

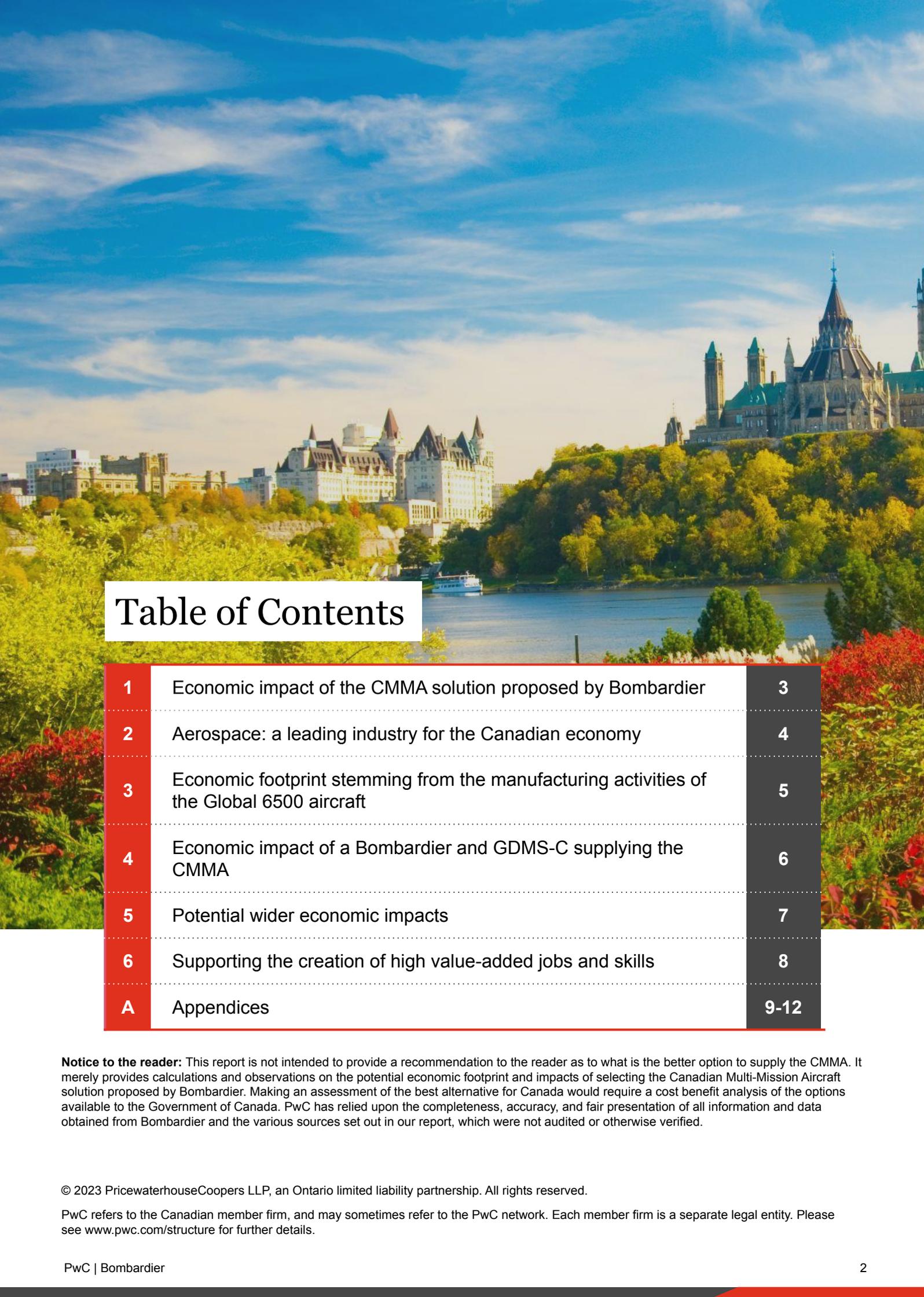


# Economic Impact of a Canadian Multi-Mission Aircraft Solution Proposed by Bombardier

Report prepared by PwC for Bombardier

July 2023





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**Notice to the reader:** This report is not intended to provide a recommendation to the reader as to what is the better option to supply the CMMA. It merely provides calculations and observations on the potential economic footprint and impacts of selecting the Canadian Multi-Mission Aircraft solution proposed by Bombardier. Making an assessment of the best alternative for Canada would require a cost benefit analysis of the options available to the Government of Canada. PwC has relied upon the completeness, accuracy, and fair presentation of all information and data obtained from Bombardier and the various sources set out in our report, which were not audited or otherwise verified.

