



## WHITE PAPER

### *«Propelling the talents of aerospace towards Industry 4.0»*

Canadian Council for Aviation & Aerospace  
Labour Market Strategy Day

November 17, 2016



# OVERVIEW OF QUEBEC'S AEROSPACE INDUSTRY



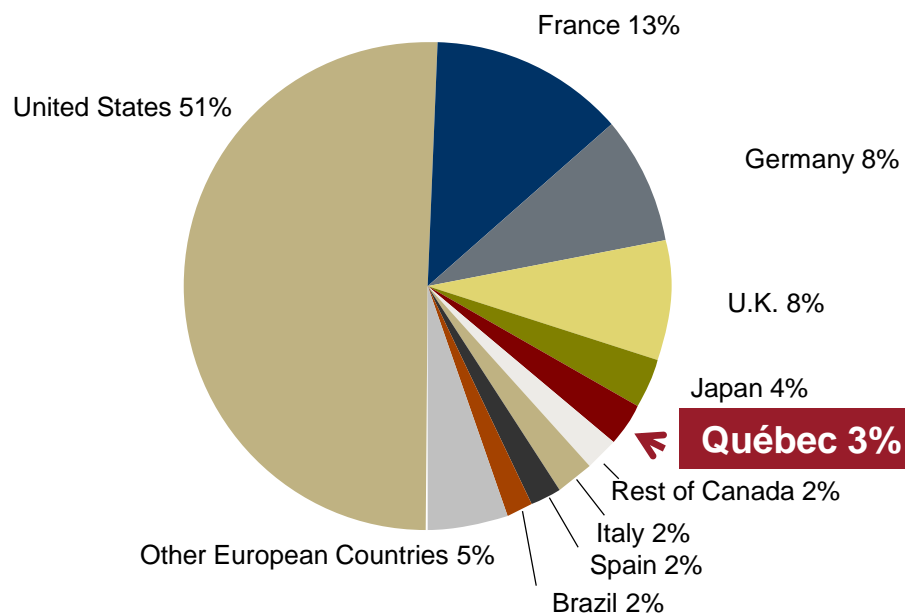
## Québec Aerospace Industry

- Montréal : **Top 3** aerospace centers in the world
- Québec ranks **#6** in the world for sales (while Canada ranks #5 in the world as a whole)

Aerospace centers in the world



Aerospace industry revenue share



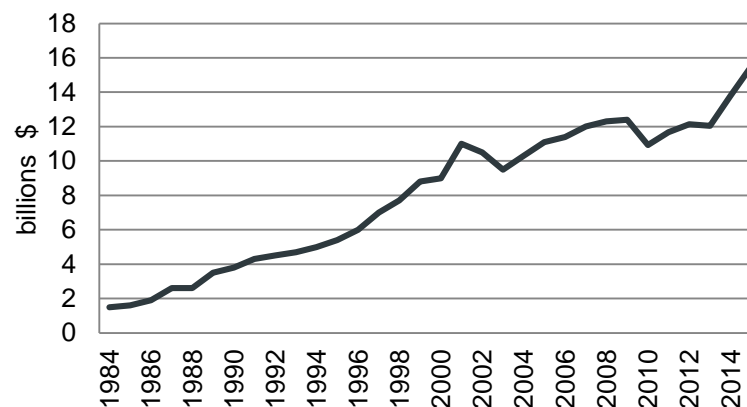
Source: MESI



## The heart of the Canadian aerospace industry

- Revenues of 15.5 billions \$ in 2015
- 40,160 jobs, including 13,000 engineering professionals
- 191 companies
- 50% of total Canadian aerospace revenues
- 50% of the Canadian workforce
- 60% of total Canadian aerospace exports (more than 80 % of our production is exported)
- 70% of Canadian aerospace R&D spending

Revenues - Quebec Aerospace Industry  
1984 à 2015



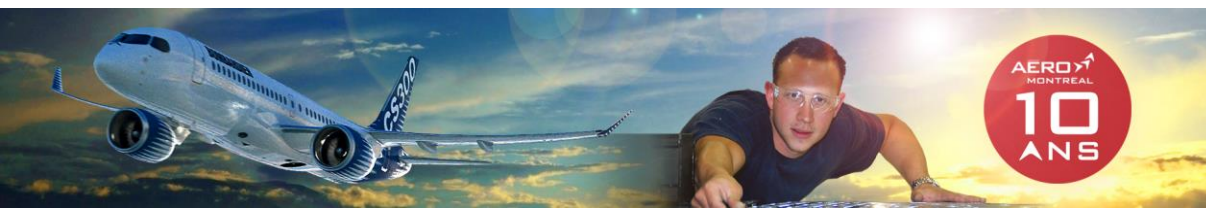
**CAMAQ** (Québec aerospace sectoral workforce committee):

