



State of Canada's Aerospace Industry Report

Fall 2021



In 2020, the COVID-19 pandemic resulted in an unprecedented year for the global aerospace industry

The COVID-19 pandemic resulted in:

- **Global production disruptions:**
 - **Facilities in certain jurisdictions were temporarily closed under government lockdown measures while facilities in other jurisdictions remained active as they were given essential service status**
 - **Defence versus commercial aerospace was also given different status across jurisdictions**
- **Demand declines:**
 - **International passenger volume was down by close to 90% between 2019 and 2020 due to quarantine and travel restrictions resulting in:**
 - **Disruptions and order cancellations focused on the global large civil aircraft market due to airline financial fragility**
 - **Significantly lowered demand for aerospace MRO* activities**

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

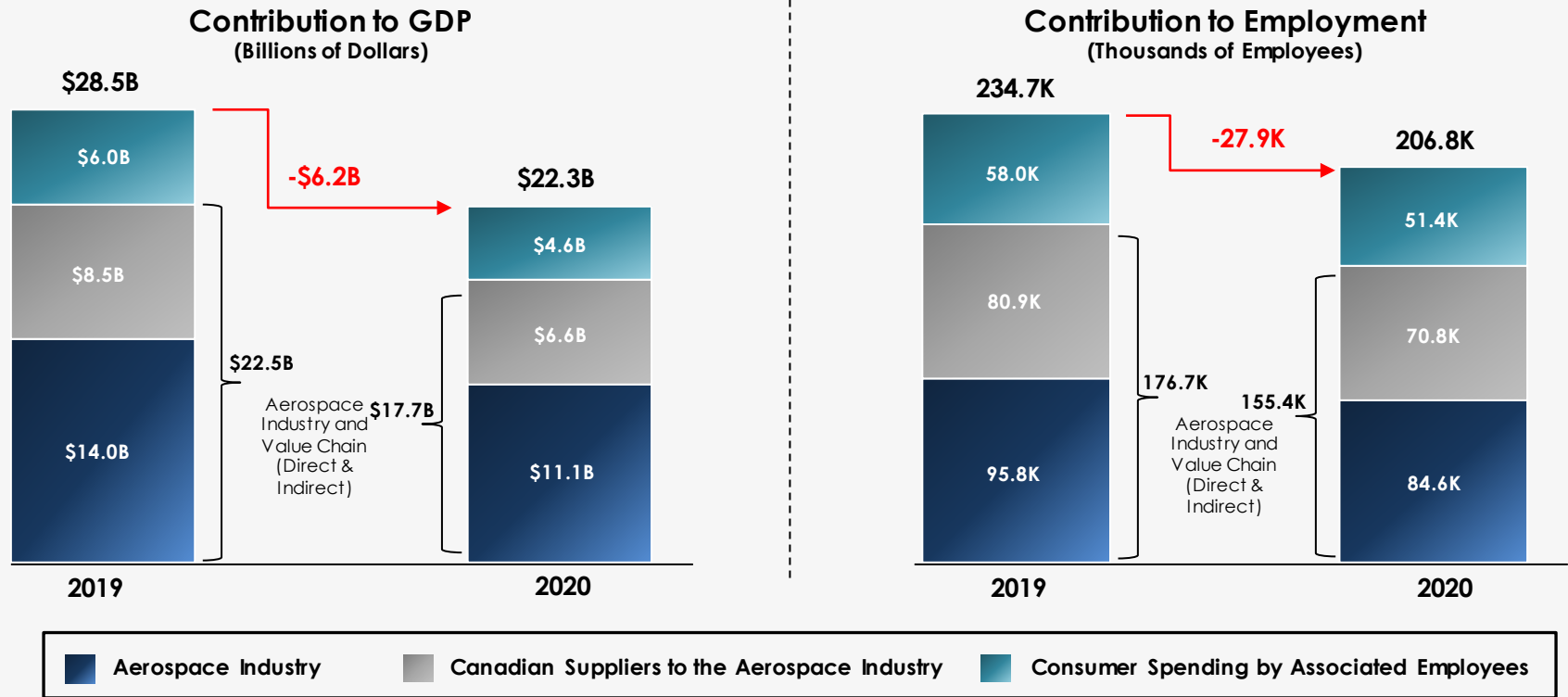
Innovation, Sciences et
Développement économique Canada



- 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 of the COVID-19 pandemic on the Canadian and global aerospace industry:
 - 2019-2020 comparative analysis
 - International comparison and global market outlook

Between 2019 and 2020, the overall aerospace industry's contribution to the Canadian economy decreased by \$6.2B in GDP and 27,900 jobs