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# Economic impact of the CMMA solution proposed by Bombardier

The Government of Canada is seeking to replace the CP-140 Aurora fleet with a Canadian Multi-Mission Aircraft (CMMA) for the Royal Canadian Air Force, as a part of Canada's defence policy Strong, Secure, Engaged.<sup>1</sup> In this context, Bombardier has partnered with defence contractor General Dynamics Mission Systems Canada (GDMS-C) to develop a fully Canadian Multi-Mission Aircraft. The proposed solution is leveraging the Global 6500 baseline aircraft that is currently in production. Over the years, Bombardier has built a track record modifying the Global family of aircraft for defence applications. Examples include Bombardier's participation in the Battlefield Airborne Communications Node program of the US Air Force with the Global 6500; Germany's Pegasus; Saab GlobalEye; UK Royal Air Force Sentinel; the US Army ARES and ATHENA; UAE's Program Dolphin; and the Indian Air Force ARMIS programs.

## About this report

Bombardier has retained the services of PricewaterhouseCoopers LLP (PwC, we, us or our) to calculate and present the economic impacts that would result from the granting of the CMMA mandate to Bombardier. In that context, we calculated the economic impacts of the following Bombardier activities:

- Current manufacturing activities for the Global 6500, based on 2022 data.
- Incremental activities related to the development and manufacturing of the 16 federally required CMMA aircraft.
- Maintenance and repair activities.

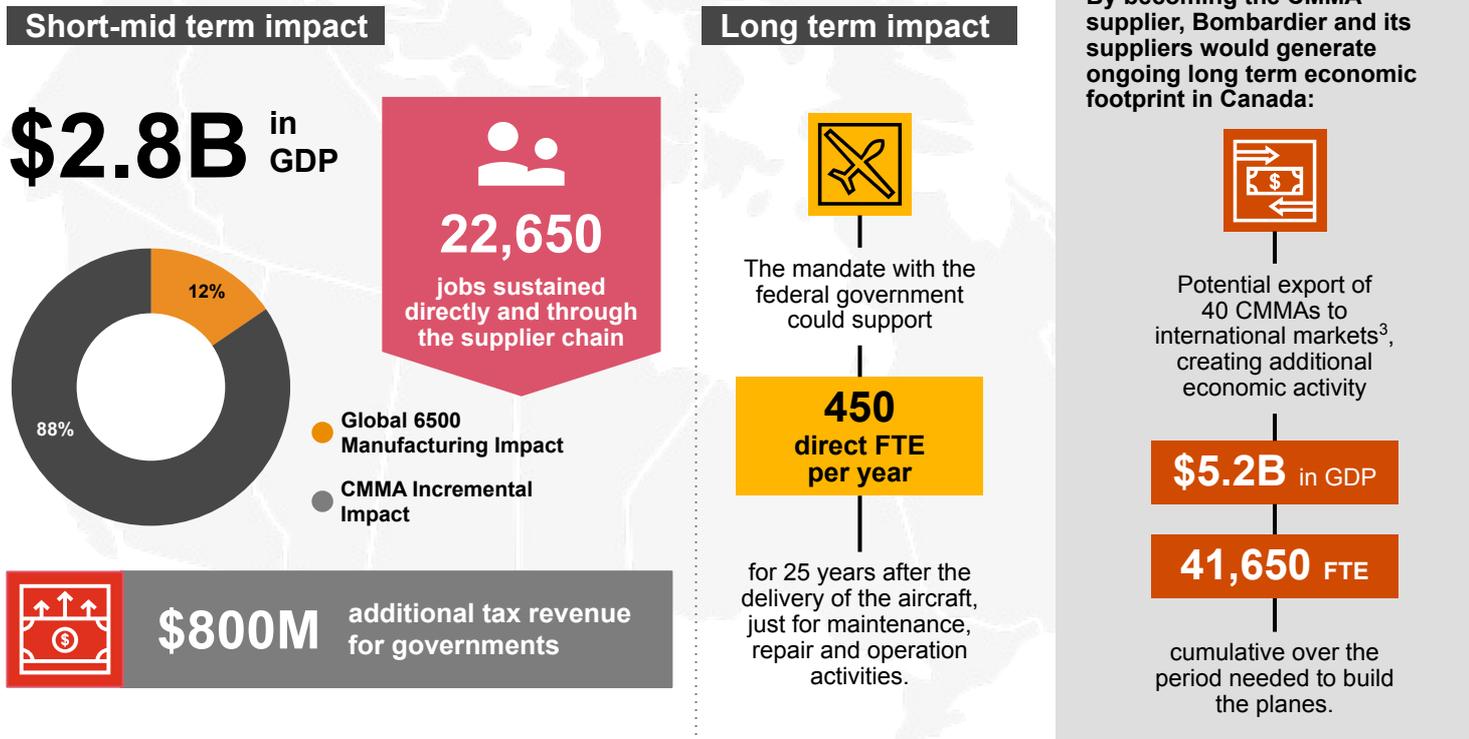
Other contributions were also assessed.

