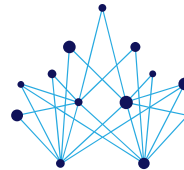


WELCOME TO THE CARIC SK WORKSHOP!



LOREN P. HENDRICKSON, P.ENG.
REGIONAL DIRECTOR (MB/SK)



C A R I C

CONSORTIUM FOR
AEROSPACE RESEARCH AND
INNOVATION IN CANADA

CONSORTIUM EN AÉROSPATIALE
POUR LA RECHERCHE ET
L'INNOVATION AU CANADA

FUNDING PARTNER | PARTENAIRE FINANCIER



Innovation, Science and
Economic Development Canada

Innovation, Sciences et
Développement économique Canada



YOU'RE INVITED TO:

CARIC Research Workshop

CARIC's Inaugural Research Workshop for Saskatchewan.

The Research Forum is the perfect event to initiate new collaborative research projects! Seize this opportunity to learn about the local aerospace industry's research and development (R & D) needs as well as national and international opportunities. You will meet industrial specialists as well as researchers from universities, colleges and research centres who could provide their expertise. Non-aerospace collaboration is welcomed!

There is **NO COST** for this event. Please register by **JAN 13, 2017** at:

<https://www.eventbrite.com/e/caric-research-network-saskatchewan-tickets-29700294380>

Date: Wednesday, January 18, 2017
Time: 1:30 p.m. to 4:30 p.m., reception to follow
Location: University of Saskatchewan
Room 2E11
College of Agriculture and Bio Resources

About CARIC

The Consortium for Aerospace Research and Innovation in Canada (CARIC) is a national non-profit organization established with the Government of Canada's financial support.

Its mission is to facilitate communication and collaboration among aerospace companies, research centres and academia. CARIC provides financial support for collaborative R&D projects and creates and supports collaboration initiatives to improve the competitiveness of the Canadian Aerospace Industry.

Funding partner:



Innovation, Science and
Economic Development Canada

Innovation, Sciences et
Développement économique Canada

Schedule

- | | |
|-----------|--|
| 1:30 p.m. | Opening Remarks – CARIC Overview |
| 1:50 p.m. | R&D Introductions, Interests & Needs |
| 2:20 p.m. | CARIC Funding Programs & Examples |
| 2:50 p.m. | Coffee & Refreshments |
| 3:10 p.m. | Presentation: Industrial Regional Benefits (ITB) – Value Proposition for R&D |
| 3:30 p.m. | Regional Collaboration – Opportunities |
| 4:30 p.m. | Wrap-up |
| 4:35 p.m. | Networking Reception |
| 5:30 p.m. | Event ends |

Time	Final Agenda - 2017 CARIC SK Regional Workshop (Rm 2E11)
13:30	Introduction (Amit Shukla)
13:35	Opening Remarks - CARIC Overview (Loren Hendrickson)
13:50	Introductions - R&D Interests & Needs (all)
14:20	Caric Funding Programs & Examples (Loren Hendrickson)
14:50	Coffee Break (Atrium)
15:10	Industrial Technological Benefits (ITB) - Value Proposition for R&D (Wendell Wiebe)
15:30	Regional Collaboration - Opportunities
16:30	Wrap up
16:35	Networking Reception (Atrium)
17:30	End

CARIC OVERVIEW:

A National Collaboration Initiative for the Canadian Aerospace Industry

SK Workshop Jan 18, 2017

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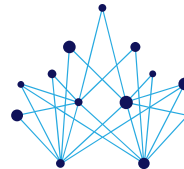
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CANADIAN AEROSPACE INDUSTRY*

Economic Impact

- Over 700 companies - 172,000 jobs
- Contributes \$28B of GDP to the Canadian economy
- 80% of its production is exported
- 70% Manufacturing and MRO, 30% services



Canadian Aerospace Activity

- 3rd in terms of global civil aircraft.

*Aerospace Industries Association of Canada & Industry Canada (2014).
The State of the Canadian Industry



C A R I C

CANADIAN AEROSPACE INDUSTRY - *BUSINESS & TECHNOLOGICAL CHALLENGES*

- Very high demand for next 20 years – Half of it in Asia
- Very innovation intensive
- Long development cycles
- Tight margins of the airlines, airports (the customer)
- Global competition
- Tighter environmental legislation
- Development of supply Chain
- Manpower
- Infrastructure



CARIC

“Collaborative approaches to R&D yield better results for both participants and the economy. This is particularly true for an industry like aerospace, in which R&D is a costly, long-term undertaking.” - Emerson Report

- Officially launched in April 2014
- \$30M financial support from Industry Canada



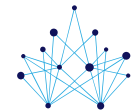
Honourable James Moore, announcing his endorsement of the creation of a new national aerospace research and technology network.

