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Wireless Data Acquisition at NRC Aerospace



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Group Leader, EFI
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National Research
Council Canada

Conseil national
de recherches Canada

Canada

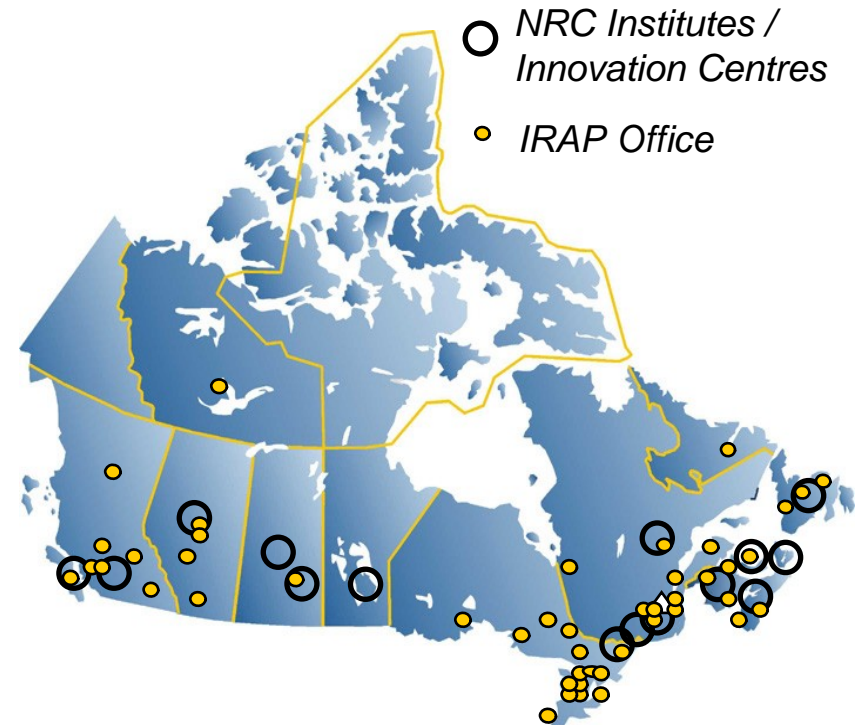
Outline

- National Research Council (NRC)
- NRC Aerospace
- NRC Aerospace as a Collaborator
- Flight Research Laboratory (FRL)
- FRL Aircraft
- Wireless Measure of Attack and Sideslip
- Wireless Measure of Flapping
- Wires for Simulator Model Development
- Wireless Automated Integration of Transducers (WAIT) Overview
- Summary