**Note:** All monetary values are presented in Canadian dollars, unless otherwise stated. The evaluation of the economic footprint was made based on assumptions provided by Bombardier.

## Summary of results – economic footprint of the CMMA

We have calculated the potential economic footprint of the CMMA project under the assumption that the CMMA contract is awarded to Bombardier, using data provided to us from Bombardier<sup>2</sup> and industry data from Statistics Canada.

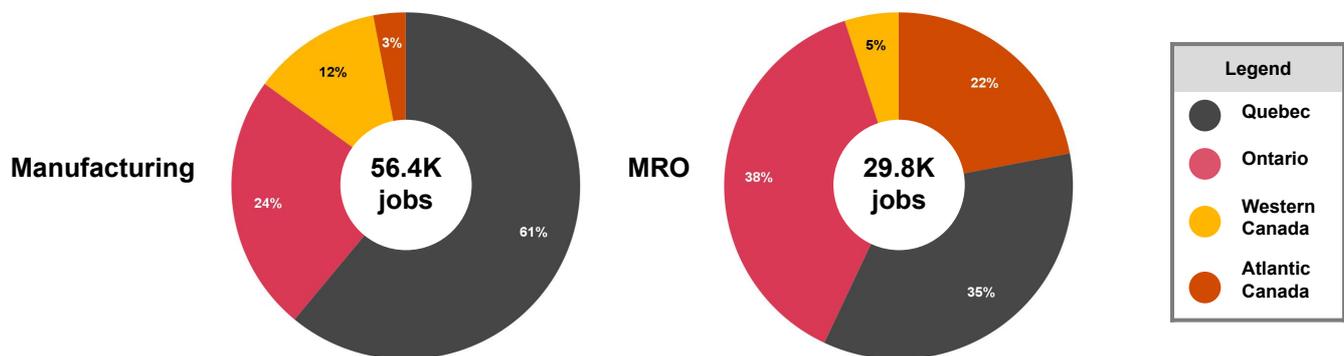
Award of CMMA contract to Bombardier and its collaborators is expected to create an economic footprint in Canada, over the contract period:



# Aerospace: a leading industry for the Canadian economy

In 2022, the aerospace industry in Canada contributed a total of **\$27B to GDP** and **212K full-time equivalent jobs**.<sup>4</sup> Exports in 2022 amounted to \$18.7B, approximately 2.4% of total Canadian exports. Geographically, aerospace activity is concentrated mostly in Quebec and Ontario.<sup>4</sup> The pie charts that follow present the share of aerospace manufacturing and MRO in total direct employment of major regions of Canada.

The 2021 federal budget stated: "As one of the most research intensive manufacturing industries, aerospace is an important driver of Canada's innovation economy."<sup>5</sup> In 2022, research and development in the aerospace sector in Canada amounted to \$683M in 2022.<sup>4</sup> That represents an R&D intensity level of more than double of the average R&D intensity<sup>6</sup> across all manufacturing sub-sectors. However, we do note that R&D investment in the sector has been declining since 2018, at which point it reached 1.4 B\$.<sup>4</sup>



Source: State of Canada's Aerospace Industry Report - Summer 2023, Innovation Science and Economic Development Canada.

