PERSPECTIVE

The Aerospace Industry Powers Up

By Joëlle Noreau, Senior Economist

The COVID-19 pandemic rocked the global economy, with the aerospace sector particularly hard hit. The domino effect caused by countries imposing strict public health measures, followed by lockdowns, border closures and the sudden and lengthy decline in passenger flights, was catastrophic. The effect on aircraft production and maintenance was swift, leaving the Quebec aerospace industry unable to dodge the impact. The question now is, how will the industry get back on its feet? According to International Air Transport Association (IATA) forecasts, the civil aviation industry will have to wait until 2023 to see a return to 2019 passenger levels. Overall, this would be fairly fast, especially in relation to the size of the decrease and the other events that have affected the aviation industry since the early 2000s. So, does this mean that the aerospace industry will be sitting on the sidelines, waiting for the recovery? Not at all. Given the work program and challenges that lie ahead, companies will be looking for solutions to increase competitiveness in time for when the orders start rolling in again. For this to happen, they'll need to invest and seek support.

Before the Shock

According to Quebec's aerospace cluster, Aéro Montréal, the industry employed 43,400 well-paid workers in 2019. When the pandemic struck in 2020, this number fell to 36,100. According to various sources, 220 to 230 companies were involved in this sector, with annual sales of nearly $18B (2019).

The aerospace industry is a global industry. So, while Quebec's economy is dynamic, the province only has 8.6 million inhabitants and can't support an industry of this size all by itself. That's why, in good years and bad, between 75% and 80% of Quebec's output is exported outside Canada. The companies are mostly, but not solely, concentrated in the Greater Montreal Area. The Quebec industry is so much more than just manufacturing: For example, it includes companies that provide maintenance, pilot training and software, all of which are helping the sector thrive.

Pandemic or not, Quebec's industry has many strengths that it can count on. First, the industry has been around for a long time: Marconi Canada, which eventually became Esterline CMC, was founded in 1903. But it's not the only one. Other long-time major players include Bombardier, Pratt & Whitney, Héroux Devtek, CAE, Rolls-Royce and MDA (formerly Spar Aerospace), some of which are global leaders. Recently, other companies, such as General Electric, Bell Textron Canada, L3Harris, Safran Landing Systems, Sonaca Montréal and Thales Group, joined this core group.

Second, the Quebec industry is extremely diverse. In addition to the production of corporate and commercial jets, there's the assembly of civilian helicopters, the development of flight simulators and the design and manufacturing of aircraft engines. And then there are the suppliers and subcontractors (about 200 SMEs) that are contributing their expertise (composite materials, surface treatments, part machining, hydraulics, software, electro-optics, etc.) to help the industry diversify.

Third, the quality of the workers and the educational institutions (universities, colleges, specialized educational institutions) that train them is another industry asset. Quebec's industry clustered in the Greater Montreal Area may account for 49% of all the aerospace workers in Canada, but it also represents more than 70% of the research and development in this sector.

It's said that Montreal is the world's capital of civil aviation. Why? Because many of the global organizations linked to the aerospace sector are headquartered here, including the International Civil Aviation Organization (ICAO), the International Air Transport Association (IATA), (which is gradually moving to Geneva), the International Business Aviation Council (IBAC) and the Airports Council International (ACI).

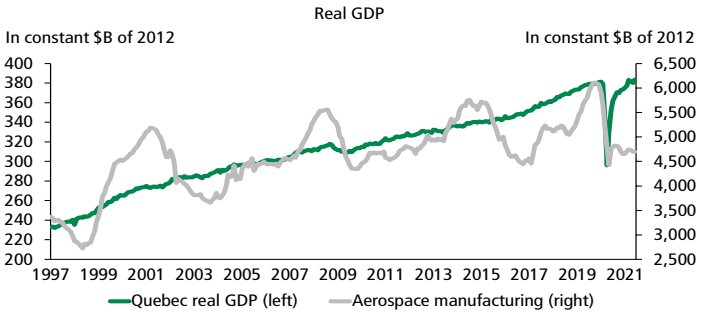
The Noticeable Impact of the Pandemic

The aerospace industry bore the brunt of the air transport industry's slowdown in addition to adapting its production and servicing methods to the physical distancing imposed on

companies and workers by public health authorities. Certain economic indicators reveal the effects of these various measures.

Table 1 shows that real GDP in the industry's manufacturing sector plunged in 2020 (-15.1%). This drop is nearly three times greater than the one the Quebec economy experienced during the same period (-5.3%). As for 2021, the two trends stand in sharp contrast to one another, with aerospace manufacturing continuing to trend down (forecast at -6.5%) and Quebec's economy expected to trend up significantly (around 7%). Graph 1 clearly shows that Quebec's economy has regained the ground lost since the pandemic, but this is not yet the case for aerospace product and parts manufacturing, which remains well below February 2020 levels. A look at the last 20 years helps illustrate the cyclical nature of aerospace product and parts manufacturing over time.

