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The Convair 580 SAR Facility – Recent Activities and Future Opportunities

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ESTS Airborne Remote Sensing

- DC-3, C-GRSB
 - Oil spill remote sensor R&D
 - Operational emergency and oil spill response



- Convair 580, C-GRSC
 - Available for rapid response, all weather oil spill mapping
 - Advanced SAR data collection flights for federal departments and agencies - VNR

Convair 580 SAR Facility

- EC took over operation of the CV-580 in November 1996 from CCRS/NRCan
- Objectives
 - Retain advanced SAR facility capability for federal government
 - Operational all-weather oil spill response capability
- Initially operating under commercial and private state operating certificates

C-GRSC



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CV 580 SAR System

- Advanced airborne SAR system
 - C- and X-band systems
 - 6 m resolution
 - Variable viewing geometry (nadir, narrow, wide)
- C-band full polarimetric capabilities
HH, HV, VH, VV polarizations
- C-band interferometric modes (InSAR)
 - Along-track
 - Across-track



SAR Transmitters/Receivers



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SAR Data Products

- Realtime and post-flight data streams
- Real-time imagery recorded onto hard disk and 8 mm digital tapes, VHS video tape, imagery available on CD in common formats (e.g. tif, jpg), also 64-level grayscale hardcopy



SAR Data Products

- Signal data - Post-flight data processing
 - Recorded on digital video tape (helical scan)
 - Transcribed onto 8 mm tapes for processing
 - Processing at DRDC-O (includes geometric and radiometric calibration)
- Now recorded directly onto hard disk to enhance reliability and avoid need for timely transcription process
 - Recent development courtesy DRDC-O
 - (Dr. Chuck Livingstone)



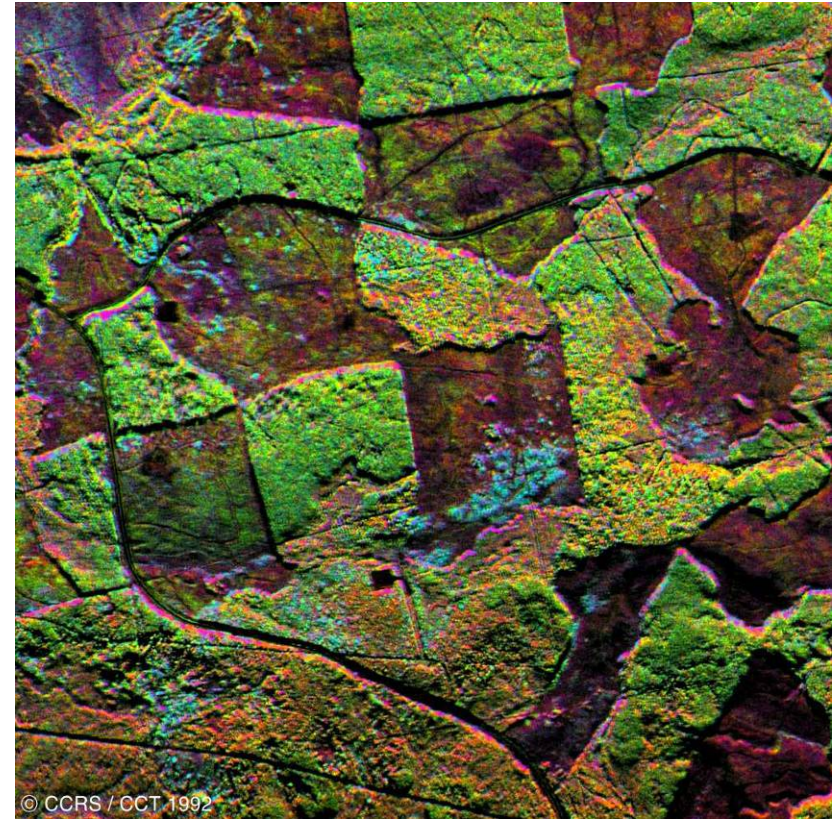
Convair History (CCRS/NRCCan)

- The Convair 580 SAR system has been used for the development of SAR data processors, algorithm development, the pre-launch simulation of space-borne SAR systems (e.g. RADARSAT-1, ERS-1 and JERS-1) and the testing and evaluation of new SAR modes (polarimetric and interferometric)

