

# AERONAUTICAL INFORMATION CIRCULAR 18/07

## INTRODUCTION OF AUTOMATIC DEPENDENT SURVEILLANCE BROADCAST (ADS-B) AIRSPACE IN THE VICINITY OF HUDSON BAY

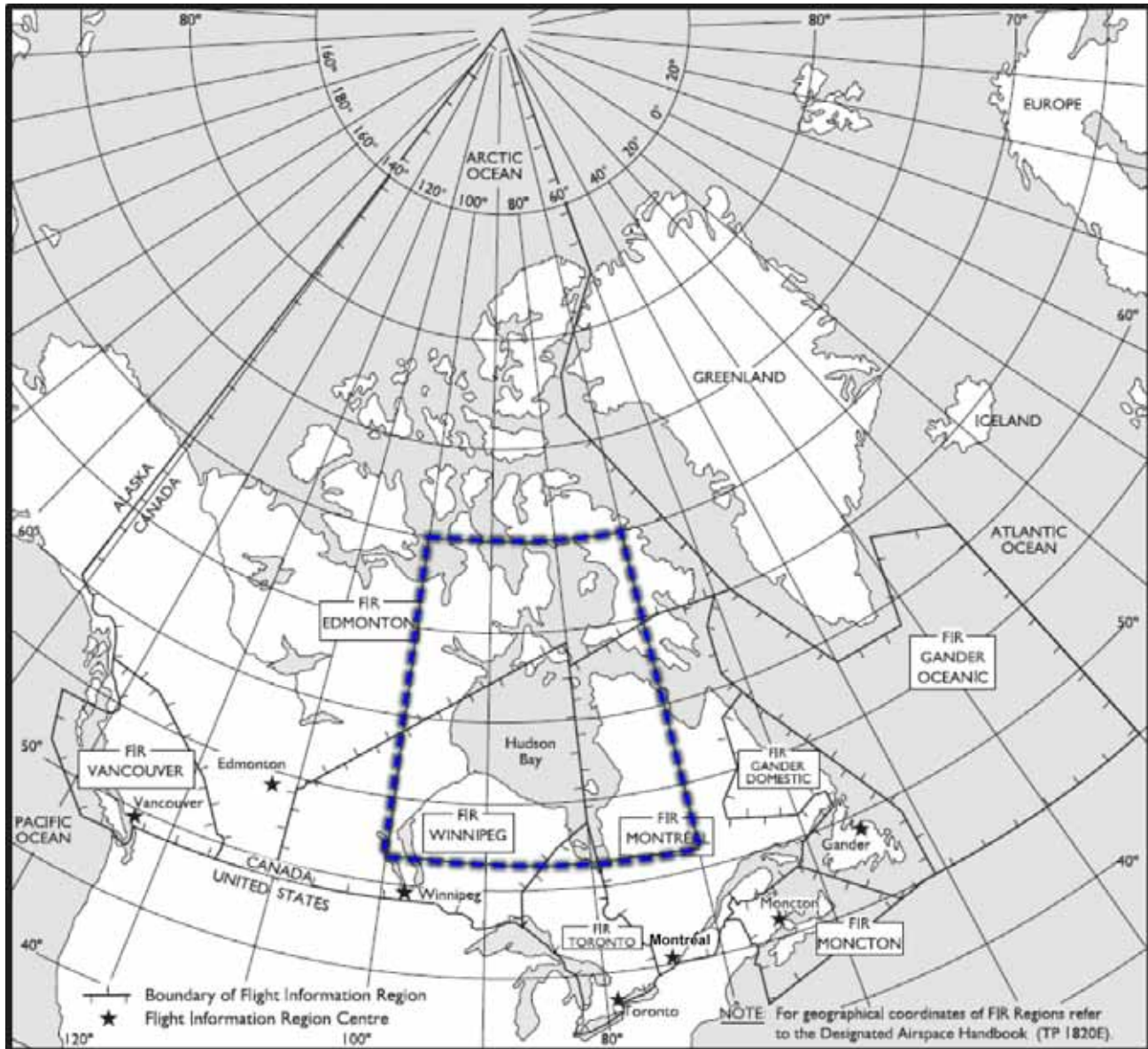
### Introduction

NAV CANADA plans to implement the use of Automatic Dependent Surveillance Broadcast (ADS-B) 20 November 2008 at 0500 Coordinated Universal Time (UTC) in the Hudson Bay area to support increased airspace capacity and allow customers access to more efficient routes. Because not all aircraft will be equipped with ADS-B avionics by this date, it will be necessary to segregate the airspace vertically, permitting only ADS-B aircraft to operate between specified flight levels (FLs). These flight levels will be determined in consultation with customers and will be based on their desire to derive benefits from the reduction in aircraft spacing that ADS-B can support. Key considerations will include customers' avionics equipage levels and the preferred aircraft operational flight levels in this airspace.