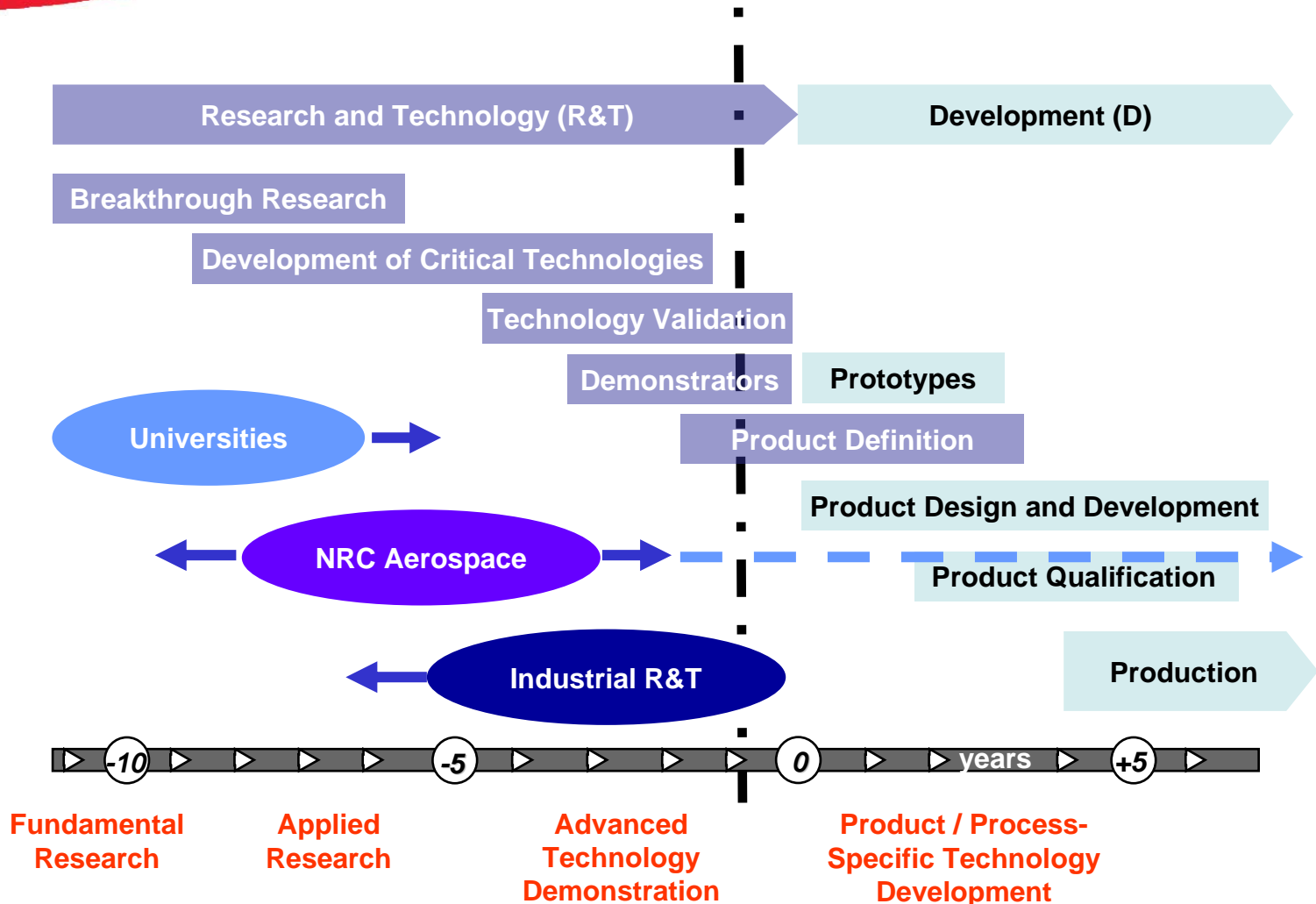


NRC – a national institution

- 4100 full-time employees, 1200 guest workers
- 19 research institutes, 2 technology centres (CHC, CSTT)
- Industrial Research Assistance Program (IRAP)
- Canada Institute for Scientific and Technical Information (CISTI)



Our role in the R&TD continuum



Examples of collaborative work

- Regional jets (Bombardier)
- Truck aerodynamics (Climate Change Initiative)
- Microgravity experiments (CSA)
- Aircraft Icing Research Alliance (Environment Canada, NASA)
- ICARTT air pollution study (Environment Canada)
- Aircraft life assessment using Holistic Structural Integrity Process (DND)
- Design and qualification of spacecraft structures (CSA)
- Flexible robotized spar assembly system (Avcorp)
- Multi-axis creep-feed grinding of carbide tools (Minicut)



Research in wide-ranging disciplines

- From nano to macro (nano-layered coatings research from first principles to aircraft testing in flight)
- From cognitive science involving human subjects to cooperating robots (cockpit symbology to robots in manufacturing)
- From cold to very hot (aircraft icing to combustion in turbines)
- From land to space (bridge aerodynamics to RADARSAT)