CARIC'S MISSION

To facilitate communications and collaboration among aerospace companies, researchers and academia...



...and provide financial support to collaborative R&D projects.



C A R I C

HOW?



1) CARIC accelerates aerospace research

- *Research projects* launched (TRL 1-6)
- Involvement: academia, research centres and industry

2) CARIC supports *student* training

- Universities and colleges

3) CARIC facilitates aerospace network outreach

- National and regional *research forums* and workshops on cutting edge research fields

4) CARIC supports the innovation system

- Share research infrastructure, build capacity, mobilize SMEs, lead *technology road mapping*

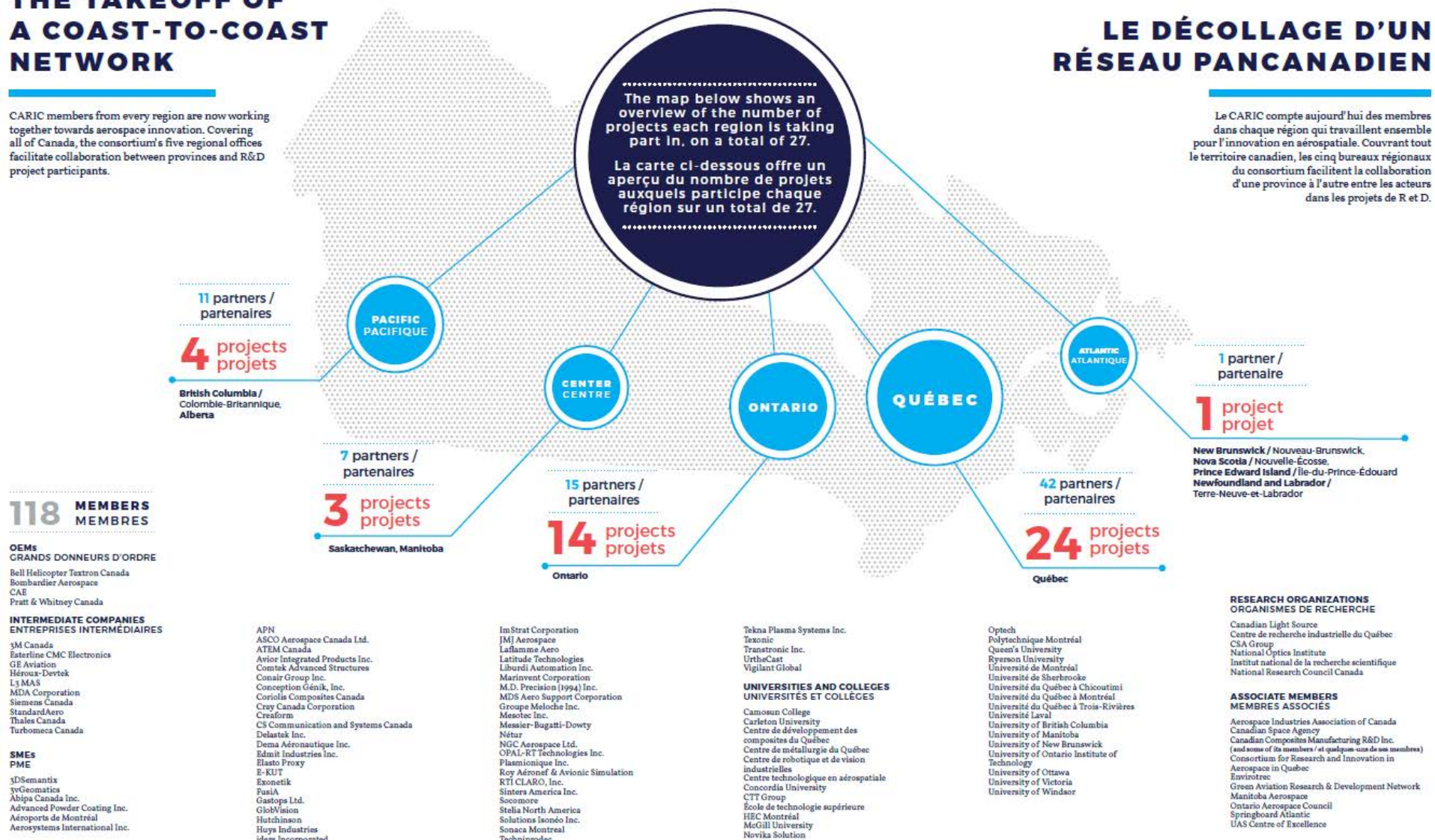


THE TAKEOFF OF A COAST-TO-COAST NETWORK

CARIC members from every region are now working together towards aerospace innovation. Covering all of Canada, the consortium's five regional offices facilitate collaboration between provinces and R&D project participants.

LE DÉCOLLAGE D'UN RÉSEAU PANCANADIEN

Le CARIC compte aujourd'hui des membres dans chaque région qui travaillent ensemble pour l'innovation en aérospatiale. Couvrant tout le territoire canadien, les cinq bureaux régionaux du consortium facilitent la collaboration d'une province à l'autre entre les acteurs dans les projets de R et D.



