

# Science and Aviation Objectives

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Environment  
Canada



Transport  
Canada



The NRC Convair-580 flight operation and data collection strategy will be aligned to support the aviation objectives:

<b>Aviation Objectives</b>	<b>Priority</b>
<b>E1: Characterize statistics of TWC and particle size for FAA/EASA regulatory objectives</b>	<b>P0</b>
<b>E2: Flight-Deck Recognition of the High-IWC Environment</b>	<b>P2</b>
<b>E3: Development of Tools to Nowcast the High-IWC Environment</b>	<b>P1</b>

The Convair-580 has a suite of tools to support E1 & E2

# Science Objectives

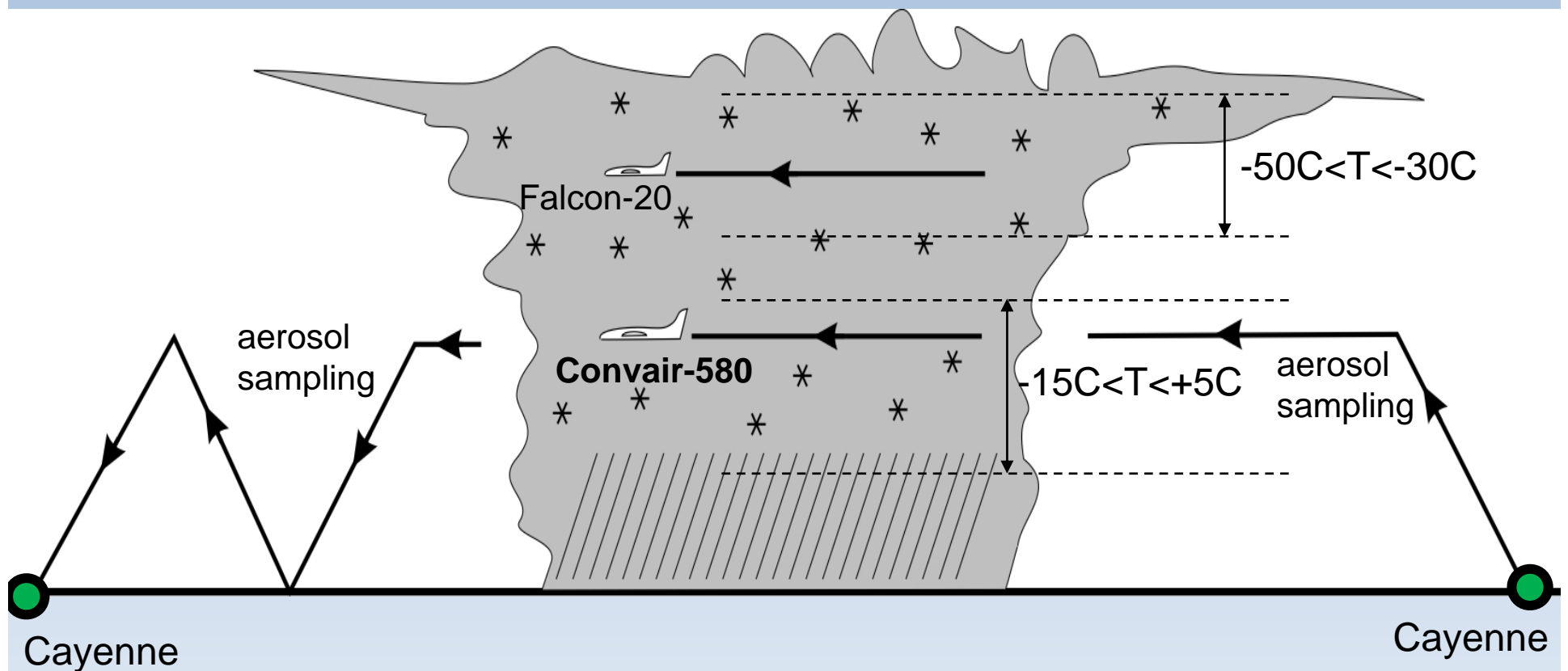
Science Objectives	Priority
S1: Characterize the microphysical and thermodynamic properties of core or near-core regions	P1
S2: Determine the small ice particle formation mechanisms and importance to bulk microphysical properties	P2
S3: Determine the temporal and spatial evolution of the mixed-phase	P2
S4: Validate and improve ground remote sensing algorithms of cloud properties	P2
S5: Validate and improve satellite remote sensing algorithms of cloud properties	P1
S6: Improve cloud resolving model simulations	P2
C7: Characterize aerosol properties in the vicinity of tropical storms	C
C8: Determine level of convection initiation	C
C9: Remote sensing signatures of high ice water content (multi-frequency and multi-parameter radar, lidar and radiometer)	C
C10: Development and validations of particle detector sensor (PDP)	C