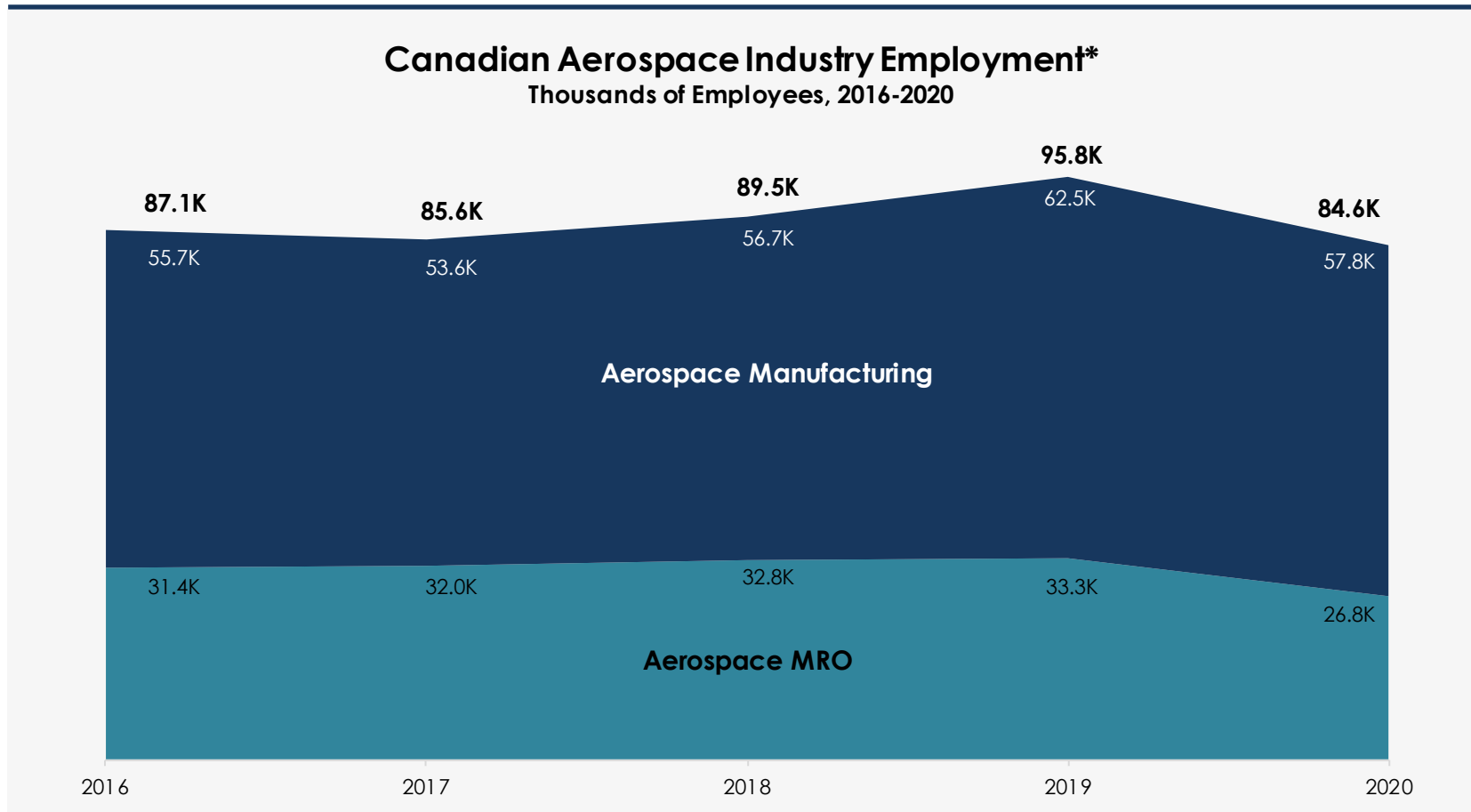
Aerospace Industry Contribution to the Canadian Economy (2019 versus 2020)



- In 2020, the Canadian aerospace industry contributed over \$22B in GDP and close to 207,000 jobs to the Canadian economy*

* 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 (2016-2020)
Source: ISED's economic model estimates (GDP in 2012 chained dollars) based on the latest Statistics Canada National Input-Output Multipliers (2016, 2017), 2021; ISED's economic model estimates based on latest revised data from Statistics Canada (2019, 2020), 2021