RESEARCH THEMES

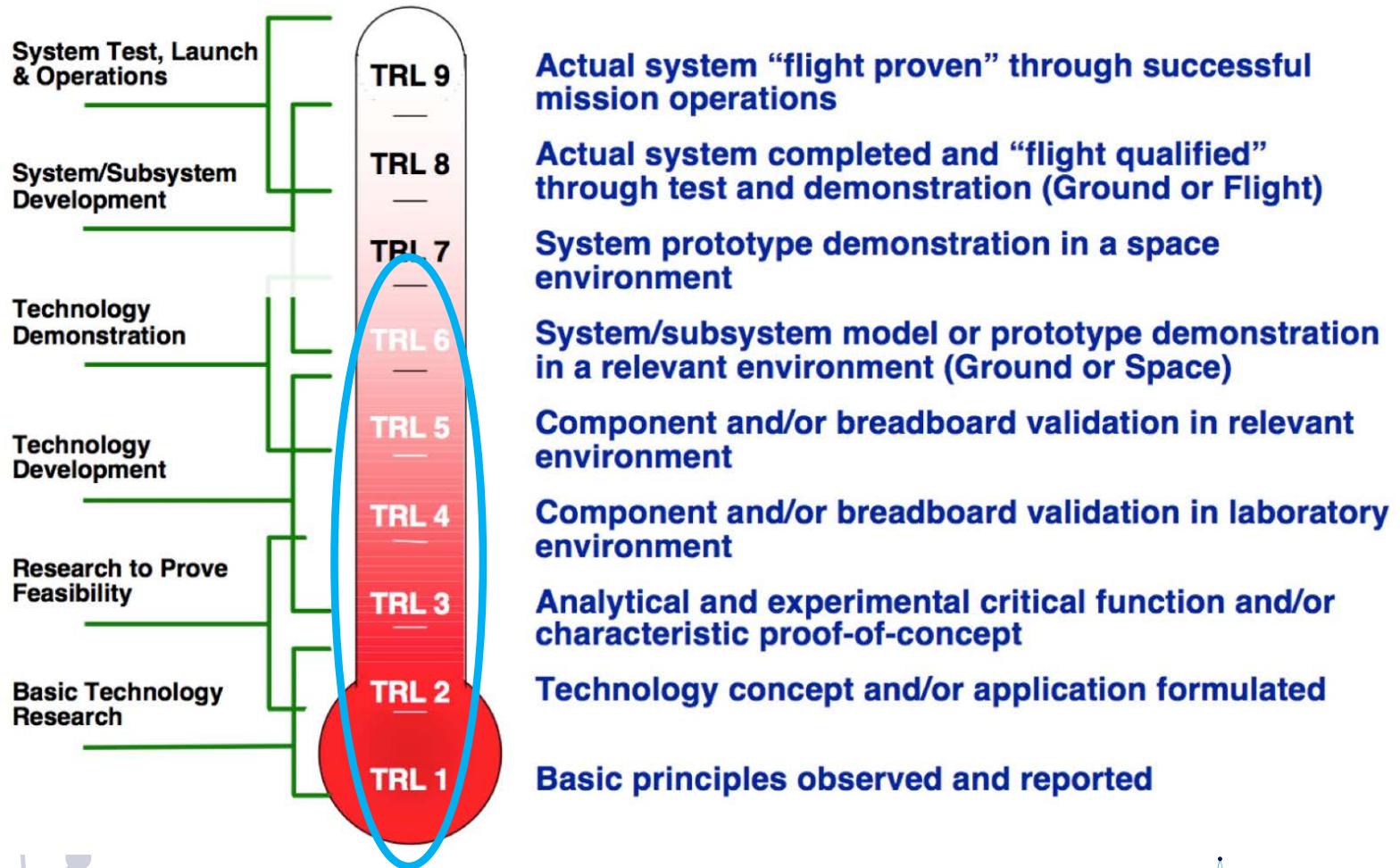
PROGRAM MANAGEMENT FRAMEWORK

Acoustics, noise control, environment, security, icing (ENV)	Composites (COMP)	Modeling, simulation, multidisciplinary optimization (MDO)
Air operation and human factors - organizational innovation (OPR)	Diagnostics, pronostics, surveillance of components (DPHM)	Product and system development, productivity (PLE-P)
Autonomous systems (AUT)	Interior design (INTD)	Supply chain optimization and LEAN (LEAN)
Avionics and control (AVIO)	Manufacturing and assembly processes, quality assurance (MANU)	



Focus: Aerospace related...



TRL SCALE – TECHNOLOGY READINESS LEVEL



CARIC COLLABORATIVE PROJECTS

	Low TRL - Understanding Technology 	Mid TRL - Maturing Technology 
Partnership	2 industrial partners + 2 academic partners	
Stacking limit	75%	
CARIC funding	max. 10% of eligible project expenditures	max. 50% of eligible project expenditures
Funding recipients	Universities or colleges delivered	Industries delivered



RESEARCH FORUMS

- Bi-Annual (alternate with CRIAQ)
- **Vancouver August 9, 2017**
- Example: Montreal, 2014
 - Official launch of CARIC
 - 1,300 registered participants
 - 89 submitted project ideas
 - 10 represented countries



Focus: generate project ideas



CARIC

SUGGEST AN IDEA AT ANY TIME

- Unsolicited projects welcomed
- Assistance provided to match required expertise and prepare project proposals



Focus: generate project ideas



CONCLUSION

Collaboration and mobilisation are the keys to consolidate Canada's competitiveness...

...and CARIC is the tool enabling it.

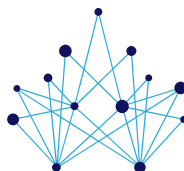


CARIC:

Funding Programs and Examples

SK Workshop Jan 18, 2017

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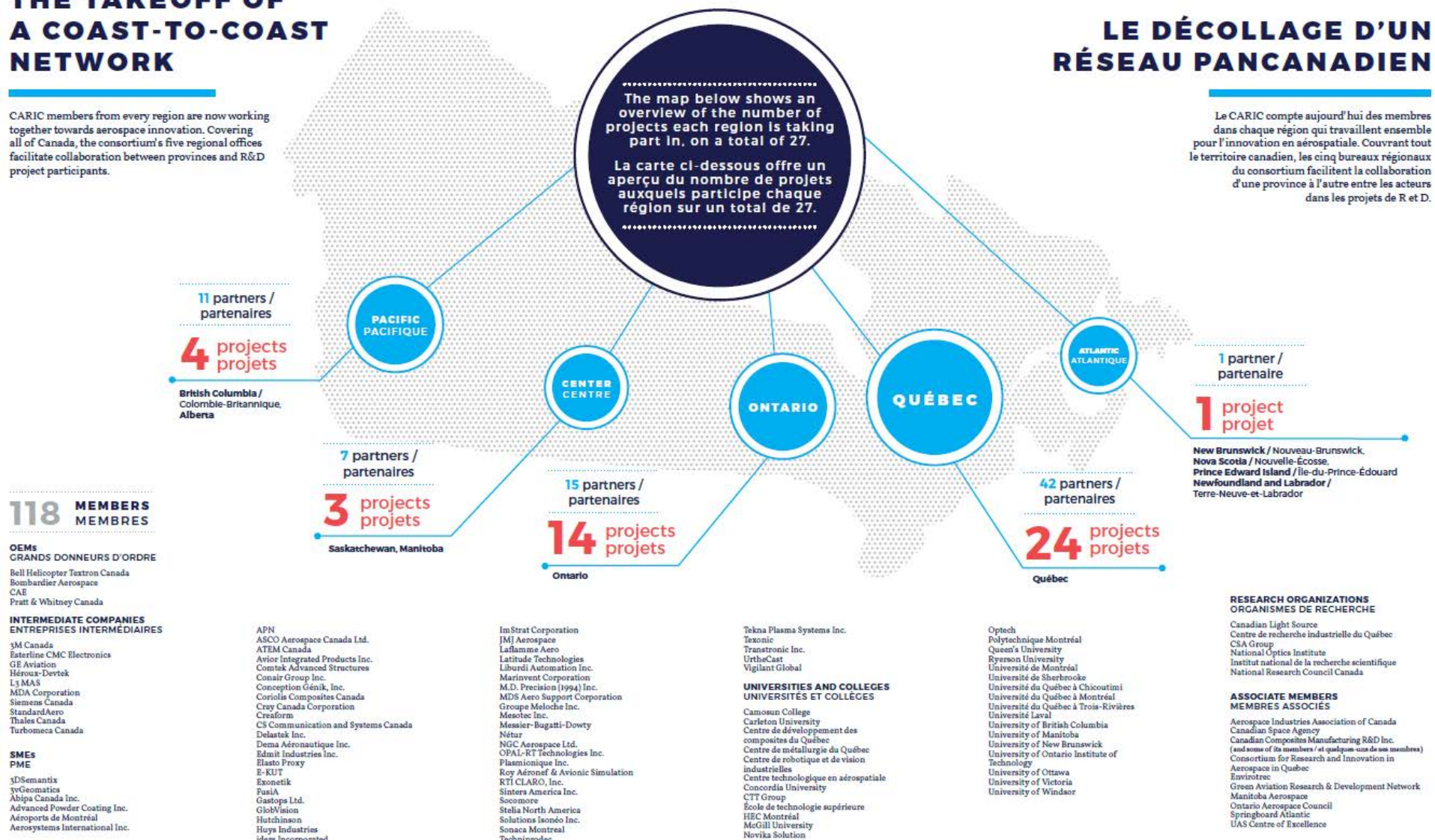


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CARIC PROGRAMS

	"AERO CONNECT"	Low-TRL "Understanding technology"	Mid-TRL "Maturing technology"
TRL level	TRL 1-6	TRL 1-4	TRL 4-6
Industry partners	1	2	2
Research partners	1	2	2
Funding Partner	NSERC ENGAGE	NSERC CRD / ARD	Others, Mitacs, NRC_IRAP
Industry	In-Kind	Cash/In-kind	Cash/In-Kind
CARIC Members	(\$25k) NSERC	Cash	Cash
Non-members	\$10k CARIC Services	N/A	N/A
Duration	6 months	~2-3 years	~1-2 years
Funds utilized by	Univ / Colleges	Research partners	Industry, research partners and Univ / Colleges
Intellectual Property	NSERC policy	CARIC/CRIAQ Generic Agreement	CARIC/CRIAQ Template
Submission process	NSERC Form → CARIC NSERC Form → NSERC	1- Project statement → CARIC If approved: 2- NSERC proposal → NSERC	Project proposal → CARIC
Approval process	NSERC on merit of proposal, CARIC on eligibility (internal)	1- CARIC Scientific Committee 2- NSERC peer review	CARIC Scientific Committee



FUNDING SCENARIOS

LOW-TRL PROJECTS

With provincial funding

Maximum of 75%
in public funding

Total project value

\$100k IN CASH
\$25k IN-KIND

\$125k



CARIC
\$10k
INDUSTRIES
\$25k
PROVINCIAL
\$15k
NSERC
\$50k

LOW-TRL PROJECTS

Without provincial funding

Maximum of 75%
in public funding

Total project value

\$100k IN CASH
\$30k IN-KIND

\$130k



CARIC
\$10k
INDUSTRIES
\$30k
NSERC
\$60k

MID-TRL PROJECTS

Total project value

IN CASH
AND IN-KIND

\$100k



CARIC
\$50k
INDUSTRIES
\$50k

PROJECT LAUNCH PROCESS



COLLABORATIVE PROJECT EXAMPLE

1. Project idea proposal (needs)
2. Team member selection (skills & interests)
3. Application preparation (research proposal)
4. Assessment (benefits, funding, scientific committee review)
5. Final agreement (Intellectual Property, etc)