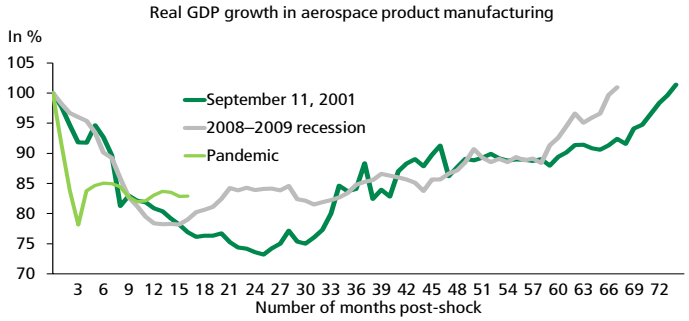
GRAPH 1
Quebec's aerospace manufacturing GDP is still below February 2020 levels, contrary to Quebec's total GDP



Sources: Institut de la statistique du Québec and Desjardins, Economic Studies

How does the current shock compare with the events of September 11 and the 2008–2009 recession in terms of real GDP? Graph 2 shows that, during the early months of spring 2020, the shock caused by the pandemic and the different measures was clearly more marked. Still, after 16 months, the aerospace product and parts manufacturing sector was able to regain what it had lost faster than during the two contractions of 2001 and 2008–2009. Is this a sign of the changes to come? That remains to be seen, as we'll discuss it later.

GRAPH 2
After 16 months, real GDP was higher than during the events of September 2001 and the 2008–2009 recession



Sources: Statistics Canada and Desjardins, Economic Studies

Table 1 also helps see that the relative size of aerospace manufacturing's real GDP has fluctuated in recent years. Nonetheless, 2021 is the year in which this sector reached its lowest point since 2016 in terms of total real GDP (1.2%) and total manufacturing in Quebec (9.6%). Graph 3 on page 3 also shows the decline in aerospace product and parts exports as a share of Quebec's total international exports in 2020 and 2021. Exports of Quebec goods fell 7.7% in 2020 while aerospace product exports plummeted 19.5%. The first seven months of 2021 saw these exports grow 17.4% and 12.9% respectively, compared to the same period in 2020.

The number of jobs lost in 2020 mentioned earlier was significant. Employment numbers also include the aerospace services industry, which can't be ignored. Various aircraft manufacturers announced layoffs in 2020. Nevertheless, some tried to keep the layoffs low to limit the rehiring effort that would be required once operations had completely recovered. Trained employees are a precious asset in a sector that seriously lacks specialized workers.

Today

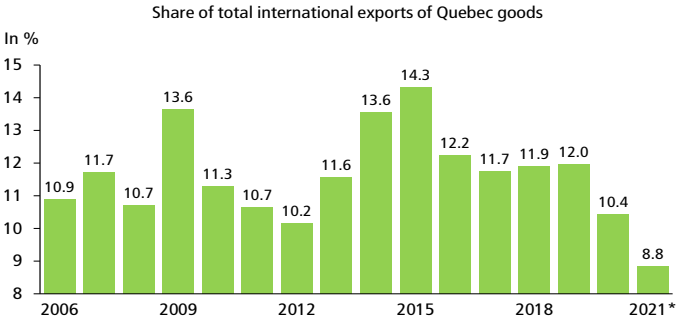
Tracking the aerospace product and parts manufacturing sector's real GDP monthly helps see how output reached its lowest point in May 2020. The sector rebounded in June but has been in a holding pattern ever since, unable to gain altitude and reach February 2020's level. The uncertainty surrounding the spread of COVID-19 and its variants has restricted air travel, delayed the

TABLEAU 1
Aerospace industry's real GDP grew in Quebec

IN %	2016	2017	2018	2019	2020	2021f
Variation of Quebec's GDP	1.6	2.9	3.0	2.7	-5.3	7.0
Variation of aerospace manufacturing's GDP	-14.4	7.9	4.1	13.0	-15.1	-6.5
Size of aerospace manufacturing in Quebec	1.3	1.4	1.4	1.5	1.4	1.2*
Size of aerospace manufacturing as a share of manufacturing in Quebec	9.9	10.3	10.3	11.4	10.7	9.6*