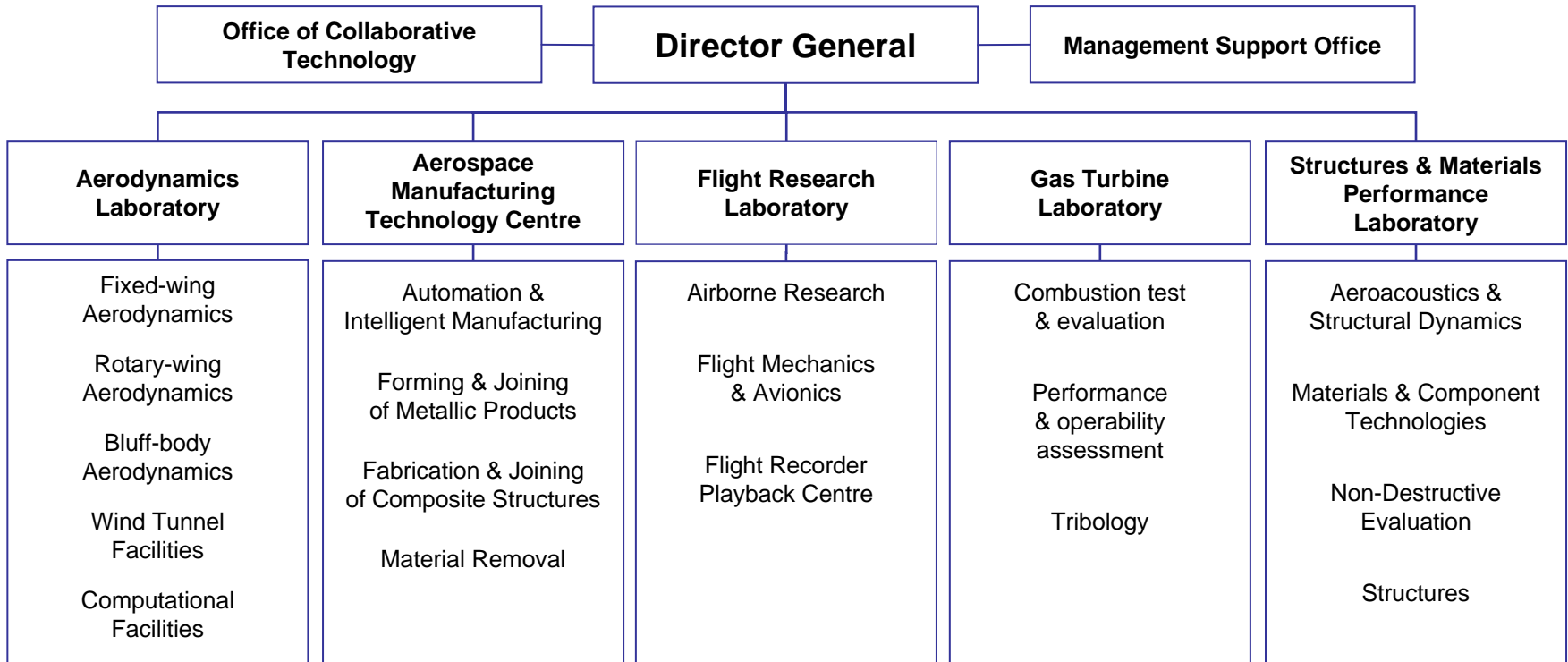


Flexible business arrangements

- Negotiated contracts & partnerships on case-by-case basis
- Both Canadian and foreign clients
- Fee-for-service contracts
- Collaborative research agreements
- Licensing arrangements (technologies usually from core research activities)



NRC Aerospace Structure



Flight Research Laboratory

Expertise and facilities in full-scale aircraft-based experimentation for flight test and airborne research

- Flight mechanics & avionics
- Airborne research
- Flight Recorder Playback Centre

Capabilities:

- Flight test
- Modeling and simulation
- Aircraft systems evaluation
- Airborne sensing of the earth and atmosphere
- Aircraft accident and incident analyses



