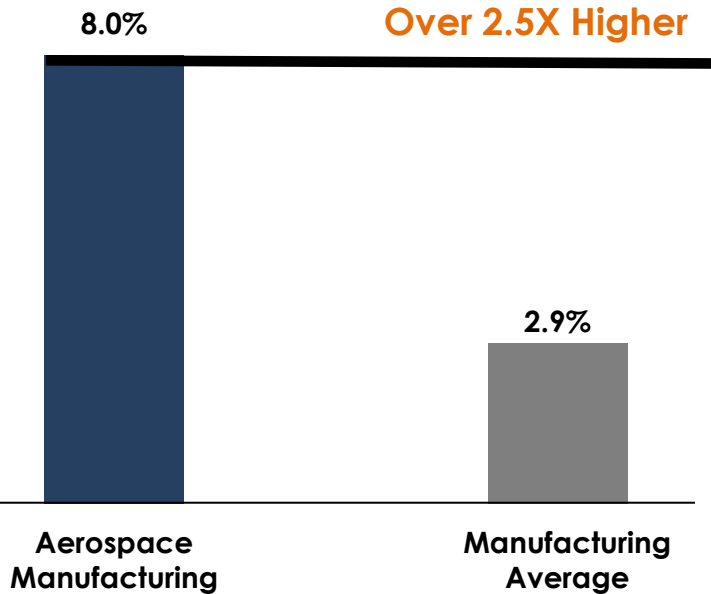
Aerospace Employment Share by Region* 2021



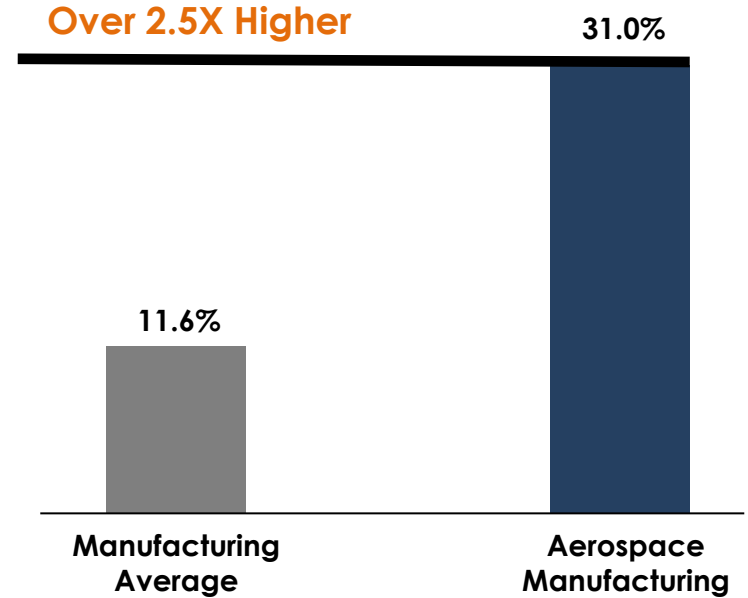
* See Annex 5 and 6 for detailed aerospace industry employment contributions to the Canadian economy by year
Source: ISED's economic model estimates based on latest revised data from Statistics Canada, the Canada Revenue Agency, and firm administrative data (2021), 2022

The Canadian aerospace industry maintained its #1 R&D* ranking among all Canadian manufacturing industries in 2021**

R&D Intensity***
2021



Share of STEM**** Employment Intensity
2021



- Aerospace manufacturing R&D intensity and share of STEM employment were over 2.5X higher than the manufacturing average
- The aerospace industry invested \$710M in R&D in 2021