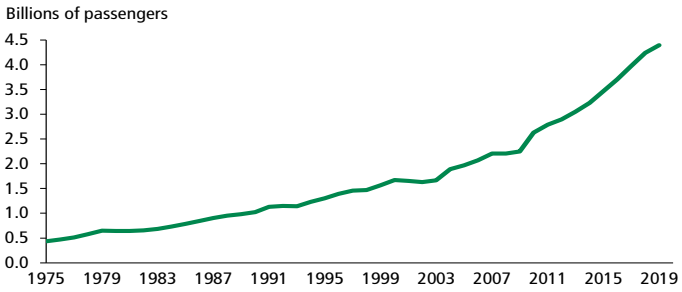
f: forecasts; * For the first six months of 2021.
Sources: Institut de la statistique du Québec and Desjardins, Economic Studies

GRAPH 3
Aerospace product and parts manufacturing's share of exports declined somewhat



* Cumulative January to June 2021 compared to January to June 2020.
Sources: Institut de la statistique du Québec and Desjardins, Economic Studies

GRAPH 4
The number of air passengers worldwide was surging pre-pandemic



Sources: World Bank and Desjardins, Economic Studies

reopening of borders and dimmed the outlook for a return to normal in the passenger transportation sector. Indirectly, it's still difficult for manufacturing to pick up the pace.

Graph 4 indicates the uninterrupted progress made in the last 50 years in passenger transportation, which really took off in the 2010s. The ICAO measured the pandemic's impact on three parameters, namely airline seat capacity, the number of passengers and gross revenue.

Table 2 shows the figures for passenger traffic in 2020 and forecasts for 2021, with comparisons based on 2019. In 2020, it's estimated that airline seat capacity tumbled 66% for international travel and 38% for domestic travel. Passenger numbers plunged 74% and 50% respectively while gross revenue fell an estimated US$250B and US$120B.

A comparison with this year's figures for domestic travel is not as painful. Compared to 2019, airline seat capacity reportedly declined from 23% to 24%, passenger totals fell from 30% to 32% and gross revenue losses went from US$66B to US$69B, almost half as much as in 2020. Still, the ICAO's forecasts for international travel are like 2020's in terms of fewer seats, fewer passengers and lower gross revenue.

These numbers are huge. It's true that the air transport sector has never encountered a situation like the pandemic, which has weighed heavily on traveller and airline intentions and thrown a wrench into the works of the aircraft manufacturers.

After so much disappointment, is there any reason to feel optimistic? In May 2021, the IATA, which represents about 290 airlines (freight and passengers) in 120 countries that cover 82% of air transport, tried to answer this question.

In the end, it estimated that passenger levels should reach 52% of those recorded in 2019 before the pandemic struck, followed by 88% in 2022 and 105% in 2023. If we apply this scenario

TABLE 2
Year 2020 results and 2021 outlook: International and domestic passenger traffic

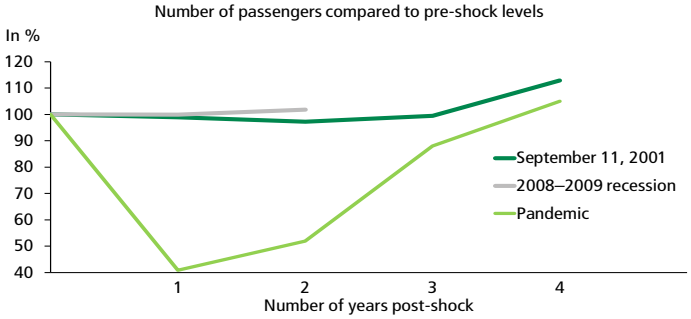
2020 VS. 2019	2021 VS. 2019
International passenger traffic: - Overall reduction of 66% of seats offered by airlines. - Overall reduction of 1,376 million passengers (-74%). - Approximately US$250B loss of gross operating revenues of airlines.	**International passenger traffic:** - Overall reduction of 61% to 63% of seats offered by airlines. - Overall reduction of 1,324 to 1,364 million passengers (-72% to -74%). - Approximately US$248B to US$255B loss of gross operating revenues of airlines.
Domestic passenger traffic: - Overall reduction of 38% of seats offered by airlines. - Overall reduction of 1,323 million passengers (-50%). - Approximately US$120B loss of gross operating revenues of airlines.	**Domestic passenger traffic:** - Overall reduction of 23% to 24% of seats offered by airlines. - Overall reduction of 801 to 838 million passengers (-30% to -32%). - Approximately US$66B to US$69B loss of gross operating revenues of airlines.

Source: International Civil Aviation Organization

to the World Bank's figures on passenger transportation by using 2019 as a baseline, the return to pre-pandemic levels may be relatively quick (graph 5). Still, it will clearly take a lot more to catch up compared to previous events for a similar period of time.