By 2026, **need of 40 000 jobs** in aerospace (12 000 new jobs + 28 000 replacements)

**Growth of 2,27 % per year over the past 32 years**



# THE QUEBEC AEROSPACE CLUSTER, AÉRO MONTRÉAL



## Aéro Montréal, Québec's Aerospace Cluster

- Founded in 2006, Aéro Montréal is a strategic think-tank that groups all the major decision makers in Québec's aerospace sector
- *Its **MISSION** is to mobilize Québec's aerospace cluster to support its growth and its influence on the global stage.*

### Bringing together industry leaders...



### ... to work on the industry priorities

Strategic Committees – in line with the trends and challenges the industry faces

- 1 Branding and Promotion
- 2 Innovation
- 3 Supply Chain
- 4 Human Ressources Development
- 5 Markets Development - SME
- 6 Defence and National Security



## Human Resources Development working group

### Main challenges:

- ✓ **Stimulate enthusiasm amongst young generations** for science and technology, especially aerospace, and to prevent school dropout
- ✓ **Workforce succession** and intergenerational knowledge transfer (linked with aging population)
- ✓ Align the education **programs to industry needs**





## Genesis of the White Paper

### **Aero Talent Forum – April 29, 2016 - International Aerospace Week**

- Three (3) clinics addressing the following issues :
  1. Training programs
  2. Company internships
  3. Funding for training
  
- Over 100 participants, 19 speakers and 17 exhibitors
  
- **Look one step further to address the impact of Industry 4.0 and digitalization on future competencies need.**

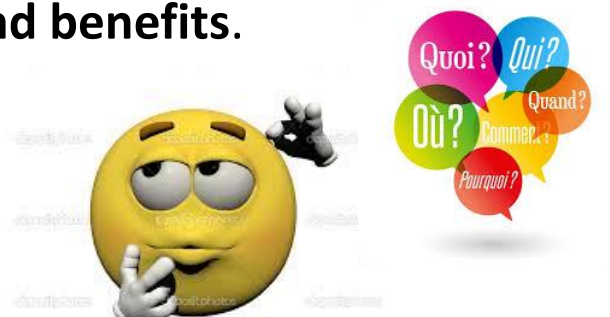




## Recommandation 1

### Demystify and clarify the concept of “Industry 4.0.”

- Not everyone is on the same level when it comes to understanding its concept, details, challenges and benefits.