* In terms of value of R&D activity

** See Annex 5 for comparative analysis of aerospace R&D from 2017 to 2021

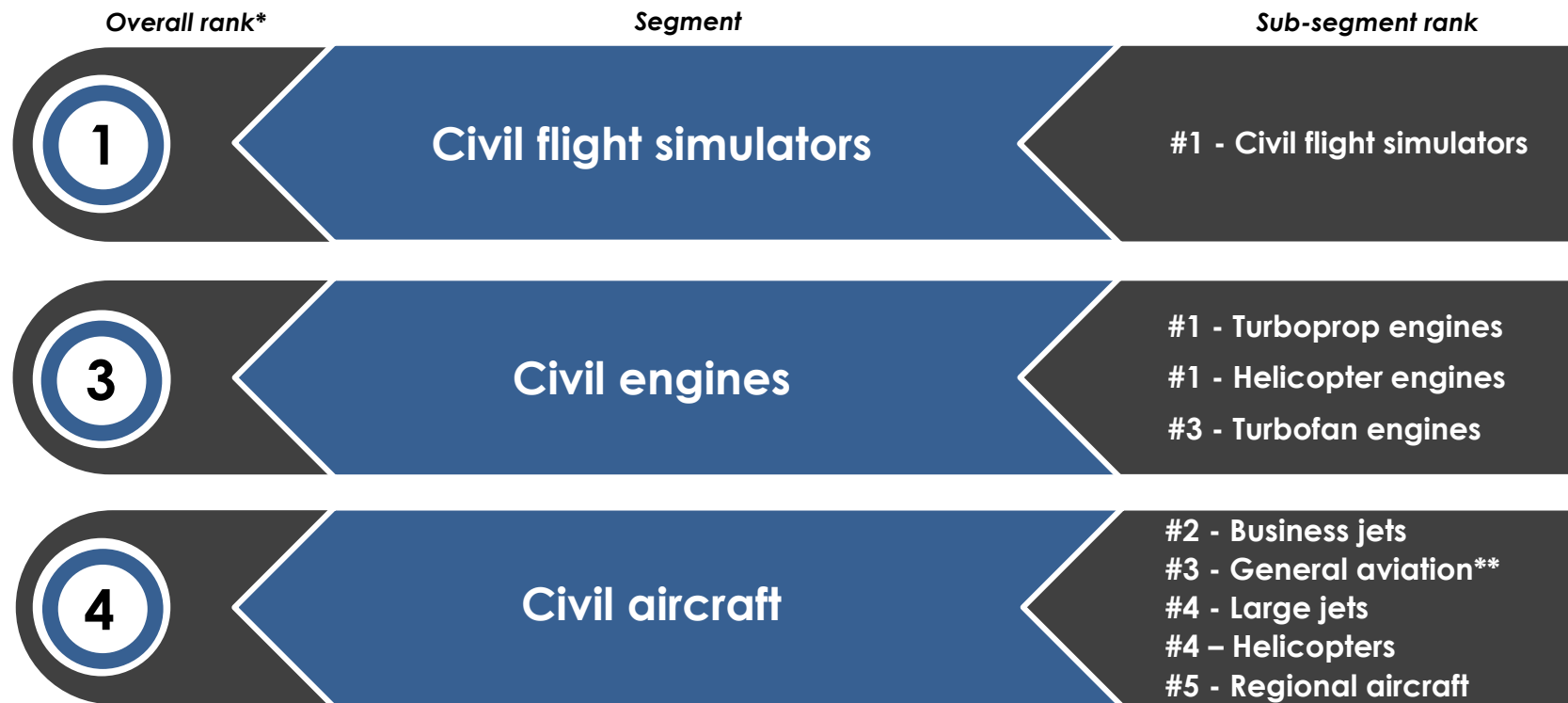
*** R&D intensity is calculated using the ratio of 2021 R&D to 2021 GDP (GDP in 2012 chained dollars)

**** STEM refers to Science, Technology, Engineering, and Mathematics

Source: Statistics Canada Tables 27-10-0333-01 and 36-10-0434-01 (2021), 2022

The Canadian aerospace industry maintained its product range diversification in 2021

