Information, Networking and Engagement Event on Canadian Aerospace Initiatives Post Emerson

Organized by Aerospace Industries Association of Canada
In collaboration with CRIAQ, GARDN, NRC and NRC-IRAP and the provincial associations: AIAC-Pacific, WestDef, Manitoba Aerospace Association, Ontario Aerospace Council in Vancouver, Calgary, Winnipeg, Toronto and Montreal
March 2014
Key presenters

- Fassi Kafyeke, Director, Strategic Technologies, Bombardier Aerospace
- Jonathan Hack, Manager, Strategic Technologies, Bombardier Aerospace
- Pierre Rioux, Manager, Technology & Flight Sciences, Bell Helicopter Textron
- Yves Rabellino, Director, Strategic Cost Management, Research & Technology and Support to Operations, Pratt & Whitney Canada
- François Provencher, Manager, Technology Collaboration Office, Pratt & Whitney Canada
- Clément Fortin, President and CEO, Consortium de Recherche et d’Innovation en Aérospatiale du Québec (CRIAQ)
- Sylvain Cofsky, Executive Director, Green Aviation Research and Development Network (GARDN)
- Jerzy Komorowski, General Manager Aerospace, NRC
- NRC-IRAP:
  - Tom Matulis, Director NRC-IRAP Ontario, Aerospace
  - James Prendergast, Industrial Technology Advisor, NRC-IRAP, Winnipeg
  - Calvin Koskovich, Industrial Technology Advisor, NRC-IRAP, Alberta
  - Denis Lacroix, Industrial Technology Advisor, NRC-IRAP, Québec
- Alain Aubertin, Vice President, Business Development, CRIAQ
- Lucie Boily, Vice President Policy and Competitiveness, Aerospace Industries Association of Canada, (AIAC)
Objectives and Program

Part 1
• Post-Emerson – Where are we now?

Part 2
• The Technology Support Landscape in Canada
• National Aerospace Research and Collaboration Network

Part 3
• Open discussion – engagement and dialogue
Where are we?

Phase III Report Implementation
25 Recommendations include:
- Market Access and Development
- Supply Chain Development
- Technology
  - Technology as a country priority
  - Technology Demonstration
  - Research Collaboration Network
    - CANNAPE
- Defence Procurement
- People and Skills
- Small Business
- Space
National Supply Chain Initiative

Recommendation to Co-fund national supply chain development initiative:

- AIAC Supply Chain Committee/ 3rd Party Report Recommendation to Support Single National Supplier Development Program based on MACH framework
- AIAC recommendation to GoC end October
- Key role for provincial associations and governments
- National implementation will require contributions from participating provincial governments
Focus on Technology

- Fundamental research
- NETWORK
- Push & Pull: Technological needs

GARDN
TDP
SDTC

SADI

Product development, manufacturing, in-service, end of life

Program launch
Entry into service

Push & Pull: Business opportunities
Going forward with the National Aerospace Collaborative Network
From Vision to Reality

- Emerson’s Recommendation
- Minister Moore’s commitment
- Industry’s Vision
- What does success look like?
- How does it work
- How do I get involved
Emerson and Moore

- Emerson Report Recommendation #5
  - It is recommended that the government co-fund a Canada-wide initiative to facilitate communications and collaboration among aerospace companies, researchers and academics.

- Minister James Moore announcement – Dec 2, 2013
  - “I am also pleased to announce today the government's support for using the Consortium for Research and Innovation in Aerospace in Quebec's (CRIAQ) approach to collaborative research as the basis for a new national aerospace research and technology network.”
Industry’s Vision for the Network

- Aerospace competitiveness through collaboration and innovation
- Excellence in science & technology
  - Enhance knowledge base (Researchers, HQP and Industry)
- An open environment for its governance
  - Welcome close working relationships with existing R&D consortia
- Long term ambition to mature technology up to TRL-7
- Industry-led
- Supported by provincial governments
- To be the voice of Canada for aerospace R&TD collaboration

A dynamic national aerospace R&I network
Network Parameters and Scope

- Focus on projects (TRL 1-5) and networking
- Focus on building strategic aerospace research capability across Canada
- Consolidate and streamline R&T efforts in aerospace
- Network reach: Science & Technology, R&T Infrastructure and Training of HQP through research/projects
BENEFITS FROM NETWORK PROJECTS

• Answer to a growing need for pre-competitive aerospace R&D.