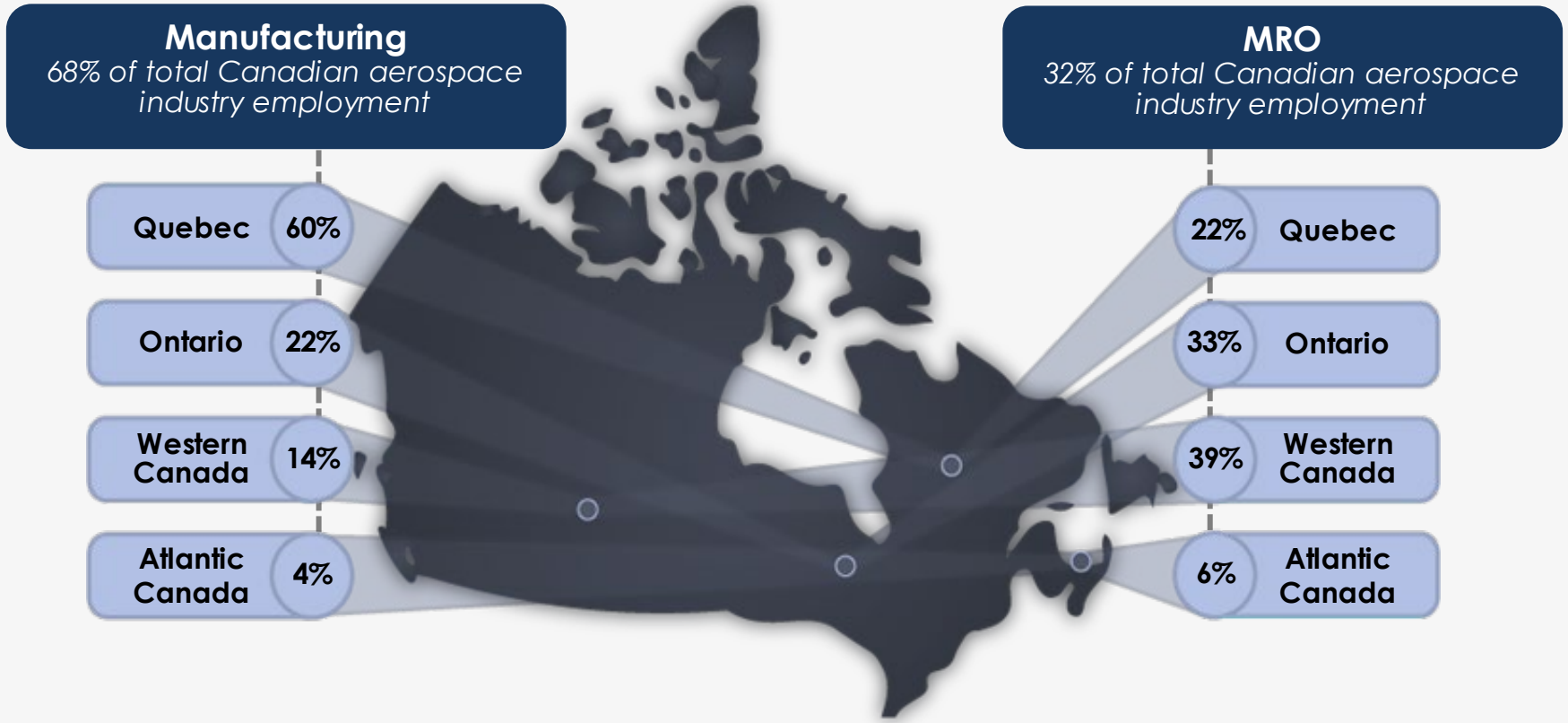
Between 2019 and 2020, employment loss occurred in both manufacturing and MRO activities



- **MRO accounted for close to 60% of the employment loss in the Canadian aerospace industry between 2019 and 2020**

Ontario was the most impacted region in terms of manufacturing employment levels, going from 27% in 2019 to 22% in 2020

Aerospace Employment Share by Region* 2020

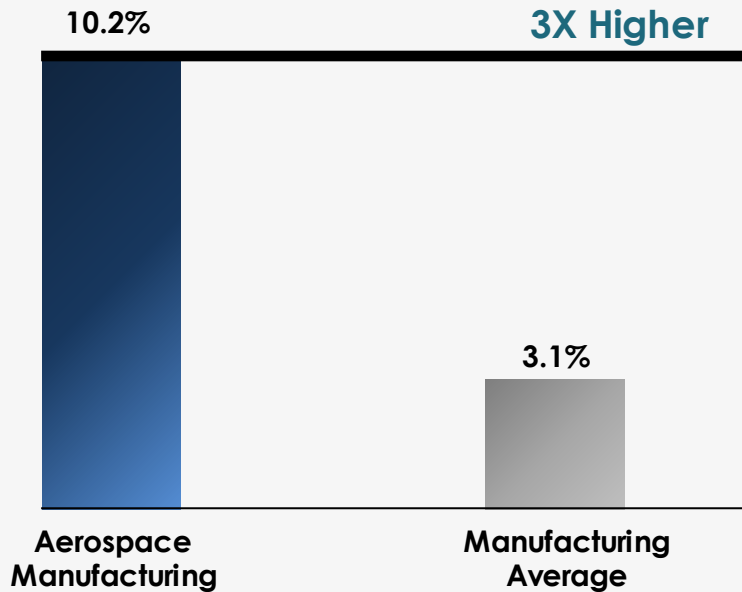


- The 2019-2020 relative level of MRO employment impact was similar across all regions