Canada's Civil Aerospace Ranking 2021



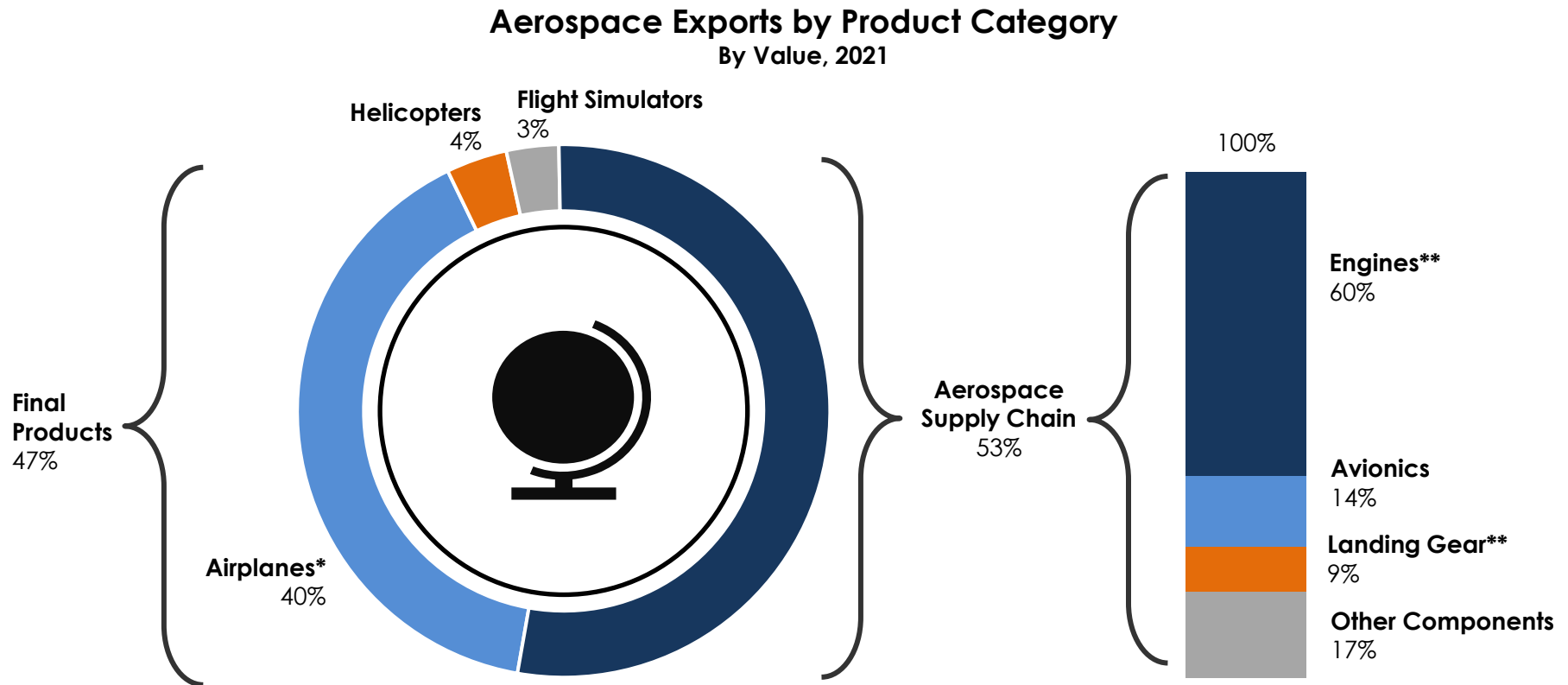
- **Canada is the only country that ranked in the top 5 across civil flight simulator, engine, and aircraft sub-segments in 2021**

* Rankings based on final production value

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

Source: Flight Global Civil Simulator Census (2020), 2022; Teal Group (2021), 2022; Forecast International (2021), 2022

The Canadian aerospace manufacturing industry was actively participating in global value chains in 2021



- **More than 90% of aerospace manufacturing revenues were export oriented in 2021, of which over 50% were supply chain related**

* Airplanes include airplanes, spacecraft, balloons, dirigibles and gliders

** Engines and landing gear include their respective systems and components

Source: IHS Markit Global Trade Atlas (2021), 2022 ; ISED's economic model estimates based on latest revised data from Statistics Canada (2021), 2022

Key Findings

- **Canada's aerospace manufacturing revenues declined at a slower rate in 2020-2021 compared to 2019-2020, with the global sector beginning to see a gradual recovery from the pandemic**
- **Both the Canadian and global aerospace defence sectors continued to grow, with defence activity representing 17% of total Canadian aerospace revenues in 2020**
- **In 2021, the Canadian aerospace industry contributed over \$24B in GDP and close to 200,000 jobs to the Canadian economy**
 - **The aerospace industry's contribution to the Canadian economy declined by \$0.9B in GDP and 7,300 jobs between 2020 and 2021**
 - **Overall, between 2019 and 2021, the aerospace industry's contribution to the Canadian economy declined by \$9.4B in GDP and 35,200 jobs**
- **The Canadian aerospace industry maintained its #1 R&D ranking among all Canadian manufacturing industries in 2021**
- **A diverse product portfolio and strong participation in global value chains continue to be key features of the Canadian aerospace manufacturing industry**

- 1) Definitions of the Canadian Aerospace Manufacturing and MRO Service Industries**
- 2) Economic Impact Methodology Principles**
- 3) Economic Impact Indicators (2021)**
- 4) Industrial Indicators (2021)**
- 5) Industrial Indicators (2017-2021)**
- 6) Aerospace Employment Share by Region (2020-2021)**

