

## Convair-580 Research Aircraft

The NRC Institute for Aerospace Research (NRC Aerospace) Convair-580 research aircraft is a multi-purpose flying laboratory supporting an extensive range of projects. The NRC Convair-580 is equipped with state-of-the-art instrumentation for measuring atmospheric state (temperature, pressure, humidity and three-dimensional wind) and aircraft state parameters. In addition, through partnerships with other agencies, NRC has integrated sensors and systems for advanced remote sensing, in-situ cloud physics studies, and aeromagnetics measurements.

Since its integration into the NRC fleet, the Convair-580 has helped advance Canadian scientific knowledge in diverse national and international collaborative projects that include:

- environmental studies
  - detection and characterization of aircraft icing
  - extratropical transition of hurricanes, arctic storms and severe weather systems
  - aircraft performance in severe weather
  - the transport of pollution and air quality in urban areas.
- remote sensing systems and algorithm development
  - spotlight synthetic aperture radar development
  - airborne infrared spectroscopy and short-wave IR hyperspectral imaging for target detection and classification
  - aircraft icing detection using remote sensing.
- aeromagnetics
  - military target detection
  - precision aeromagnetics including horizontal gradiometry and in-flight sensor qualification.

### Up-to-date systems

NRC Aerospace is constantly developing and improving the aircraft's on board installations. Project specific



NRC Convair-580

research instrumentation has been combined with our suite of standard research support capabilities that includes high-speed data acquisition systems, air sampling inlets, multi-camera video recording systems, multiple navigation sensors, under-wing and wingtip mounted instrumentation sites.

Recently, we have integrated a Short Wave Infrared (SWIR) hyperspectral imaging system that has 160 channels covering the spectral ranges of 1000 nm to 2450 nm. We are also in the final development stage of a dual-frequency (W and X-band) fully polarimetric Doppler radar system. This NRC Airborne W and X-band radar system (NAWX) will be integrated onto the Convair by January 2006.

### Experience and versatility

The Convair is backed by an experienced technical team whose focused, responsive airborne research and experimentation can meet the needs of a broad client community.

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### Technical specifications

Research aircraft:	<ul style="list-style-type: none"><li>Convair-580 twin engine, long range (up to 5 hours) turboprop</li></ul>
On-board installations (NRC Aerospace and its collaborators Environment Canada and Defence Research and Development Canada):	<ul style="list-style-type: none"><li>Workstation layout for easy installation of experiments</li><li>Multiple navigation sensors (GPS and INS)</li><li>Satellite communication system for data, voice and fax transmission</li><li>Air inlet and exhaust system for atmospheric sampling</li><li>Wing-mounted pylons for 10 canister-mounted instrument stores</li><li>Multi-camera video recording system</li><li>Arrays of cloud microphysics probes</li><li>LICOR water vapour and CO<sub>2</sub> measurement system</li><li>Dual dropsonde system for wind, temperature and humidity profiling</li><li>Aeromagnetics for geophysical exploration</li><li>Upward and downward looking radiometers</li><li>Spotlight radar for ship/ground target classifications</li><li>Infrared imaging spectrometer</li><li>Short Wave InfraRed (SWIR) hyperspectral imaging system</li><li>Cloud radar systems (W and X-bands system NAWX and dual-view Ka-band)</li></ul>
Special configurations:	<ul style="list-style-type: none"><li>As required</li></ul>



Researchers on the Convair-580 collecting icing data



Cloud physics probes mounted on wing pylons

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