Funding released & Project kickoff



PROJECT EXAMPLES

DPMH-711 - Light alloy repair, novel welding techniques, non-aerospace SME from Ontario

COMP-709 - Multi partner consortia \$2.5M project on difficult to mfg composite geometries

ENV-702 - Helicopter blade deicing, non-aerospace electronics SME from MB

OPR-706 - Fatigue management for aerial firefighting, sportsmedicine + sensors + flight data monitoring + cockpit operations



WHERE VISION TAKES FLIGHT



Presentation at CARIC Workshop on January 18, 2017



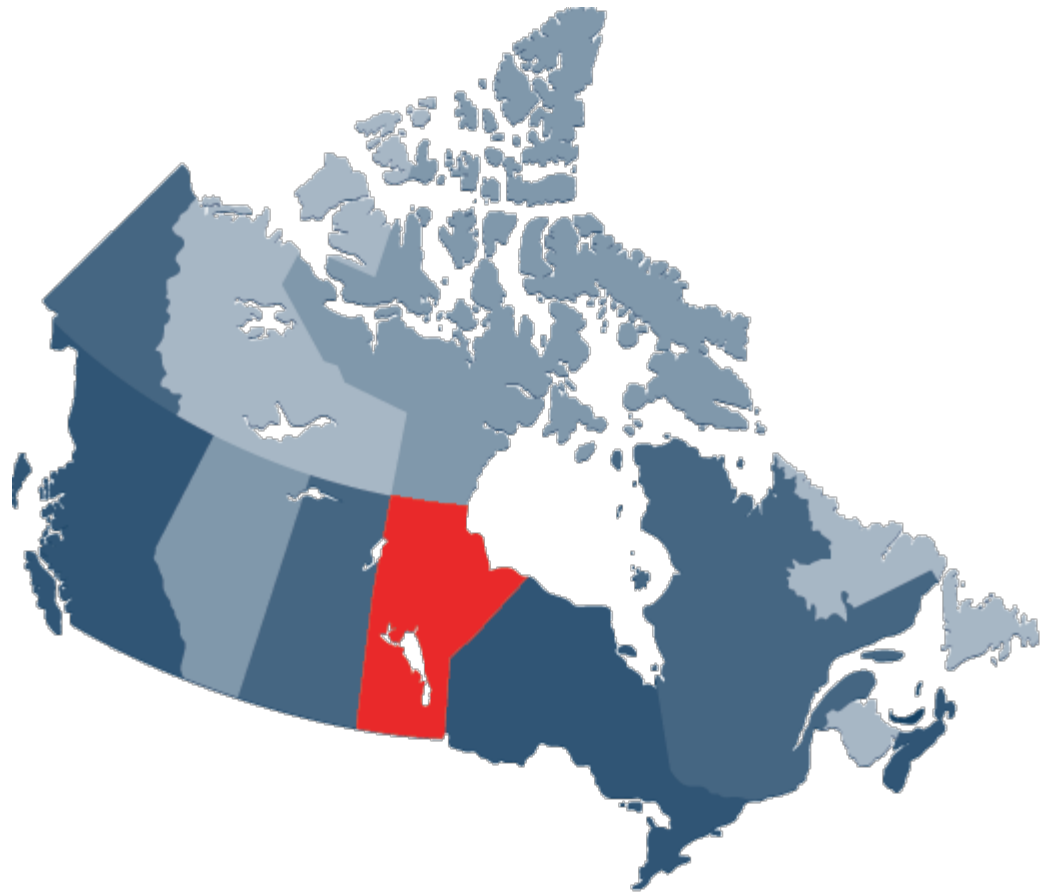
Manitoba Aerospace Inc. 1000 Waverley St Winnipeg, MB R3T 0P3

Agenda

- Overview of Manitoba Aerospace Industry
- Overview of Industrial and Technological Benefits Program
- Overview of Manitoba Aerospace & how we can help Saskatchewan Aerospace Industry
- Questions / Answers