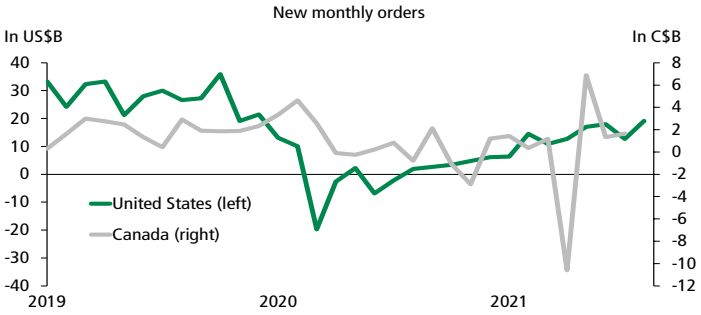
Longer term, the IATA is even expecting annual passenger numbers to grow 3.9% a year between 2025 and 2030. If these forecasts prove to be right, this will give the aerospace industry (production and services) the boost it needs. Similarly, Boeing has made it known that, by 2040, China may need 8,700 additional planes, offering a glimmer of hope to suppliers, some of whom are in Quebec. By then, new orders for aerospace manufacturing are expected to be up, especially in the United States (graph 6).

GRAPH 5
According to the IATA, air passenger numbers should mostly recover



IATA: International Air Transport Association
Sources: World Bank and Desjardins, Economic Studies

GRAPH 6
New aerospace manufacturing orders are on the rise, especially in the United States



Sources: U.S. Department of Commerce, Statistics Canada and Desjardins, Economic Studies

Labour

The Quebec aerospace industry will need workers to stay competitive. The shortage of qualified workers was already a problem before the pandemic. Once the workers temporarily laid off are called back, the problem of hiring and retaining workers, technicians and engineers will be just as glaring as before the shock caused by COVID-19.

Training students takes time: Without a doubt, the upheaval that the airline and aerospace industries experienced did not lead to a rush for the doors of educational institutions in the fall of 2020 and in 2021. This only made it harder for the industry to fill jobs. In 2019, according to the Comité sectoriel de main-d'œuvre en aérospatiale du Québec (CAMAQ), which regularly surveys the Quebec aerospace industry, 63% of the companies that responded are having problems finding workers to fill an estimated 1,226 jobs. Most highly sought-after: machinists and programmers, aircraft maintenance technicians, tradespeople (such as fettlers, day labourers, polishers, assistant machinists), and electrical, electronics and avionics engineers and technicians. Laurentides, Laval, Montérégie and Montreal were hit particularly hard. The problem is so serious that the companies surveyed revealed that the shortage had an impact on their ability to maintain operations (41%) or expand (51%).

However, it is not for lack of educational institutions in Quebec. Besides university programs, there is the École nationale d'aérotechnique and the École des métiers de l'aérospatiale, both of which offer programs that lead to degrees recognized in the industry. Annual compensation isn't bad either, as it ranges from $65,000 to $90,000 according to the CAMAQ.

A Major Work Program

The labour issue isn't the only thing troubling the aerospace industry. It isn't changing, cut off from the rest of the world. It must improve production and propulsion methods and transition to "green" practices aimed at limiting its impact on the environment. That's why there is increasing talk of electric and hydrogen power and towards sustainable aviation fuel to reduce greenhouse gas emissions.

Creating equipment that is more environmentally friendly and lower cost requires more technology companies. That's what the strategies of government and organizations like Aéro Montréal and the Consortium de recherche et d'innovation en aérospatiale du Québec (CRIAQ) are trying to tackle. Quebec has an aerospace strategy for 2016–2026, with its funding renewed in the most recent budget tabled in the spring of 2021. The next three years will see $95M committed to the four objectives identified when the strategy was launched: strengthen and diversify the industrial structure (and target the defence and security niches), support innovative projects and invest in labour, support SMEs in their development and focus on innovation. The federal government had earmarked $1.75B for its Strategic Innovation Fund over seven years, with an additional $250M over three years included in its last budget to boost the regional aerospace industry (to help SMEs improve productivity, market their products and services and "go green" in terms of their operations and products).

Quebec's aerospace industry must work on all fronts: recruit and retain workers, upgrade technology to remain a credible partner in the global supply chains and meet environmental

requirements. And all that when the planet is battling a virus and learning to live with it. At a time when borders are not yet fully open and only about 37% of the world's population is adequately vaccinated, no one can claim that air traffic will return to pre-pandemic levels any time soon. There's still a long road ahead and, if we believe the IATA's forecasts, we'll have to wait until 2023 for civil aviation passenger numbers to return to 2019 levels. Overall, this would be fairly fast, especially in relation to the size of the decrease and the other events that have affected the aviation industry since the early 2000s.

So, does this mean that the aerospace industry will be sitting on the sidelines, waiting for the recovery? Not at all. First, it will also be trying to diversify into the defence and security sectors. Moreover, given the work program and challenges that lie ahead, companies will be looking for solutions to increase competitiveness in time for when the orders start rolling in again. For this to happen, they'll need to invest and seek support.