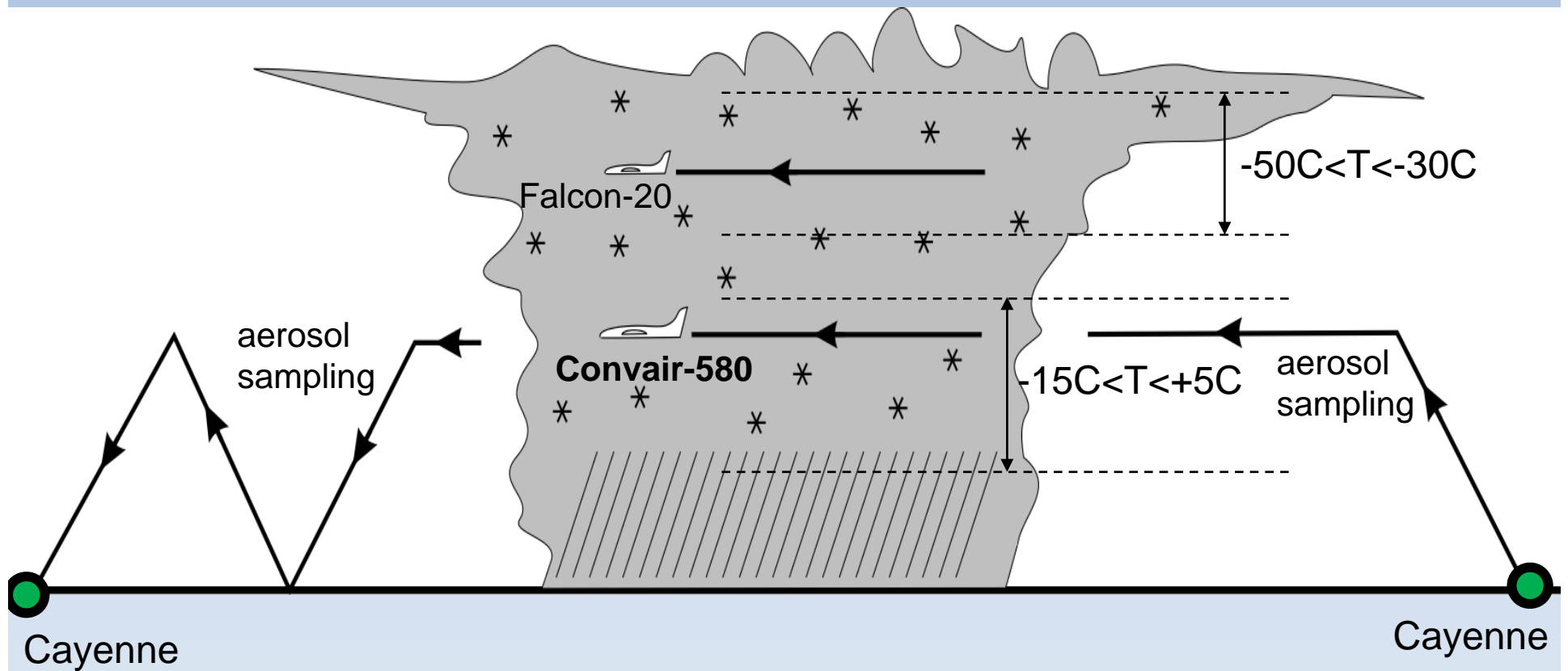
- Previous studies showed that tropical storms have significant microphysical variability both in horizontal and vertical directions, which results from coupling dynamics and cloud microphysics.
- Understanding of dynamics and microphysics of convective storms from in-situ measurements can be facilitated simultaneous sampling at several levels.
- It is proposed synchronous cloud sampling by the Falcon-20 and Convair-580 at different levels.