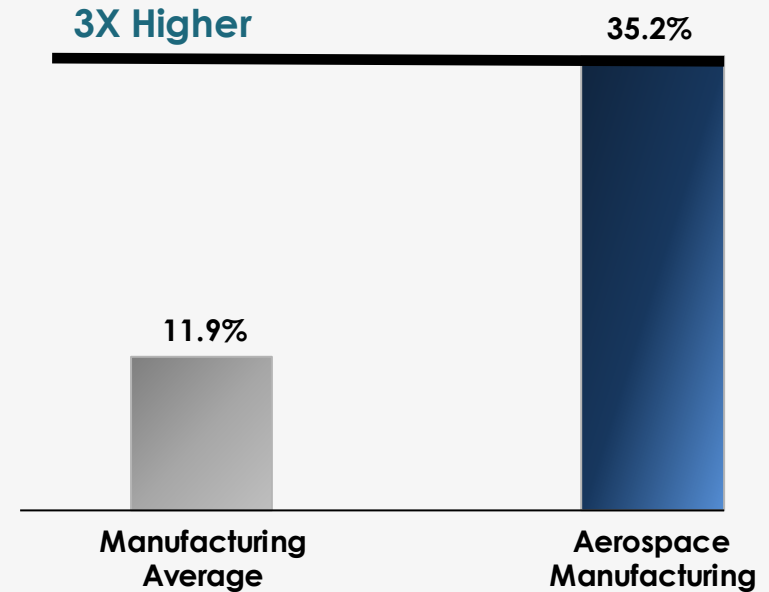
* See Annex B1, B3, and B4 for detailed aerospace industry employment contributions to the Canadian economy by year (2016-2020)
Source: ISED's economic model estimates based on latest revised data from Statistics Canada, the Canada Revenue Agency, and firm administrative data (2020), 2021

The Canadian aerospace industry maintained its #1 R&D* ranking among all Canadian manufacturing industries in 2020

R&D Intensity**
2020



Share of STEM*** Employment Intensity
2020



- Aerospace manufacturing R&D intensity and share of STEM employment were 3X higher than the manufacturing average
- Between 2019 and 2020, the aerospace manufacturing industry's investment in R&D**** was relatively stable (\$934M R&D investment in 2020)