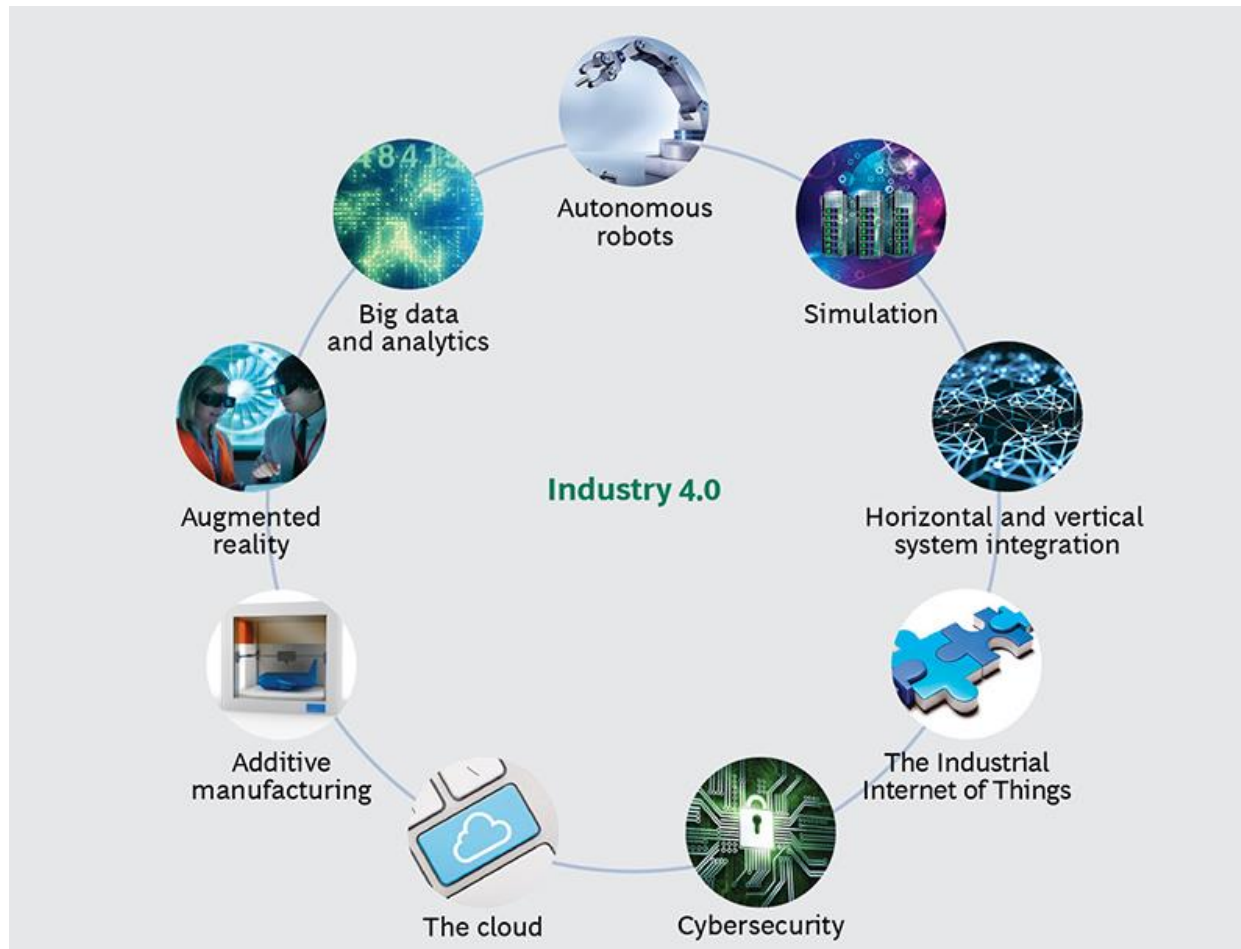


- Industry 4.0” was introduced in Germany in 2005 to describe the 4<sup>th</sup> current revolution in the **manufacturing industry**.
- Industry 1.0 (1784) was characterized by **mechanical production and steam power**;
- Industry 2.0 (1870) by **electric power, mass production and the first assembly line**;
- Industry 3.0 (1969) by **electronics, ICT, and automation**.



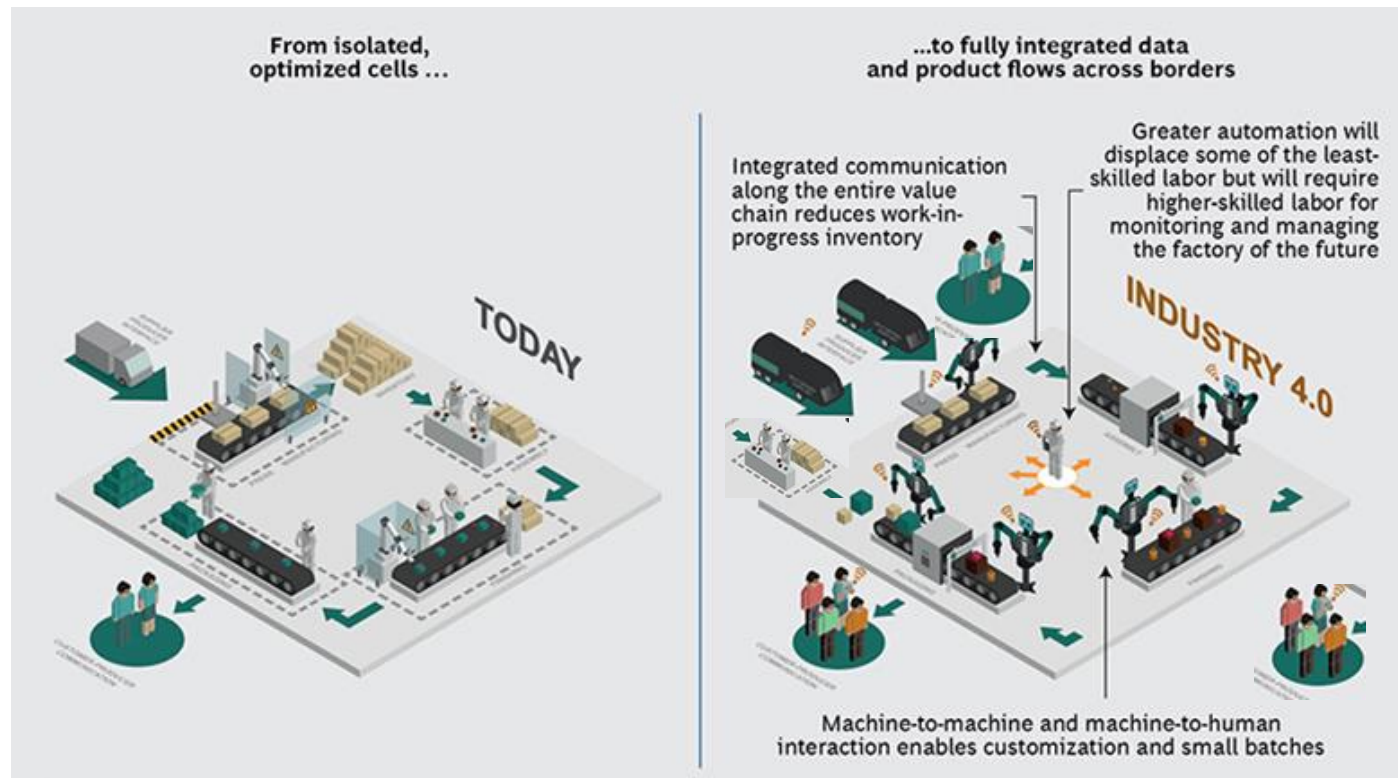
## Technologies that are transforming industrial production in Industry 4.0