Environment Canada Convair 580 - RADARSAT-2

- Canadian Space Agency undertook a flight program with the Convair-580 SAR in the early 2000s to help the SAR user community prepare for the advanced features of RADARSAT-2
 - Enhanced polarization capabilities
 - including like-polarization, cross-polarization, dual-polarization, and in the polarimetric mode (HH + VV +HV +VH)
 - GMTI/MODEX
- Data collection flights over a variety of targets to simulate RADARSAT-2 data
- Provided data sets and polarimetric software to user community

Polarimetric Applications



Images courtesy
CCRS/CCT



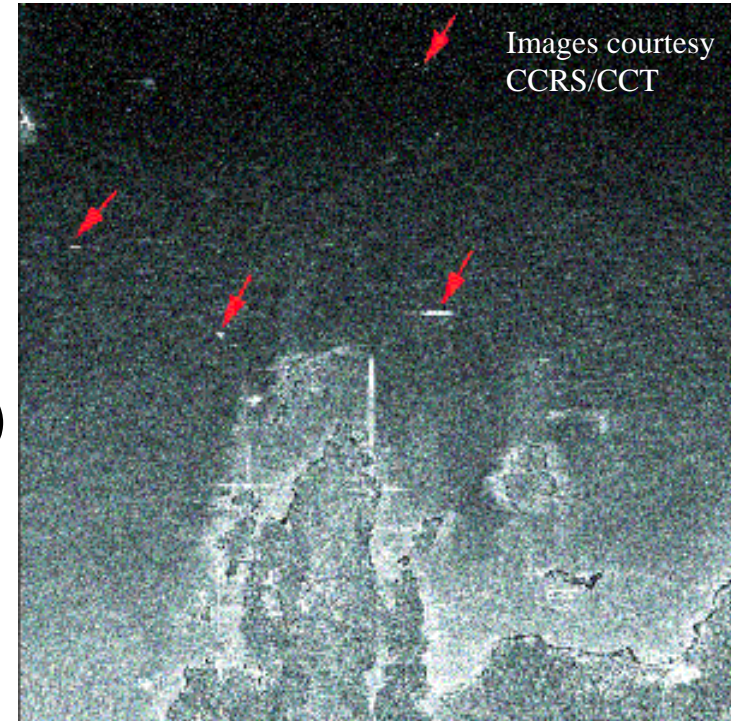
CV 580 – Late 1990s & Early 2000s

Clients

- CSA
- CCRS
- DREO / DRDC-O
- TSB
- EC-MSC (Canadian Ice Service)
- AgCan
- GSC

SAR Modes

- Polarimetric, InSAR / GMTI, Bistatic, X/C 4-channel, C 2-channel Envisat simulation, RADARSAT-2 simulation



Environment Canada – Late 2000s

- DND AIMP Radar Development and Testing Program
- Replacement for Aurora Search and Rescue Radars
- Economical alternative
 - Use existing SAR pedestal to mount new AIMP radar
 - Construct new larger radome
 - Flight testing and certification of radome
 - Numerous flights in Ottawa area & Maritimes
 - Advanced SAR modes



Late 2000s – DRDC-O

- DRDC-O Dr. Chuck Livingstone
- C-band fully polarimetric SAR
- Flights in Ottawa area and 3 week acquisition program on west coast, based out of Victoria, BC
 - Under-flights of RADARSAT-2
 - GMTI mode
 - Testing of new solid-state data recording system
- 2nd maritime flight program, east coast

Current and Future Opportunities

- DRDC-O flight program (Chuck Livingstone) late summer early fall 2010

The Future?

- Other SAR or Electro-Optical sensor testing?
- Satellite sensor validation flights?

Thanks!! Convair Support

- Aircraft Flight Operations, Maintenance
 - Bryan Healey, Bill Chevrier, Doc O'Connor, Theo van Westerop, Iain Bogie, John Mintha
- Flight Planning/Project Coordination
 - Bill Bayer, Bryan Healey, Bill Chevrier
- Operational Support
 - Lloyd Gamble, Dave Roy, Ina Henry
- Scientific Support
 - Bob Hawkins, Chuck Livingstone, Kevin Murnaghan, Paul Daleman ...
- Operators/Sensor Maintenance
 - Reid Whetter, Doug Percy, Richard Marois
- Partners
 - CSA Daniel Delisle
 - DRDC-O, CCRS, RSI, EC/CIS, DND/AIMP, NRC/IAR

Questions?