## Bombardier: the largest aerospace company in Canada

For over 30 years, Bombardier has designed, built and supported one of the largest fleets of business jets globally, which today stands at more than 5,000 aircraft. In 2021, Bombardier delivered 120 business aircraft, reaching \$7.6B in revenue, which is more than 25% market share in the aerospace manufacturing sector (including parts manufacturers). Overall, Bombardier's generated and facilitated in 2021 the following economic activities in Canada:<sup>7</sup>



## General Dynamics Mission Systems: an established supplier of Canadian aircraft manufacturers and global armed forces

Established in 1948, GDMS-C is a supplier to Canada's armed forces and global allied forces, providing design and implementation services to equip military and first responders with the necessary hardware, software and systems. The company offers four areas of expertise: Land Communications; Cyber Solutions; Airborne Mission Systems; and Underwater Warfare. Its Airborne Mission Systems unit can be leveraged by aircraft manufacturers to develop and implement cutting edge capabilities aimed at Defense use cases. In Canada, GDMS-C directly employs more than 4,200 employees, sustains another 16,200 jobs across Canada, and contributes over \$1.8B in GDP.<sup>8</sup>

# Economic footprint stemming from the manufacturing activities of the Global 6500 aircraft

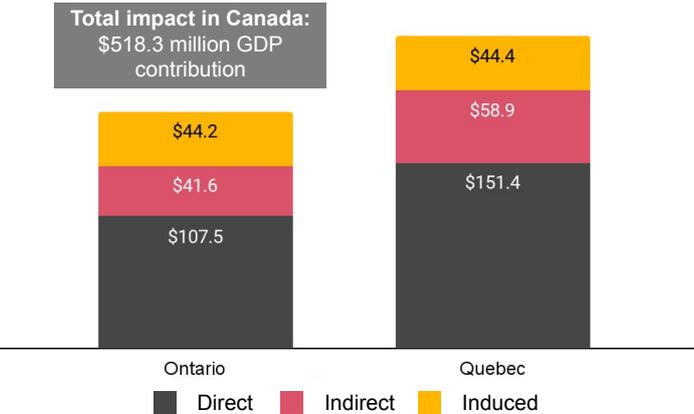
The Global 6500 is part of Bombardier’s Global Family of business jets and received its Transport Canada certification in 2019. The Global 6500 has a maximum range of around 6,600 nautical miles, with a top speed of Mach 0.90 and a high-speed cruise of Mach 0.85. The aircraft has an Environment Product Declaration, which is a third-party attestation of the environmental performance and footprint of the aircraft from a full life cycle perspective. Over 140,000 parts of the aircraft have been analyzed for their environmental impact, offering transparency and benchmarks from which improvements can be made.

To develop a multi-mission aircraft for the CMMA contract, Bombardier intends to leverage its existing capacity developed with the Global 6500. In this context, we have calculated the economic footprint stemming from the manufacturing activities of the Global 6500 in 2022.

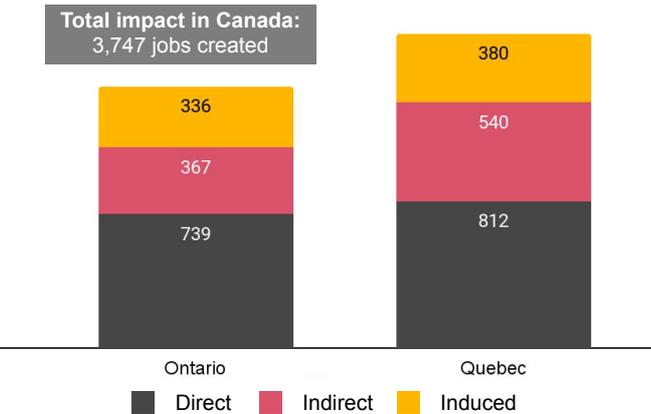
We calculate that the total economic footprint (direct, indirect, and induced impacts) generated in Canada from Bombardier’s Global 6500 manufacturing activities in 2022 was \$518.3 million in GDP, 3,747 full-time equivalent (FTE) jobs, and \$309.1 million in labour income. Taxes generated in relation to Bombardier’s Global 6500 manufacturing activities were calculated to amount to a total \$146.1 million, of which \$72.4 million accrued to provincial governments and the remaining \$73.6 million accrued to the federal government. Provincial tax included \$14 million in corporate income taxes, \$31.4 million in personal income taxes and \$27.0 million in taxes on production and products. Federal tax included \$20.5 million in corporate income taxes, \$44.7 million in personal income taxes and \$8.4 million in taxes on production and products.