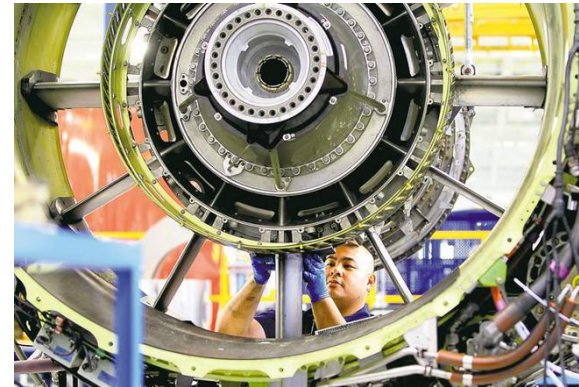
Manitoba Aerospace Industry

- Manitoba is home to the largest hub of aerospace companies in Western Canada
 - 5,300 people in direct jobs in the sector
 - 15% of all aerospace & MRO employees in Canada
 - \$1.9 Billion in products and services annually
 - \$ 412 Million purchased from Canadian Suppliers (\$103 Million in MB)
 - \$340 Million in payroll



Manitoba Aerospace Industry

- Boeing Canada Operations
- Magellan Aerospace
- StandardAero
- 2 Engine Test Facilities
- 40 other enterprises



WHERE VISION TAKES FLIGHT



Industrial & Technological Benefits

ITB Policy Highlights

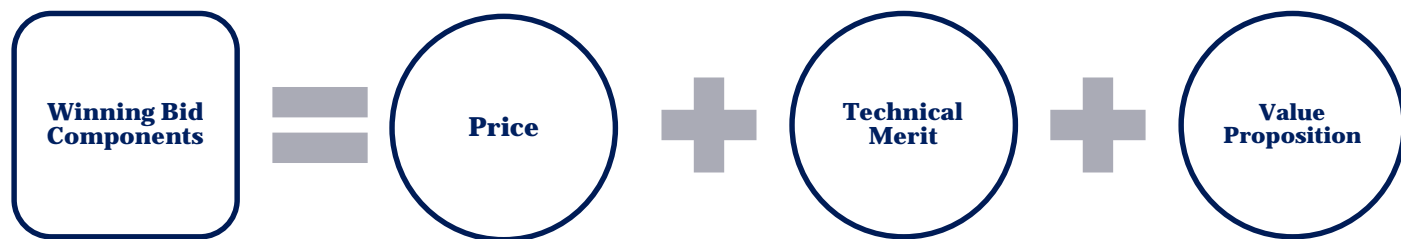
	Industrial and Technological Benefits (ITB) Policy
Scope of Coverage	Applies to: all eligible defence procurements over \$100 million; all eligible Coast Guard procurements over \$100 million and for which the National Security Exception applies; and eligible defence procurements over \$20 million, subject to a review. ~ 15 procurements per year
Overall Obligation	Undertake business activity in Canada = 100% of the contract value
Transaction Types	<ul style="list-style-type: none">• business activity directly related to the product or service being procured (direct)• other work not directly tied to the procurement (indirect)
Scoring at Time of Bid	<p>Rated Evaluation Criteria:</p> <ol style="list-style-type: none">1. Defence Sector2. Canadian Supplier Development3. R&D4. Exports <p>Weighted: generally 10% of overall evaluation score.</p>

ITB Policy Highlights

	Industrial and Technological Benefits (ITB) Policy
Identified Activities at Time of Bid	Generally 30% of the ITB obligation.
SME Obligation	Generally 15% of the ITB obligation.
Plans	Assessed as pass/fail: <ul style="list-style-type: none">• IRB Management Plan• Company Business Plan• SME Plan• Regional Plan
Enhanced Priority Technology List	At least 5% of contract value
Contractual Commitment	Yes
Policy/administrative features of IRB Policy	Multipliers

ITB vs IRB

The ITB Policy is a significantly more powerful government lever than the IRB Policy because it includes a Value Proposition which requires bidders to compete on the basis of the economic benefits to Canada associated with each bid. Previously, winning bidders were selected on the basis of price and technical merit. Now, the Government will also assess “Value Proposition.”



ITB Transaction Types – With Multipliers

ITB Transactions are related to Direct and Indirect Transactions and are a relevant to all RFPs with ITB proposal requirements.