Annex 1 – Definitions of the Canadian Aerospace Manufacturing and MRO Service Industries

Aerospace Manufacturing Industry	Aerospace 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 systems• Telecommunication satellites and components• Avionics• Helicopters, propellers and parts	<p>Main activities:</p> <ul style="list-style-type: none">• 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 2 – 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 is based on gross domestic product (GDP)** and full-time equivalent employees
- The economic impact estimates presented in the State of Canada's Aerospace Industry Report - 2022 were based on the most recent Statistics Canada economic impact multipliers***

* 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 administrative data and Input-Output multipliers are updated on a yearly basis for latest and past years

Annex 3 – Economic Impact Indicators (2021)*

	Impact on Canadian GDP (\$B)				Impact on Canadian Employment (Jobs in Thousands)			
	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	\$8.9	\$4.3	\$3.6	\$16.8	54.5	40.8	36.1	131.4
Aerospace MRO	\$3.1	\$2.8	\$1.7	\$7.6	26.0	26.9	15.2	68.1
Aerospace Total	\$12.0	\$7.1	\$5.3	\$24.4	80.5	67.7	51.3	199.5

* National Input-Output Multipliers (2018) adjusted to 2021 GDP (in 2012 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)

Source: ISED's economic model estimates (GDP in 2012 chained dollars) based on the latest Statistics Canada National Input-Output Multipliers (2018), 2022: ISED's economic model estimates based on latest revised data from Statistics Canada (2021), 2022

Annex 4 – Industrial Indicators (2021)*

	Aerospace Manufacturing	Aerospace MRO	Aerospace Industry Total
GDP (\$B)	\$8.9	\$3.1	\$12.0
Employment (jobs in thousands)	54.5	26.0	80.5
Revenues (\$B)	\$20.4	\$6.4	\$26.8
R&D** (\$M)	\$675	\$35	\$710

* National Input-Output Multipliers (2018) adjusted to 2021 GDP (in 2012 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"

Source: ISED's economic model estimates based on latest revised data from Statistics Canada, the Canada Revenue Agency, and firm administrative data (2021), 2022; Statistics Canada Table 16-10-0118-01, 2022

Annex 5 – Industrial Indicators (2017-2021)

	Industry	2017	2018	2019	2020	2021	% Change 2020-2021	% Change 2017-2021
GDP (\$B)	Aerospace Manufacturing	\$10.9	\$11.1	\$12.1	\$9.2	\$8.9	-3.3%	-18.3%
	Aerospace MRO	\$4.6	\$4.4	\$4.5	\$3.2	\$3.1	-3.1%	-32.6%
	Aerospace Total	\$15.5	\$15.5	\$16.6	\$12.4	\$12.0	-3.2%	-22.6%
Employment (Jobs in Thousands)	Aerospace Manufacturing	53.6	56.7	62.5	57.8	54.5	-5.7%	1.7%
	Aerospace MRO	32.0	32.8	33.3	26.8	26.0	-3.0%	-18.8%
	Aerospace Total	85.6	89.5	95.8	84.6	80.5	-4.8%	-6.0%
Revenues (\$B)	Aerospace Manufacturing	\$24.8	\$26.3	\$30.8	\$23.2	\$20.4	-12.1%	-17.7%
	Aerospace MRO	\$7.8	\$8.0	\$8.1	\$6.6	\$6.4	-3.0%	-17.9%
	Aerospace Total	\$32.6	\$34.3	\$38.9	\$29.8	\$26.8	-10.1%	-17.8%
R&D* (\$M)	Aerospace Total	\$1,938	\$1,443	\$1,017	\$970	\$710	-26.8%	-63.4%

* Several aspects of the Statistics Canada Annual Survey of Research and Development in Canadian Industry have been redesigned in 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"

Source: ISED's economic model estimates based on latest revised data from Statistics Canada, the Canada Revenue Agency, and firm administrative data (2021), 2022

Annex 6 – Aerospace Employment Share by Region (2020-2021)

Region	Aerospace Manufacturing		Aerospace MRO	
	2020	2021	2020	2021
Western Canada	14%	12%	39%	39%
Ontario	22%	22%	33%	34%
Quebec	60%	62%	22%	22%
Atlantic Canada	4%	4%	6%	5%

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