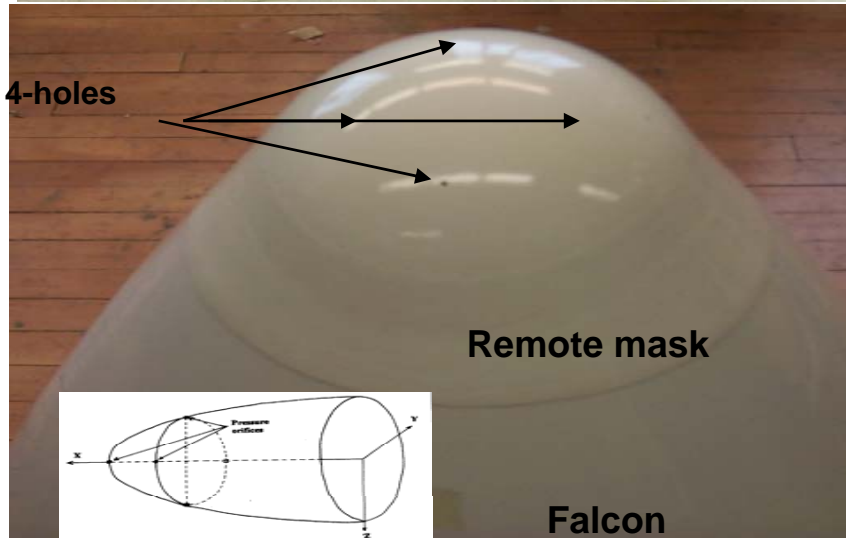
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FRL Aircraft