- Each requires resources and specific skills sets.

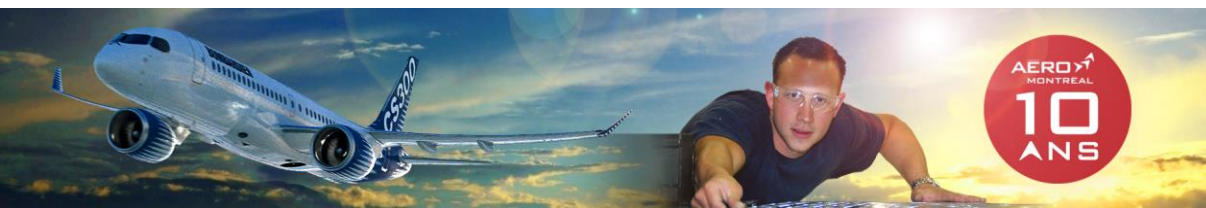




## Industry 4.0 transforms traditional interactions related to manufacturing



- Despite the greater use of robotics and computerization, there will be a net increase in jobs (ex.: **Robot coordinators, Industrial data scientists**)
- **Technical skills** + transversal skills “**soft skills**” (organisational, management, communication, supervision)



## Recommandation 2

Define a shared vision of education at all levels and in a concerted way to guide the entire aerospace ecosystem towards Industry 4.0.







## Recommandation 2

### *Proposed means:*

- Make representations to the relevant ministries (Québec Education Department, *Emploi Québec*, etc.) so that educational programs in aerospace change and **adapt more quickly**.
- Redefine the curriculum of high schools, colleges and universities to incorporate a **“4.0 Program” into basic training**



## Recommandation 2

### *Proposed means (cont'd) :*

- Review the elementary school academic curriculum to **initiate young students** even earlier on their journey to **science, digital technology** (programming), **robotics** and **aerospace**.



- Develop a “**4.0 Skills Guide**” through concerted and continuous consultation with aerospace companies, with the participation of educational institutions of all levels, research centers, the aerospace cluster and its partners.



## Recommandation 2

### *Proposed means (cont'd) :*

- Expand access to **scholarships** for high school, college and university (undergraduate) training in the workplace and for SMEs, as well as to **funds for internships, continuing education** and professional development in companies.
- Bring the **industry closer to training centers** by promoting and financing **mobile training opportunities** for skilled workers and technicians.
- Repeat events that bring together companies, students and workers to promote career opportunities in aerospace.
  - *Take advantage of these opportunities to raise awareness among participants about “Industry 4.0.”*





## Recommandation 3

**With the implementation of Industry 4.0 in aerospace, establish a gradual approach to analyze the business needs of companies, especially SMEs, and support them in developing a strategy**





## Recommandation 3

### *Proposed means:*

- Understand, communicate and use the measures of the Québec Aerospace Strategy to implement actions related to supporting and financing companies transitioning to Industry 4.0.

#### **MACH FAB 4.0 : Encourage SMEs to make the transition to Industry 4.0**

- Sponsorships and support for SMEs making the transition to Industry 4.0 (9,5 M\$)
- Special digital intervention squads (4 M\$)
- Investment support for transitioning to Industry 4.0
  - Support **50 SMEs** in the aerospace sector in their transition to becoming digital companies of the future.
  - Partners : STIQ, CEFRIO et AÉROETS.





## Recommandation 4

**Develop a culture of knowledge sharing and succession focused on the emergence of a new generation of 4.0 workers.**

Faced with an **aging workforce** and numerous retirements :

- Intensify efforts and activities **promoting careers in aerospace**, especially among **women and immigrants**
- Develop a **culture of succession within companies**



## Conclusion

### Success in Quebec relies on the collaboration between:

- Industry
  - Education Institutions
  - Government
- 
- **Need for a National HR Strategy to address the issues of Industry 4.0 , and to align education programs to future industry needs**



# THANK YOU!

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