Wireless Data Acquisition at NRC Aerospace

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• 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

- **Research and Technology (R&T)**
  - Breakthrough Research
  - Development of Critical Technologies
  - Technology Validation

- **Development (D)**
  - Demonstrators
  - Prototypes
  - Product Definition
  - Product Design and Development
  - Product Qualification
  - Production

- **Universities**
- **NRC Aerospace**
- **Industrial R&T**
  - Fundamental Research
  - Applied Research
  - Advanced Technology Demonstration
  - Product / Process-Specific Technology Development
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)
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
Wireless Sensing of Angles: Attack and Sideslip

- 4-holes
- Pressure transducer
- Flexible battery
- RF transmitter
- RF receiver
- Remote mask
- Falcon nosecone
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
Questions?