NAV CANADA's analysis indicates that ADS-B airspace should be based between FL330 and FL370, topped at FL410. Eventually, when most aircraft are equipped, NAV CANADA will be able to extend the benefits of ADS-B separation down to FL290. Because equipage on aircraft operating below FL290 is expected to take some time, early ADS-B control service will be limited to the higher flight levels.

### Geographical Boundary

The lateral dimensions of the initial ADS-B and ADS-B transition airspace are projected to begin with the airspace bounded by 100°W to 70°W north of 52.5°N and south of 70°N inclusive. The exact dimensions of the ADS-B surveillance airspace will be determined prior to operational commencement of services based on coverage flight testing and further customer consultation.



## Background

Traffic levels in the northern part of the Edmonton and Montréal flight information region and control areas (FIR/CTAs) are rising as customers increase service on North Atlantic, Pacific, and cross polar routes. These routes cross in different areas, during different time periods, and outside areas of current surveillance and very high frequency (VHF) communications, meaning that it is difficult for air traffic control (ATC) to allow customers to follow preferred trajectories, which results in delays and inefficiencies.

In recent years NAV CANADA has brought into service a number of northern radars to allow reduced separation owing to the availability of surveillance in the airspace to the east and west of Hudson Bay. With advances in ADS-B technology and increased customer avionics equipment, NAV CANADA can cost-effectively provide additional surveillance airspace over and around Hudson Bay. VHF communications coverage will complement the added surveillance.

## NAV CANADA Infrastructure

Over the 2007 calendar year, a number of ADS-B ground stations will be installed on the shores of Hudson Bay. The sites for these stations have been selected to provide maximum surveillance coverage across this large expanse of remote airspace. Coverage models for ADS-B signal reception forecast an area in the centre of Hudson Bay, varying in size with altitude, where ADS-B coverage may not be available. The specific dimensions of this area and required operational procedures will be determined through operational certification flights and customer consultation. It is not expected that this will result in significant operational penalties.

## ADS-B Aircraft and Operator Approval

To operate in ADS-B surveillance airspace, aircraft require a Mode S 1090 MHz transponder and a global positioning system (GPS) sensor integrated to transmit the following minimum parameters:

1. Airborne position;
2. Pressure altitude;
3. Aircraft identity (ICAO 24-bit code and flight ID);
4. Navigation uncertainty category — position (NUCp);
5. Special position indicator (SPI); and
6. Emergency flag.

This message set is the current minimum required to ensure the unique identity and position of the aircraft to the required accuracy and integrity. Operators are encouraged when selecting ADS-B avionics to consider the availability of future upgrades to the full ADS-B message set. Access to expanded ADS-B message elements will allow NAV CANADA to continue to expand operational efficiencies to ADS-B-equipped customers. Aircraft unable to downlink the minimum message set as indicated will be provided revised altitude or route clearances to avoid entering ADS-B surveillance airspace.

Operators and aircraft may be required to receive specific approval from their responsible state authority in order to qualify for operations in ADS-B surveillance airspace. Operators are encouraged to consult their state regulator for specific requirements.

Canadian operators should contact Transport Canada to determine operational and technical requirements for operations in ADS-B surveillance airspace.

Compliance with state guidance and approvals related to the correct selection, installation, and operation of ADS-B avionics should ensure aircraft transmission of the required message set. Links to guidance material and reference documents produced by national and international standards setting agencies, civil aviation authorities, as well as NAV CANADA and other air navigation service providers may be found through the [ANS Programs](#) section on the NAV CANADA website:

<www.navcanada.ca>  
Services  
ANS Programs  
ADS-B

## Flight Planning and Flight Operations

It is imperative that International Civil Aviation Organization (ICAO) flight plan item 7 (flight identification) be entered correctly by the pilot into the transponder. This is done either directly or through the flight management system, depending on the aircraft integration. Flight identification data is correlated by the NAV CANADA tracking system to the unique ICAO 24-bit aircraft identifier. This data is then linked to the operational flight plan for use by air traffic control.

In addition, item 10 of the ICAO flight plan identifies aircraft equipment, including surveillance equipment. Although a flight plan may be filed indicating “/D” for ADS capability, unless a NAV CANADA ADS ground station is in continuous contact with the aircraft and receiving the defined message set, access to ADS-B surveillance airspace will be denied.

Aircraft broadcasting the required ADS message set will be allowed to enter and operate in ADS-B surveillance airspace. Surveillance separation standards will be based on continuing to receive required ADS-B messages. Aircraft that are unable to broadcast the required ADS messages will be provided rerouting clearances to avoid entering ADS-B surveillance airspace. Because continuous ADS broadcast is a required stipulation for operation in this airspace, aircraft experiencing an ADS-B failure after entry will be rerouted out of the airspace.

## Ongoing Consultation

NAV CANADA is continuing to consult with customers regarding the initial implementation of ADS-B in the vicinity of Hudson Bay and the expansion of this service to lower levels, as well as into other areas of Canadian airspace. Should you wish to provide input to these decisions and are not already part of one of our ongoing consultation forums, please contact one of the individuals listed below.

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