## Economic footprint facilitated by Bombardier manufacturing activities for the Global 6500 in 2022

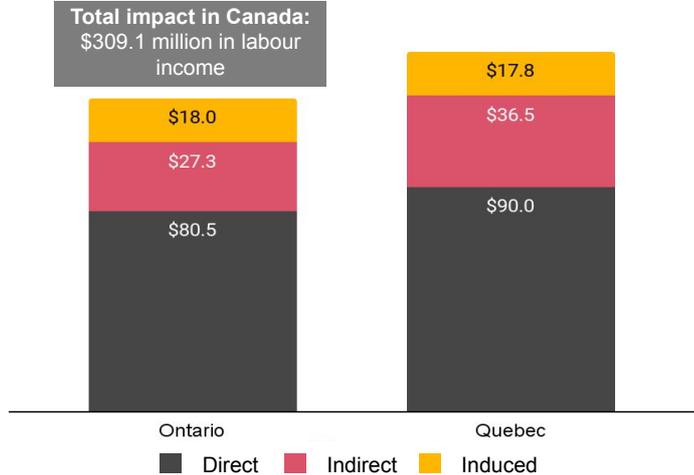
**GDP (2022 \$CAD, millions)**



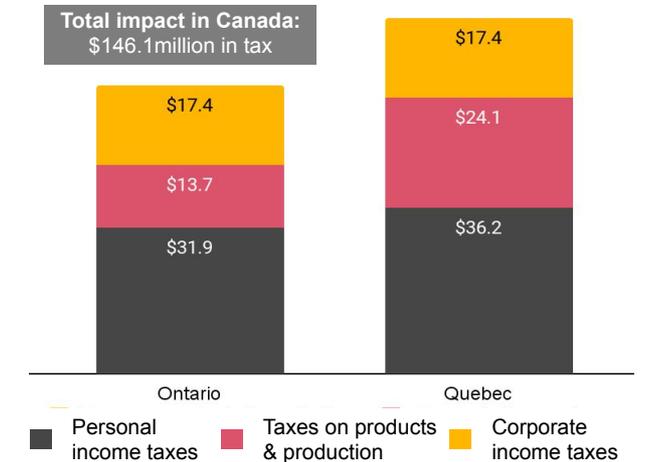
**Jobs (FTE)**



**Labour income (2022 \$CAD, millions)**



**Federal, provincial and municipal tax impact (2022 \$CAD, millions)**



**Notes:** The results are based on data provided by Bombardier. The tax revenue figures presented are based on federal and provincial taxes and include the sum of corporate income tax, personal income tax as well as taxes on production and products. Totals may not sum due to rounding.

# Economic impact of Bombardier and GDMS-C supplying the CMMA

**We calculated the economic footprint that may result from the development, the manufacturing and the maintenance of the CMMA contract**

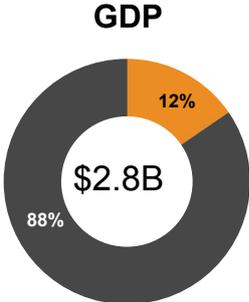
We calculated the potential economic impact based on the assumption that Bombardier is selected as the supplier for the CMMA contract. We understand that the collaboration between Bombardier and GDMS-C intends to support the economic footprint in Canada for the aircraft lifecycle. The Canadian economic footprint is expected, under this assumption, to be generated from:

- manufacturing the frame of the aircraft;
- development, upgrade and installation of the mission system and ASW capability aligned to meet or exceed Canada’s mission requirements. This system will leverage the capabilities currently on the Aurora platform and will upgrade and advance them to remain at the forefront of multi-mission.
- maintenance and repair activities; and
- training (incl. pilot training, and training on systems and maintenance).

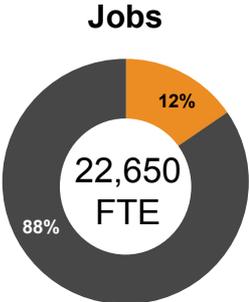
We calculated that the cumulative total economic footprint (direct, indirect, and induced impacts) to Canada’s economy stemming from the CMMA contract to be \$2.8 billion in GDP, 22,650 full-time equivalent (FTE) jobs and \$1.8 billion in labour income. Taxes generated in relation to Bombardier supplying the CMMA contract are estimated at \$800 million.