* In terms of value of R&D activity

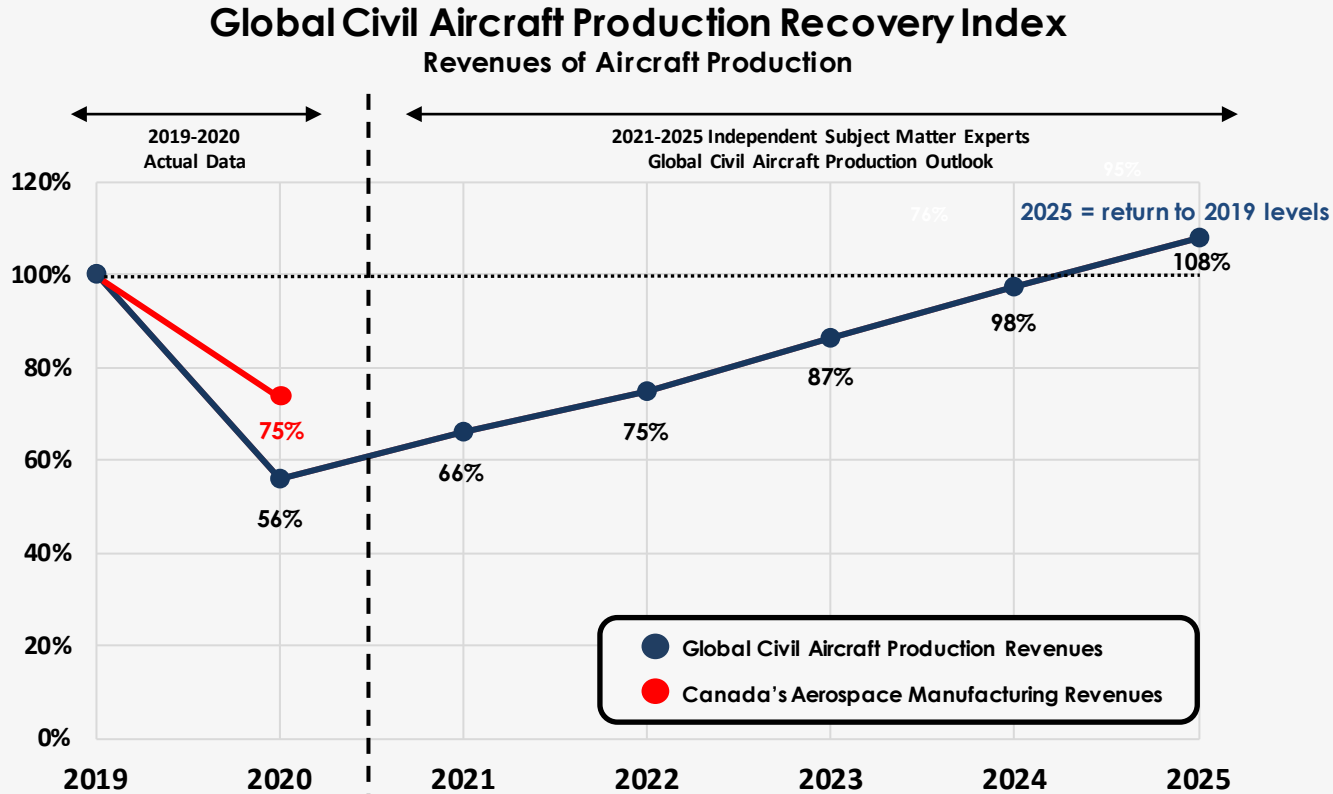
** R&D intensity is calculated using the ratio of 2020 R&D to 2020 GDP (GDP in 2012 chained dollars)

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

**** See Annex B3 for comparative analysis of aerospace R&D from 2016 to 2020

Source: Statistics Canada Tables 27-10-0333-01 and 36-10-0434-01 (2020), 2021

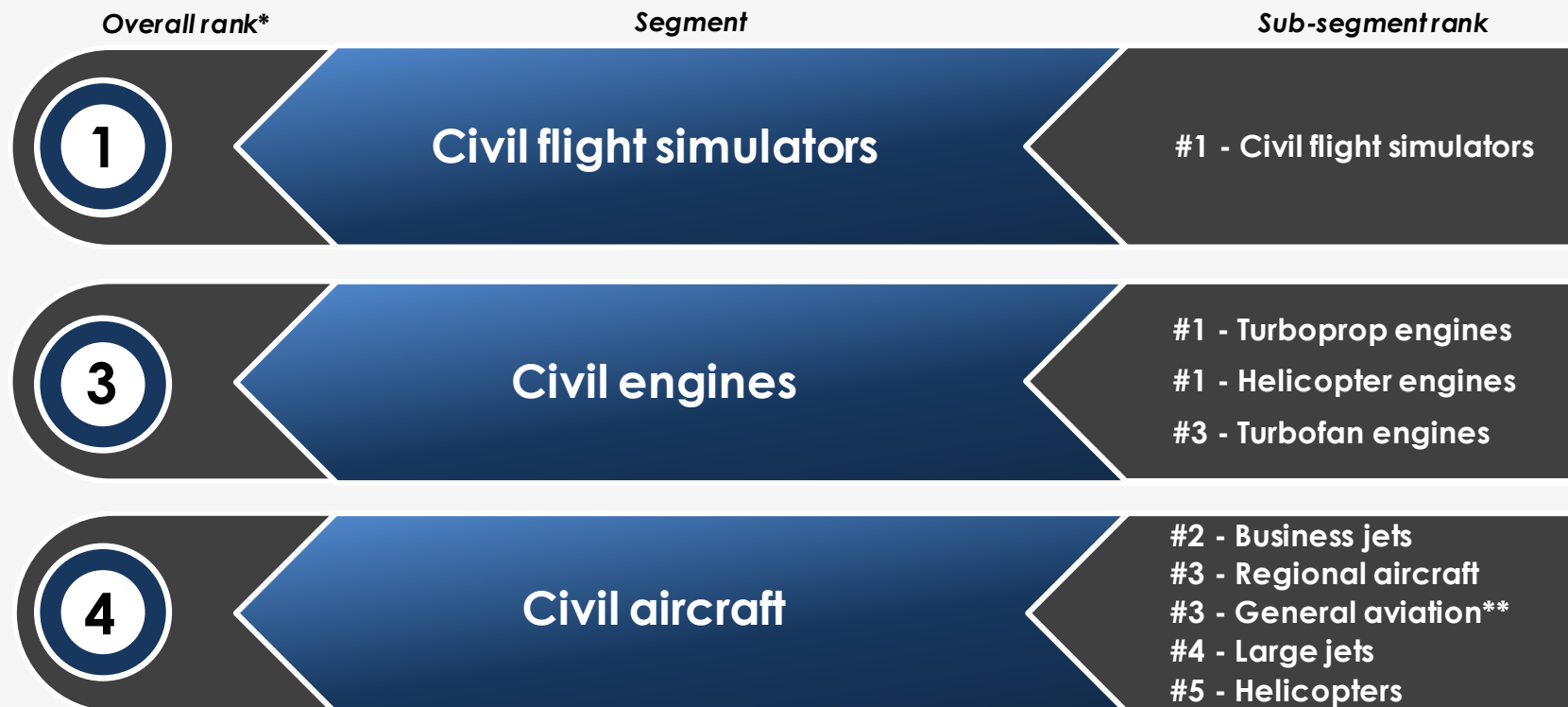
In comparison to global civil aircraft production, Canada's aerospace manufacturing* industry revenues were less impacted in 2020