• Access test equipment to perform testing and analyses.

• Work with the best researchers in universities and research centers.

• Advantageous leverage for industry (8:1).

• Train high qualified personnel (Students are future employees).

• Maintain alignment of University R&D with Aerospace Industry needs.

• Increase the competitiveness of the Canadian aerospace industry.
Translating Vision into Success

- Characteristics of Success:
  - Open Innovation
  - Partnerships across Canada
MANU-601 – a national success

Additive Manufacturing Technologies for Aerospace Components

Financial Partners

Industrial Partners

[Logos of various companies]
MANU-601 “Additive Manufacturing Technologies for Aerospace Components”

Gathers all the elements that have made CRIAQ a success as a unique model of open innovation in terms of:

- **Strengthening the competitiveness of the aerospace industry** => AM is considered as the 3rd manufacturing revolution
- **Collaborative research** => One of our biggest projects
  - 13 partners including 8 industries (OEMs, intermediate members, SMEs) and 5 academic partners (anglophone and francophone universities, research centre, college)
- **Training through research** => 10 students who will become HQP to serve the industry
- **Financial leverage** => 10 to 1 on overall project
- **A project in line with the creation of The Network** => 2 partners located in Saskatchewan (Canadian Light Source) and Ontario (Liburdi – SME).
Pilot Project: TRL 4+

MANU_604 “Additive manufacturing”
• 1 year exploratory project

Financial Partners

Industrial Partners

Research Partners
**Pilot Project : TRL 4+**

**MANU_604 “Additive manufacturing”**

- BA, BHTC and P&WC have initiated a 1-year project on Additive Manufacturing (AM) (MANU 604) to define a high TRL program on AM development.

- **Guiding principles:**
  - **Share and Improve** collaborative technology management best practices.
  - **Increase speed of execution and flexibility** to maintain relevance for future years.
  - **Increase interaction between universities and industries** by embedding researchers in industries.
  - **Maximize incentives for industries to use academia** and for academia to add value.
  - **Develop an innovation ecosystem** where all members have capability to learn and adapt.
Pilot Project : TRL 4+

MANU_604 “Additive manufacturing”

Work and management structure:

- 4 Post-doctoral fellows working on-site in industry as part of Integrated technology teams
- Matrix organization structure where knowledge is shared among the 3 industries
- Three-tiered management structure: Steering Committee, Project Management Office and Integrated technology teams.
- Bi-monthly reports (at all three levels) by teleconference and constant monitoring of progress
- More than 25 industry specialists involved
Typical Project: COMP-1

COMP-1: Out-of-autoclave composite manufacturing

Financial Partners

Industrial Partners

Research Units
COMP-1: Out-of-autoclave composite manufacturing

The project gathers all the elements that have made CRIAQ a success as a unique model of open innovation in terms of:

- **Collaborative research** => 9 partners including 3 industries and 5 academic partners

- **Training through research** => 15 students (4 Undergraduates, 7 Masters, 3 Ph.D, 1 Post-doc) who will become HQP to serve the industry

- **Collaborative environment** =>
  - Prof. sabbatical leave at Ind. partner (9 months)
  - Direct technological transfer to active industrial programs

- **Financial leverage** =>
  - 8 to 1 on overall project
  - $60 000 investment of one partner leads to $1,000,000 project with related IP
TRL Scale – Technology Readiness Level

- **TRL 9**: Actual system “flight proven” through successful mission operations
- **TRL 8**: Actual system completed and “flight qualified” through test and demonstration (Ground or Flight)
- **TRL 7**: System prototype demonstration in a space environment
- **TRL 6**: System/subsystem model or prototype demonstration in a relevant environment (Ground or Space)
- **TRL 5**: Component and/or breadboard validation in relevant environment
- **TRL 4**: Component and/or breadboard validation in laboratory environment
- **TRL 3**: Analytical and experimental critical function and/or characteristic proof-of-concept
- **TRL 2**: Technology concept and/or application formulated
- **TRL 1**: Basic principles observed and reported
Research Themes