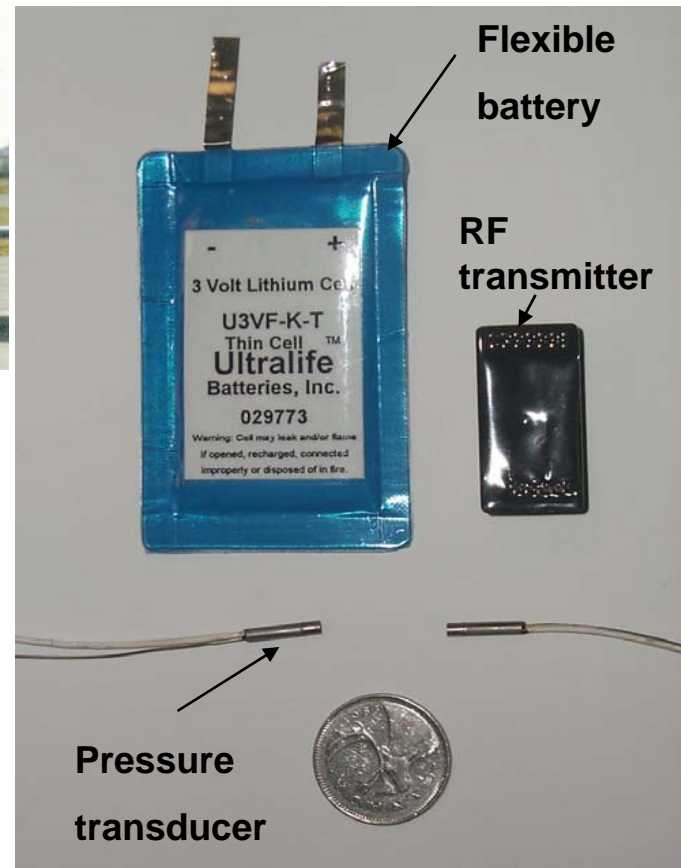


Wireless Sensing of Angles: Attack and Sideslip



Remote mask

Falcon
nosecone



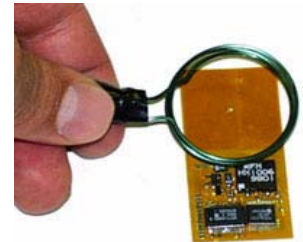
Flexible
battery

RF
transmitter

Pressure
transducer



RF
receiver

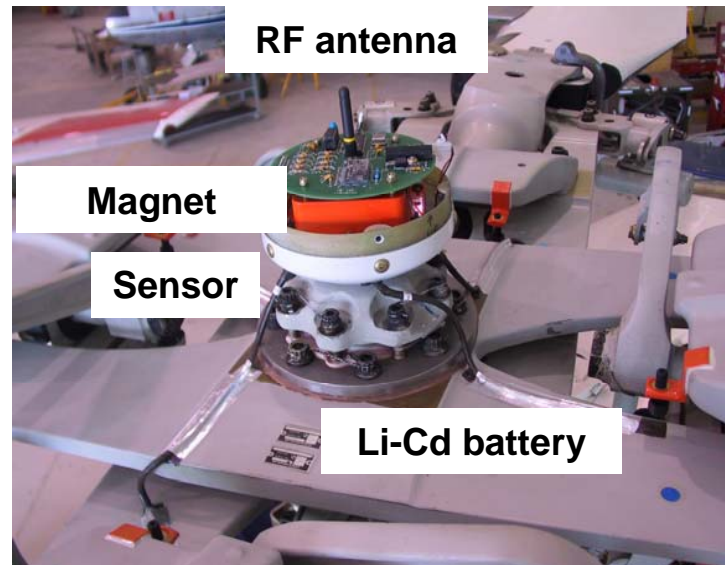
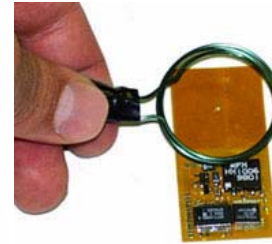