Some Transactions have a multiplier attached to the direct Canadian Content Value (CCV) dollar. These are highly desirable however they do require a significant amount of planning and effort:

- Post-Secondary and Public Research Institution Transactions
- Consortium Transactions
- Investment Framework (IF) Transactions
- Venture Capital Fund Transactions

Post-Secondary and Public Research Institution Transaction 5X

8.4 Post-Secondary and Public Research Institution Transactions

8.4.1. A multiplier of five (5) is permitted on Transactions involving: cash contributions to Post-Secondary Institutions for research or the establishment of research chairs; investments in advanced technology skill development at Post-Secondary Institutions; and, collaborative research undertaken with Public Research Institutions.

Example – Assuming Transaction Meets Eligibility Criteria of: Causality, Timing, Incrementality and Eligible Party

Contractor Invests cash in training initiative with College	\$250,000
Contractor Invests in cash establishing a research chair at a University	\$50,000
Contractor Investments cash in a collaborative Research Project with Public Research Institution	\$200,000
Total Investment cash	\$500,000

Multiplier of Five and Total ITB Credit assuming all Eligible \$2,500,000

Defense Acquisition Guide

Royal Canadian Air Force has over thirty (30) procurement projects:

- Seven (7) aircraft types, estimated value of over \$6 Billion
- Unmanned aerial system (UAS) for surveillance and weapons delivery, estimated value at over \$1.5 Billion
- Aircraft Life Extension Project for six (6) service aircraft types, estimated at over \$4.5 Billion
- Other equipment and weapons system upgrades / acquisitions, estimated at over \$4.2 Billion

WHERE VISION TAKES FLIGHT



Introduction to Manitoba Aerospace Inc.

Manitoba Aerospace Inc.

- Created by the amalgamation of the Manitoba Aerospace Human Resources Council (MAHRC) and the Manitoba Aerospace Association (MAA) in April, 2016.
- Each founding organization had almost 25 years of operational history in the Province.



Manitoba Aerospace Inc.

- Mission

To support and promote the aerospace industry through business development, research and innovation, and human resource initiatives.

Current Priorities - 4 Pillars

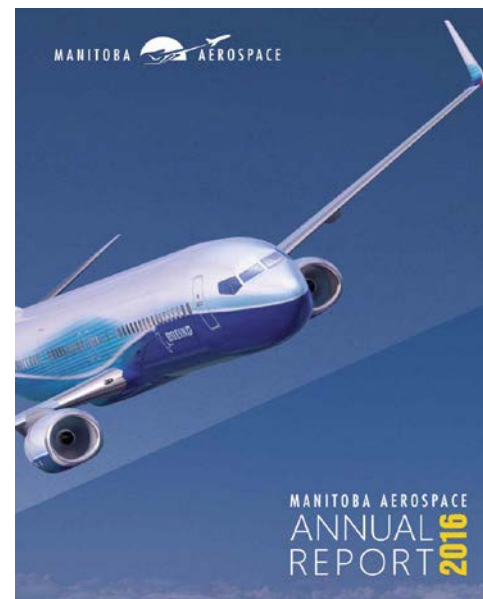
- 1) Workforce Development (Human Resources Committee)
 - Training of Existing Employees
 - Career Development - links to educational streams
 - Career Awareness - programs to attract the brightest students
 - Leadership Development
- 2) Promotion & Branding (Marketing & Communications Committee)
 - Aerospace Week - Free Press Supplement & various events
 - AAiM Day - Introduce grade 6 students to aerospace & aviation
 - Student Endowment Fund (Golf Tournament, Awards Dinner)

Current Priorities - 4 Pillars

- 3) Innovation, Research and Technology (MARTC)
 - CARIC Regional Office
 - Manitoba Technology Roadmap
 - Potential link to NRC's "Factory of the Future Program"
- 4) Supplier and Cluster Development
 - Competitive Edge Program
 - Industrial and Technological Benefits
 - Local Supply Chain for the Big 3 (Boeing, StandardAero, Magellan)

Manitoba Aerospace Inc.

- Committed to facilitating growth in Manitoba's Aerospace Industry Sector and beyond, through business development, training and human resources services, research and innovation, partnering with industry, individuals, institutions and governments



WHERE VISION TAKES FLIGHT



Questions and Answers

WHERE VISION TAKES FLIGHT



Manitoba Aerospace
1000 Waverley St
Winnipeg, MB R3T 0P3



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www.mbaerospace.ca