- Between 2019 and 2020, global civil aircraft production revenues fell by 44% compared to 25% for the Canadian aerospace manufacturing industry
- According to international independent subject matter experts, global civil aircraft production is forecasted to surpass its 2019 levels by 2025

The Canadian aerospace industry maintained its product range diversification in 2020

Canada's Civil Aerospace Ranking 2020



- **Canada is the only country that ranked* in the top 5 across civil flight simulator, engine, and aircraft sub-segments in 2020**

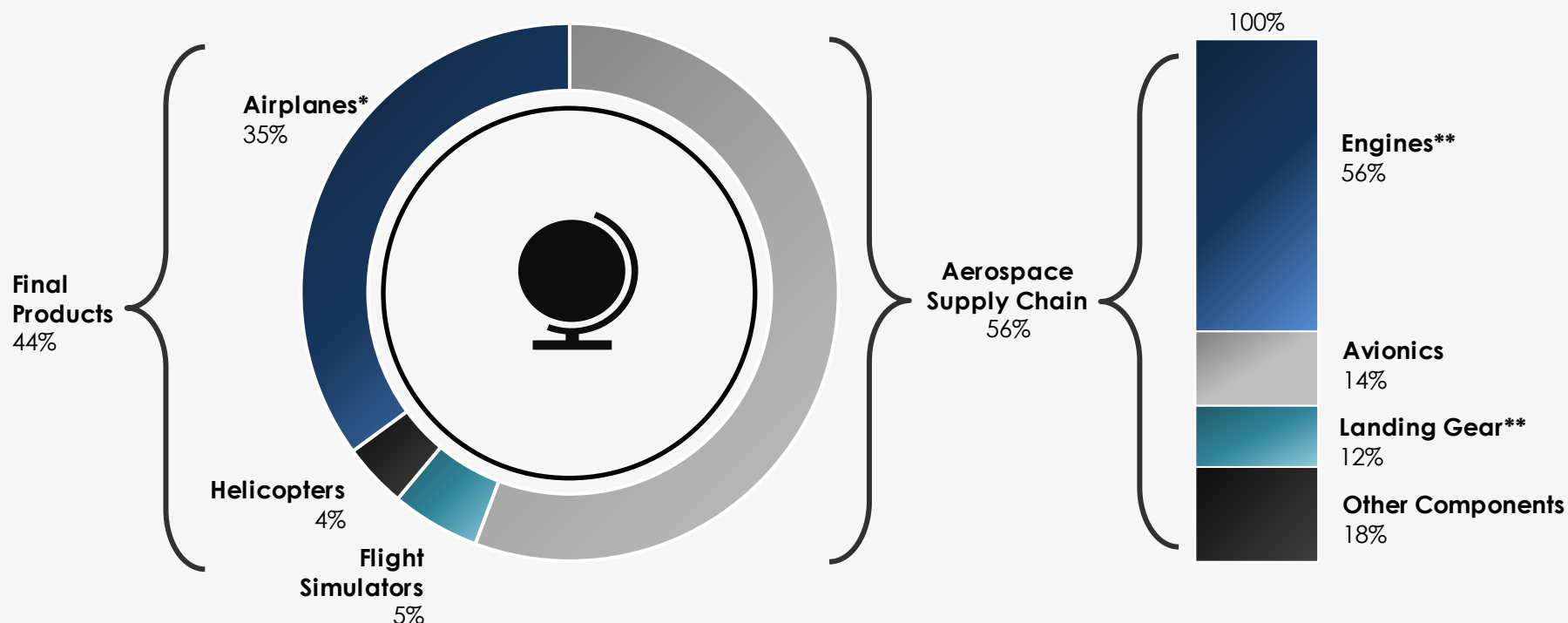
* Rankings based on final production value