<i>Convair-580</i>	<i>primary level</i>	$T = -10C$
	<i>optional</i>	$T = +5C, 0C, -5C, -15C$
<i>Falcon-20</i>		$-50C < T < -30C$





- Challenges of vertical synchronization of two aircrafts flying at different speed.
- Sampling strategy need to be elaborated



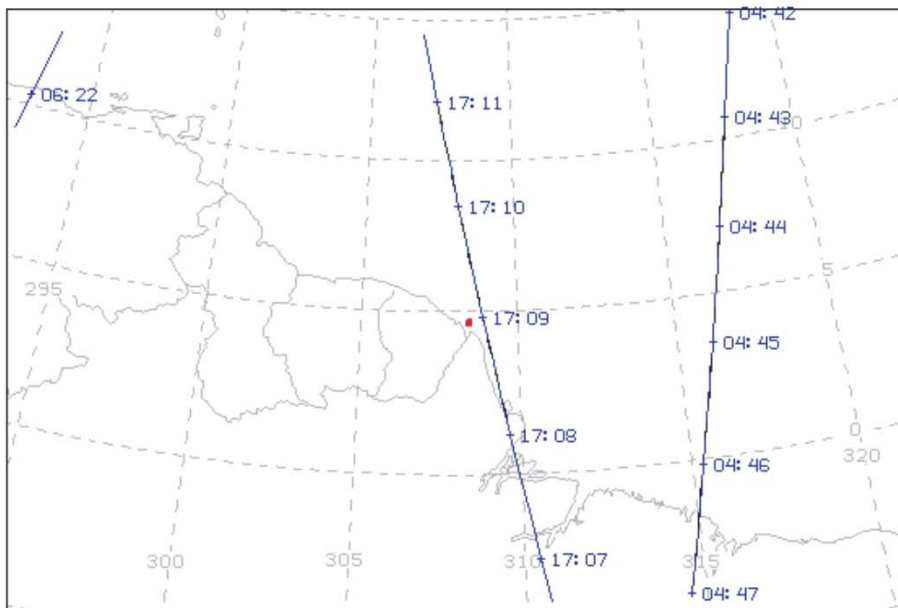
Perform aerosol sampling on approach to the operation area and on the transit back to Cayenne

# Attempt aligning the Convair-580 flight with the CloudSat overpasses in the vicinity of Cayenne on 18 or 25 May 2015

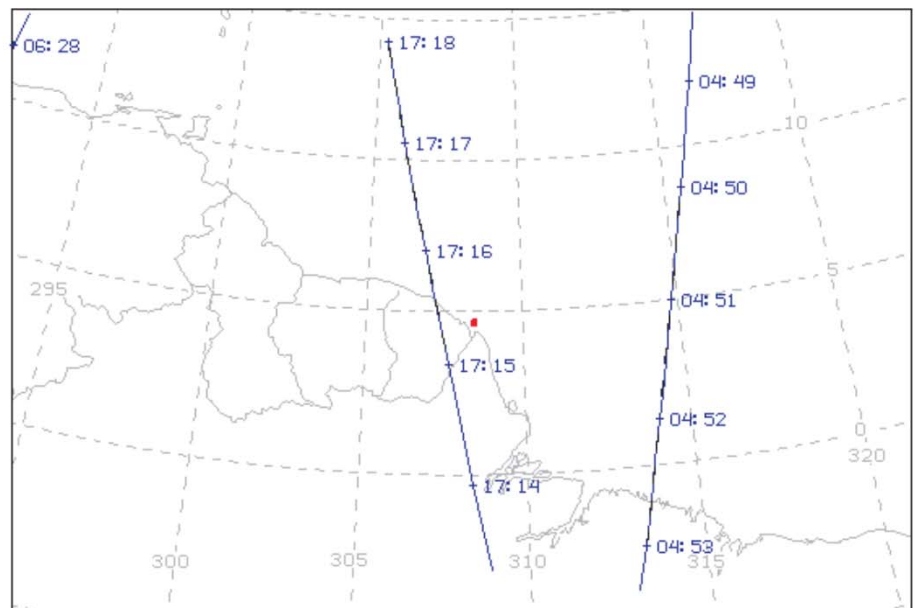
## Aviation Objective E3: Development of Tools to Nowcast the High-IWC Environment

18-May-2015

25-May-2015



CLOUDSAT 2015/05/18 UTC CLOUDSAT ORBITAL PREDICT PLOT EPOCH DATE: Mar-8-2015  
lat: 5 lon: 308 res: 10 km



CLOUDSAT 2015/05/25 UTC CLOUDSAT ORBITAL PREDICT PLOT EPOCH DATE: Mar-8-2015  
lat: 5 lon: 308 res: 10 km

Thank you