Nosemask

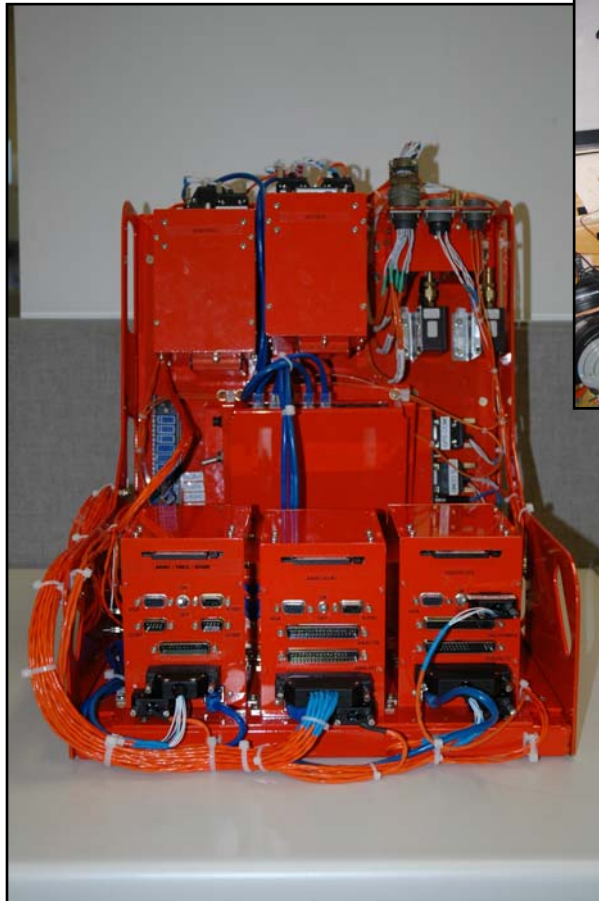


Wireless Sensing of Flapping Angle

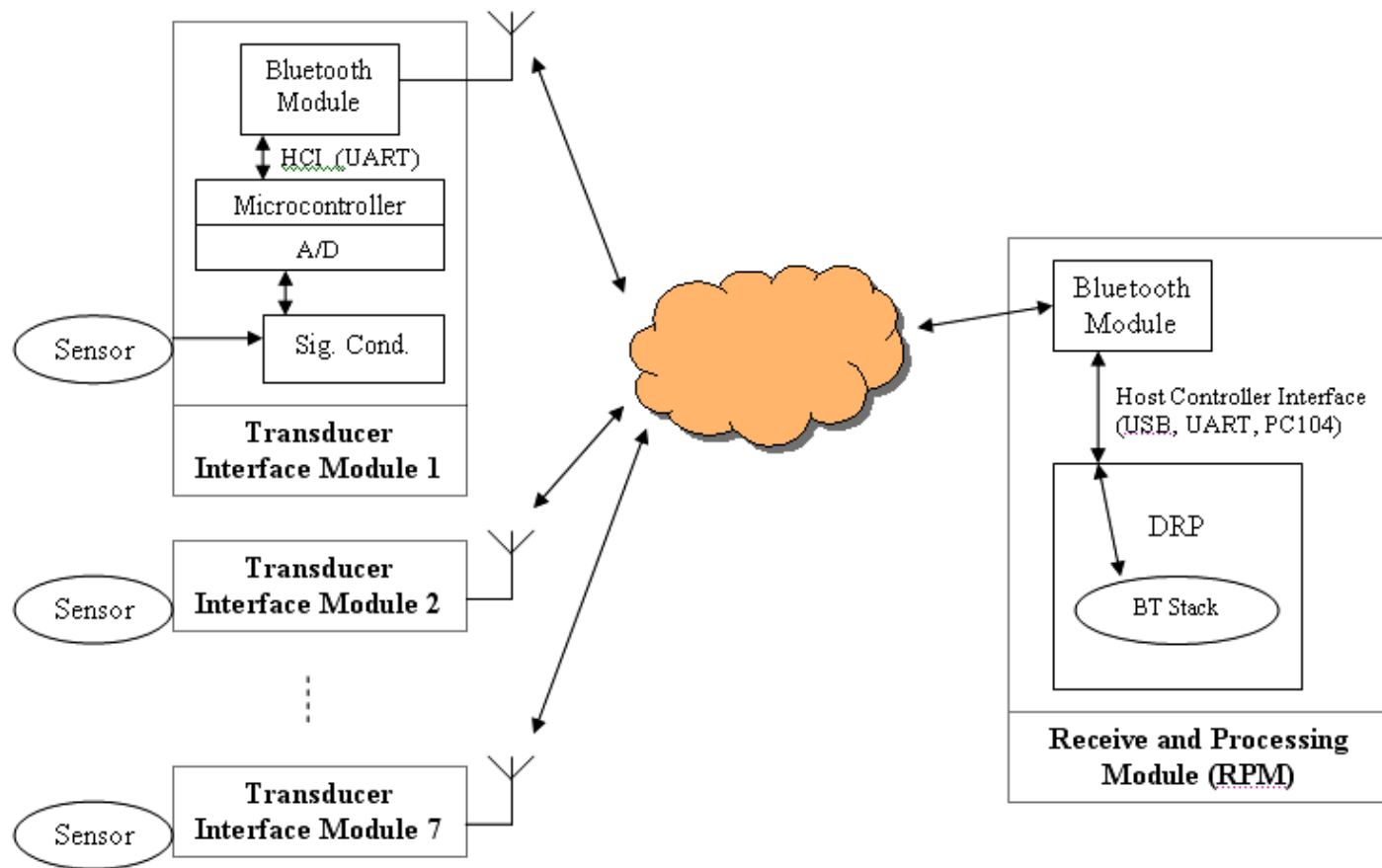
- Composite cover
- RF transmitter
- 9 volt battery
- Hall effects magnetic sensor



Wires for Simulator Model Development



Wireless Automated Integration of Transducers (WAIT) Overview



Summary

- Collaborative Approach
- Aircraft Availability
- User Technology Development



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Questions?



A stylized graphic in the top left corner featuring a dark blue curved shape with a red maple leaf inside. A white horizontal line and a curved orange line intersect within this shape. A white starburst is positioned to the right of the shape.

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From **Discovery**
to **Innovation...**

Science —at work for— Canada



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Council Canada

Conseil national
de recherches Canada

Canada^{🇳🇪}