** 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), 2021; Teal Group (2020), 2021; Forecast International (2020), 2021

The Canadian aerospace manufacturing industry was actively participating in global value chains in 2020

Aerospace Exports by Product Category
By Value, 2020



- Over 55% of aerospace manufacturing exports were supply chain related in 2020

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

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

Source: Global Trade Atlas (2020), 2021; Trade Data Online (2020), 2021; Statistics Canada Table 16-10-0047-01 (2020), 2021

The Canadian aerospace manufacturing industry exported over 75% of Canadian aerospace products to 186 countries across 6 continents in 2020



* Canadian aerospace goods were exported to countries shaded in blue in 2020; See Annex A3 for export market rankings
Source: Global Trade Atlas (2020), 2021; Trade Data Online (2020), 2021; Statistics Canada Table 16-10-0047-01 (2020), 2021

Key Findings

- In 2020, the Canadian aerospace industry contributed over \$22B in GDP and close to 207,000 jobs to the Canadian economy
- Between 2019 and 2020, the overall aerospace industry's contribution to the Canadian economy decreased by \$6.2B in GDP and 27,900 jobs
 - MRO accounted for close to 60% of the employment loss in the Canadian aerospace industry between 2019 and 2020
- The Canadian aerospace industry maintained its #1 R&D ranking among all Canadian manufacturing industries in 2020
- In comparison to global civil aircraft production, Canada's aerospace manufacturing industry revenues were less impacted in 2020
- Product and export diversification as well as participation in global value chains are key features of the Canadian aerospace manufacturing industry



Annex A1 – Definitions of the Canadian Aerospace Manufacturing and MRO Service Industries

Annex A2 – Economic Impact Methodology Principles

Annex A3 – Ranking of Canadian Aerospace Export Markets (2020)

Annex A1 – 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

* Ex cludes 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 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 - 2021 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 A3 – Ranking of Canadian Aerospace Export Markets (2020)

1	United States	34	Czech Republic	67	Portugal	100	Guinea	133	Nicaragua	166	Solomon Islands
2	France	35	Ireland	68	Peru	101	Fiji	134	Sierra Leone	167	Armenia
3	United Kingdom	36	Sweden	69	Guyana	102	Macau	135	St. Vincent & the Grenadines	168	St. Martin Island (North Part)
4	Germany	37	Kenya	70	Jordan	103	Slovakia	136	Sudan	169	Central African Republic
5	China	38	India	71	Greece	104	Kuwait	137	Belarus	170	Cape Verde
6	Mexico	39	Chile	72	Tanzania	105	French Polynesia	138	Anguilla	171	Haiti
7	Brazil	40	Bangladesh	73	Slovenia	106	Tunisia	139	Macedonia	172	Azerbaijan
8	Singapore	41	Taiwan	74	Trinidad & Tobago	107	U.S. Minor Outlying Is.	140	Georgia	173	Wallis & Futuna Islands
9	Switzerland	42	Hong Kong	75	Cambodia	108	Liberia	141	Mongolia	174	Tajikistan
10	Australia	43	South Africa	76	Cyprus	109	Greenland	142	Dominican Republic	175	Comoros
11	Malta	44	Malaysia	77	Niger	110	Paraguay	143	Burkina Faso	176	Christmas Island
12	Japan	45	Turkey	78	Kazakhstan	111	Zimbabwe	144	Bolivia	177	Albania
13	Norway	46	Vietnam	79	Djibouti	112	Belize	145	Costa Rica	178	Turks & Caicos Islands
14	Egypt	47	Colombia	80	Congo	113	Seychelles	146	Aruba	179	Cayman Islands
15	Italy	48	Saudi Arabia	81	Bahrain	114	Cote d'Ivoire	147	Libya	180	Norfolk Island
16	Netherlands	49	Uganda	82	Brunei Darussalam	115	Venezuela	148	St. Barthélemy	181	Togo
17	Nigeria	50	Israel	83	Ecuador	116	Mali	149	Montenegro	182	Andorra
18	Poland	51	Qatar	84	Guatemala	117	Iraq	150	St. Lucia	183	Bosnia & Herzegovina
19	Latvia	52	Morocco	85	Cameroon	118	Sint Maarten	151	Namibia	184	Equatorial Guinea
20	United Arab Emirates	53	Algeria	86	Lebanon	119	South Sudan	152	Mauritius	185	Guinea-Bissau
21	Spain	54	Belgium	87	Senegal	120	Nepal	153	Antarctica	186	Moldova
22	Ethiopia	55	Romania	88	Hungary	121	Gabon	154	Pitcairn		
23	Angola	56	Maldives	89	Lithuania	122	Rwanda	155	Vanuatu		
24	Russia	57	Ukraine	90	Suriname	123	Myanmar	156	Uzbekistan		
25	South Korea	58	Bulgaria	91	Serbia	124	Zambia	157	Barbados		
26	Indonesia	59	Ghana	92	Estonia	125	Madagascar	158	El Salvador		
27	Luxembourg	60	Afghanistan	93	Iceland	126	Cuba	159	Kyrgyzstan		
28	Philippines	61	Chad	94	Oman	127	St. Pierre & Miquelon	160	Kiribati		
29	Thailand	62	Croatia	95	Pakistan	128	Botswana	161	Bermuda		
30	Finland	63	Curacao	96	New Caledonia	129	Uruguay	162	Mauritania		
31	Austria	64	Panama	97	Democratic Republic of the Congo	130	Guam	163	East Timor		
32	Denmark	65	Papua New Guinea	98	Bahamas	131	Jamaica	164	Mozambique		
33	New Zealand	66	Argentina	99	Somalia	132	Sri Lanka	165	Honduras		