## Total economic footprint from Bombardier and GDMS-C supply to the CMMA

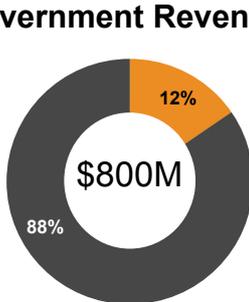
In 2022 \$CAD, cumulative over the contract period



● Mfg of the Global 6500  
● CMMA Incremental



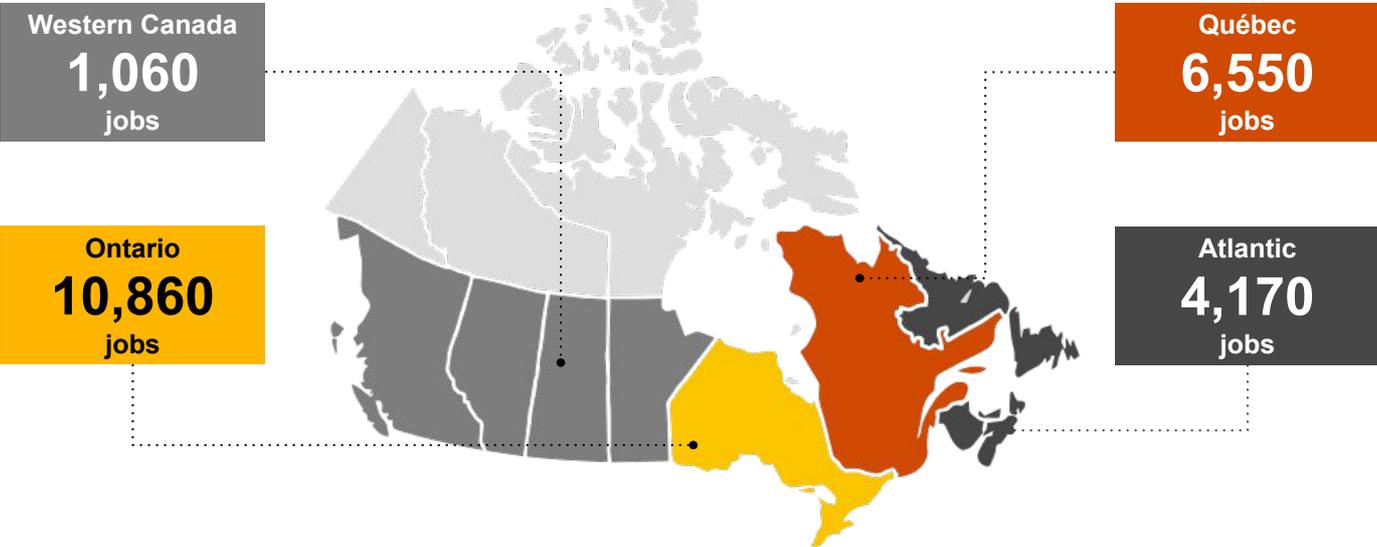
● Mfg of the Global 6500  
● CMMA Incremental



● Mfg of the Global 6500  
● CMMA Incremental

Note: Totals may not sum due to rounding.

## A Canada-wide economic impact



# Potential wider economic impacts

This report is not meant to conduct an analysis as to the alternative that would provide Canada the best cost benefit outcome in relation to supplying the CMMA. However, we note that wider economic impacts that may result from conducting activities associated with the CMMA in Canada, rather than elsewhere, may include the following:

## Contributing to Canada's exports



Expanding Canada's export base is one of the ways to grow per capita GDP and incomes. The CMMA contract has the potential to support the development of Canadian ASW aircraft and the ecosystem necessary for its manufacturing.

In that context, we note that there are hundreds of maritime patrol aircraft that will need to be replaced in the coming years (for context, there are about 180 P8s in the world today), which Bombardier believes will open an opportunity for exports of CMMA. Assuming, for illustration purposes, that Bombardier receives orders for 40 aircraft in the next decade, we calculated that this additional activity could contribute \$5.2 billion to Canada GDP (in \$2023) and support 41,650 jobs cumulative over the period necessary to build the aircraft.

## Intellectual property (IP) creation



By granting the mandate to Bombardier and GDMS-C, the federal government supports the creation and retention of IP in Canada, which could potentially be leveraged for other applications and generate further economic impact.

The systems developed by GDMS-C can be applied to remotely piloted aircraft systems (RPAS) technologies - which is expected to experience a surge in demand. In 2021, GDMS-C has established the Centre of Excellence for RPAS in Sherbrooke (Quebec), with the support of Investissement Québec with the aim to position Canada at the leading edge of emerging RPAS technology and advanced autonomous airborne mission systems integration. As such, GDMS-C participates in the development of sovereign solutions for Canadian defense industry - one of the objectives of Canadian defense policy "*Strong, Secure, Engaged*".