Avionics and control
- AVIO

Autonomous systems
- AUT

Product and system development, productivity
- PLE-P

Air operation and human factors - organizational innovation
- OPR

Acoustics, noise control, environment, security, icing
- ENV

Diagnostics, pronostics, surveillance of components
- DPHM

Interior design
- INTD

Optimisation of the supply chain and lean production
- LEAN

Manufacturing and assembly processes, quality assurance
- MANU

Modeling, simulation, multidisciplinary optimization
- MDO

Composites
- COMP
With provincial funding “Classic- TRL1-4”

50% NSERC
25% In-Kind
25% Industry

Prov. funds
“TRL 1-4” without provincial funding

- Industry funds: 33%
- NSERC: 67%
National Network – coupled project structure

Project A

“CRIAQ classic” – TRL 1-4
Going deeper into knowledge and technology understanding

Project B

TRL 4+
Technology maturation

OR

NSERC

In-kind

Industry

CRIAQ Prov. funds

33%

67%

In-kind

NSERC

Industry funds

Industry Canada

$ PME

$ P ME

50%

50%

In-kind

Industry
Industry engagement – Key milestones

- 1st National Network Forum, April 16, 17, 2014 jointly with CRIAQ’s 7th Forum April 16, 17
- Canadian Aerospace Summit
  - November 18 and 19th 2014
  - November 17th – Technology pre-program including

Join forces to the benefit of all industry
7th CRIAQ Forum

Concurrent with …

… 1st National Network Forum
Project ideas Presentation

- During the **plenary session**:
  - Large and Medium-sized companies members
  - SMEs members
  - Universities, research centres members (with industrial endorsement (letter of support))
  - National and International collaborators: through an industrial member
- New project ideas can emerge from **Thematic Workshops**

*presentation by a representative, adjustments could be made depending on the number of proposed project ideas
Project Proposal Submission: template use

- Project idea title
- Network/CRIAQ theme
- Technology Readiness Level
  - CRIAQ Classic model (TRL 1 @ 4)
  - TRL 4+
- Targeted project duration
- Needs and research objectives description
- Expertise wanted
- Potential partners
- Opened to international collaboration, project continuation

- 2 pages/ project template
- To submit in English and French version (simultaneous distribution)
- Submit before deadline to projets@criaq.aero
From proven model

- Benefits of proven model to whole of the Canadian industry...
Inclusive Governance:

Industry-led with strong academia partnership

Members of the Board
OEM, Tier1 VP of Eng
CTO
SME president
Eng faculty Dean
VP research

Board of Directors
23 members
Executive Committee
12 members (7 + 5)

Strategic Techno Committee
AIAC led - open
12 members

Scientific Committee
12 members

Research Committee
All members

IP Agreement Committee
7 members

Network success will greatly rest on the shoulders of individual members to the board, committed and engaged
BoD seat distribution

- Industry-led with strong academic involvement
  - 60% Industry (12) + 40% Academia (incl. colleges) (8)
- Ensure regional representation & encourage participation to Network
  - 40% regional seats and 60% participant seats
- Regional seats (8)
  - 1 Industry + 1 Academia for each region (East, Quebec, Ontario, West)
  - Elected by NETWORK members from each region
- Participant seats (12)
  - 4 University/college + 8 Industry
  - Elected by Network members at large
  - Must include two seats for SMEs
Hybrid, Network extends its governance to interested programs and interfaces with the structure of existing organizations.
Deployment

Head office
Full time office
Part time office

With maturity Network local footprint will evolve
A proven model - a connected community

2012 CRIAQ researchers forum

Recommendation
Next Steps

• Board and AGM meeting
  • Membership

• Engage the Community
  • Tour across Canada

• Submit your projects –
  • Forum April 16, 17th
• A one-time opportunity for Canadian industry to join forces and create the best national aerospace collaborative research network

• National engagement is key to the success of the Network
Invitation to dialogue