- **Annex B1 – Economic Impact Indicators (2020)**
- **Annex B2 – Industrial Indicators (2020)**
- **Annex B3 – Industrial Indicators (2016-2020)**
- **Annex B4 – Aerospace Employment Share by Region (2019-2020)**

Annex B1 – Economic Impact Indicators (2020)*

	Impact on Canadian GDP (\$M)				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	\$8,234	\$4,117	\$3,109	\$15,460	57,780	43,818	36,194	137,792
Aerospace MRO	\$2,915	\$2,481	\$1,513	\$6,909	26,850	26,926	15,199	68,975
Aerospace Total	\$11,149	\$6,598	\$4,622	\$22,369	84,630	70,744	51,393	206,767

* National Input-Output Multipliers (2017) adjusted to 2020 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 (2017), 2021; ISED's economic model estimates based on latest revised data from Statistics Canada (2020), 2021

Annex B2 – Industrial Indicators (2020)*

	Aerospace Manufacturing	Aerospace MRO	Aerospace Industry Total
GDP (\$M)	\$8,234	\$2,915	\$11,149
Employment (jobs)	57,780	26,850	84,630
Revenues (\$M)	\$23,197	\$6,571	\$29,768
R&D** (\$M)	\$934	\$36	\$970

* National Input-Output Multipliers (2017) adjusted to 2020 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 (2020), 2021; Statistics Canada Table 16-10-01 18-01, (April 2020 Release), 2021

Annex B3 – Industrial Indicators (2016-2020)

	Industry	2016	2017	2018	2019	2020	% Change 2019-2020	% Change 2016-2020
GDP (\$M)	Aerospace Manufacturing	\$8,507	\$8,638	\$9,086	\$9,952	\$8,234	-17.3%	-3.2%
	Aerospace MRO	\$3,714	\$4,026	\$4,051	\$4,029	\$2,915	-27.6%	-21.5%
	Aerospace Total	\$12,221	\$12,664	\$13,137	\$13,981	\$11,149	-20.3%	-8.8%
Employment (Jobs)	Aerospace Manufacturing	55,663	53,588	56,707	62,567	57,780	-7.7%	3.8%
	Aerospace MRO	31,458	31,998	32,756	33,273	26,850	-19.3%	-14.6%
	Aerospace Total	87,121	85,586	89,463	95,840	84,630	-11.7%	-2.9%
Revenues (\$M)	Aerospace Manufacturing	\$23,574	\$24,787	\$26,319	\$30,767	\$23,197	-24.6%	-1.6%
	Aerospace MRO	\$7,698	\$7,830	\$8,016	\$8,143	\$6,571	-19.3%	-14.6%
	Aerospace Total	\$31,272	\$32,617	\$34,335	\$38,910	\$29,768	-23.5%	-4.8%
R&D* (\$M)	Aerospace Total	\$2,126	\$1,938	\$1,443	\$1,017	\$970	-4.6%	-54.4%

* 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 (2020), 2021

Annex B4 – Aerospace Employment Share by Region (2019-2020)

Region	Aerospace Manufacturing		Aerospace MRO	
	2019	2020	2019	2020
Western Canada	13%	14%	38%	39%
Ontario	27%	22%	34%	33%
Quebec	56%	60%	22%	22%
Atlantic Canada	4%	4%	6%	6%

Canada 