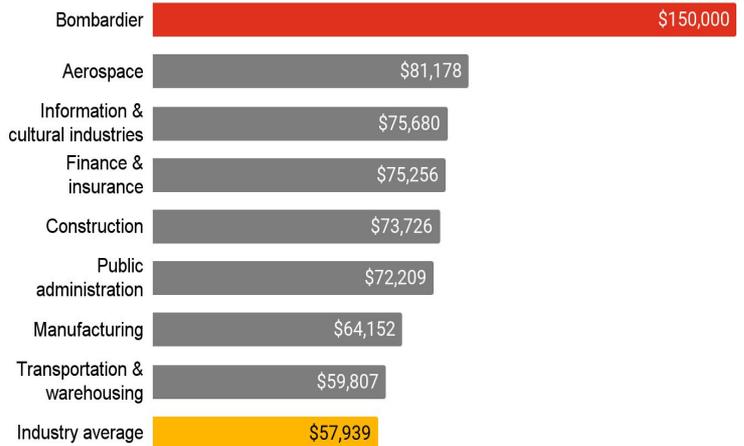
# Supporting the creation of high value-added jobs and skills

## Supporting high quality jobs



Bombardier and GDMS support job creation in the fields of Science, Technology, Engineering and Mathematics (STEM). STEM jobs play an important role in the economy, as they foster innovation, technology advancement and productivity gain. In 2022, the average salary for jobs related to design of Bombardier aircraft was \$150,000, more than 2.5 times higher than the industry average in Quebec.<sup>9</sup>

### Annual compensation by industry, Québec, 2022<sup>10</sup>



## Supporting supply chain resiliency



We understand that selecting a Canadian manufacturer will enable the Government of Canada to avoid relying on approvals from the US government for any changes it may need to apply to the aircraft, which should bolster its supply chain resiliency, security and sovereignty.



An aerial photograph of a city, likely Montreal, showing a large river (St. Lawrence River) curving through the urban landscape. The sky is filled with a thick layer of white, fluffy clouds. A white dashed line runs diagonally from the top right towards the bottom left, crossing the clouds. At the bottom of the image, there is a red banner with a white diagonal stripe on the left side. The word "Appendices" is written in white serif font on the red background.

# Appendices

# Appendix A: Data sources and approach

## Data sources

Operational data for the Global 6500 and the CMMA contract was provided to us by Bombardier. Information related to CMMA are assumptions, shared by Bombardier. PwC has not verified the accuracy of this data or assumptions.

## Input-output analysis

To calculate the economic footprint of Bombardier's activities, we have applied Statistics Canada's input-output multipliers to data provided by Bombardier.

The fundamental philosophy behind economic impact analysis is that spending on goods and services has attendant impacts throughout the economy. For instance, Bombardier's manufacturing activities will generate demand for the inputs to this process (such as tools and labour), that in turn generates additional demand that extends beyond the initial spending. Our analysis permits the estimation of this cascading effect by using the input-output model of the Canadian economy.

The input-output model used for the purpose of this report estimates the relationship between economic activity for a given good or service and the resulting impacts throughout the economy (including demand for other goods and services and tax revenues). For the purpose of this report, economic impacts were estimated for the following measures of economic activity:

- **GDP (also known as value-added)** – the value added to the economy, or the output valued at basic prices less intermediate consumption valued at purchasers' prices. GDP includes only final goods in order to avoid the double-counting of products sold during a certain accounting period.
- **Employment** – the number of jobs created or supported.
- **Labour income** – the amount earned by the employment expected to be generated (including social benefits such as employer contributions towards pensions and employment insurance).
- **Payroll tax revenue** – the amount of revenue collected by provincial and federal governments for personal income taxes.

Economic impacts are typically estimated at the direct, indirect, and induced levels:

- Direct impacts are those that result directly from the company's expenditures on labour and capital, as well as gross operating profits;
- Indirect impacts arise from the activities of the firms providing inputs to the company's suppliers (in other words, the suppliers of its suppliers);
- Induced impacts are the result of consumer spending by employees of the businesses stimulated by direct and indirect expenditures.

In applying the input-output analysis, we made the following key assumptions:

- Spending breakdown associated with Bombardier's manufacturing is similar to that in the industry as a whole (Aerospace Product and Parts Manufacturing and Scientific Research and Development Services ).

# Appendix B: Limitations

## Limitations

**Data limitations and verification:** PwC has relied on data and information provided by Bombardier. PwC has relied upon the completeness, accuracy, and fair presentation of all information and data obtained from Bombardier and the various sources set out in our report, which were not audited or otherwise verified. The findings in this report are conditional upon such completeness, accuracy, and fair presentation, which have not been verified independently by PwC. Accordingly, we provide no opinion, attestation, or other form of assurance with respect to the results of this study.

Where the information or data provided is not sufficient to conduct the analysis that has been requested, we have made assumptions, as noted throughout the report.

In addition, PwC has relied on Bombardier for information about its environmental commitments, technological development, and technical abilities. PwC has not verified this information.

**Technology assessment:** We are not technical experts and are not in a position to assess the technical aspects of Bombardier activities. Thus, any statement in this report regarding the technical aspects reflects our understanding based on discussions with Bombardier.

**Receipt of new data or facts:** PwC reserves the right at its discretion to withdraw or revise this report, should we receive additional data or be made aware of facts existing at the date of the report that were not known to us when we prepared this report. The findings are as of June 2023, and PwC is under no obligation to advise any person of any change or matter brought to its attention after such date, which would affect our findings.

**This study is not a recommendation:** Our report is not intended to provide a recommendation to the reader as to what is the better option to supply the CMMA. It merely provides calculations and observations on the potential economic footprint and impacts of selecting the Canadian Multi-Mission Aircraft solution proposed by Bombardier. Making an assessment of the best alternative for Canada would require a cost benefit analysis of the options available to the Government of Canada.

**Input-output analysis:** Input-output analysis does not address whether the inputs have been used in the most productive manner or whether the use of these inputs in this industry promotes economic growth more than their use in another industry or economic activity. Nor does input-output analysis evaluate whether these inputs might be employed elsewhere in the economy if they were not employed in this industry at the time of the analysis. Input-output analysis calculates the direct, indirect, and induced economic impacts that can reasonably be expected to affect the economy based on historical relationships within the economy. This analysis does not take into account fundamental shifts in the relationships within the economy that may have taken place since the last estimation of multipliers by Statistics Canada in 2019, nor shifts that may take place in the future.

**Use limitations:** This report has been prepared solely for the use and benefit of, and pursuant to a client relationship exclusively with, Bombardier. We understand that Bombardier may share our report with third parties. This report can be released to third parties and/or the public only in its entirety. Any commentary or interpretation in relation to this report either requires PwC's written consent or has to be clearly identified as the interpretation of Bombardier or third parties. Alternatively, these parties are required to add a link to the full deliverable. PwC accepts no duty of care, obligation, or liability, if any, suffered by Bombardier or any third party as a result of an interpretation made by those parties of this report.

Further, no other person or entity shall place any reliance upon the accuracy or completeness of the statements made herein. In no event shall PwC have any liability for damages, costs or losses suffered by reason of any reliance upon the contents of this report by any person other than Bombardier.

**This report and related analysis must be considered as a whole:** Selecting only portions of the analysis or the factors considered by us, without considering all factors and analysis together, could create a misleading view of our findings. The preparation of our analysis is a complex process and is not necessarily susceptible to partial analysis or summary description. Any attempt to do so could lead to undue emphasis on any particular factor or analysis.

We note that significant deviations from the above-listed major assumptions may result in a significant change to our analysis.

# Appendix C: Endnotes

Page	Reference	Source/Note
3	1	Public Services and Procurement Canada. (2023). Statement on the Canadian Multi-Mission Aircraft (CMMA) for the Royal Canadian Air Force.
3	2	All calculations were made based on data and assumptions provided by the Bombardier to PwC. PwC did not audit nor test the accuracy of the assumptions.
3	3	We assume a production equal to half of the total maritime patrol aircraft that Bombardier is anticipating in the next 10 years (80 in total).
4	4	State of Canada's Aerospace Industry Report - Summer 2023, Innovation Science and Economic Development Canada.
4	5	2021 Federal Budget, Part 2 - Creating Jobs and Growth, Chapter 4: Helping Canadian Businesses Grow and Succeed.
4	6	R&D intensity represents the ratio of R&D investments as a share of its contribution to GDP.
4	7	PwC (2022). <i>The economic footprint of Bombardier's activities 2012-2025</i> .
4	8	Bombardier, accessible at <a href="https://defense.bombardier.com/en/canadas-multi-mission-aircraft-team">https://defense.bombardier.com/en/canadas-multi-mission-aircraft-team</a> .
8	9	Bombardier (2023). Operational and financial data.
8	10	Statistics Canada (2023). Employee wages by industry, annual. Table: 14-10-0064-01.



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