
Subject: ADS-B Out Operations in Canadian Controlled Airspace.

Note: This bulletin supersedes FB 13-03. The original bulletin is being reissued to mention the additional areas where ADS-B may be utilized. Updated information is depicted by revision bars.

Introduction

The FAA recently approved the use of Automatic Dependent Surveillance - Broadcast (ADS-B). Effective immediately, ADS-B is authorized for use on all appropriately equipped Delta B747-400 aircraft. ADS-B operation will be transparent to the flight crew; no action is required.

Note: The ADS-B installation is part of the FANS modification. It will be documented by an EP-19 placed in the aircraft logbook.

Background

ADS-B is a next generation surveillance technology that supports radar-like separation standards. Aircraft with ADS-B automatically transmit position reports every second to ATC. As a result, ADS-B will allow aircraft to follow the most efficient flight trajectory.

This new technology is being used in the Hudson and Minto Sectors of northern Canada, Taiwan, Hong Kong, Vietnam, and Singapore to support increased airspace capacity.

To function in ADS-B airspace, the aircraft must be equipped with a 1090 MHz extended squitter that is integral to the Mode S transponder. FANS modified aircraft are upgraded with this capability. There is no independent control of ADS-B data by the flight crew. If the transponder is on, ADS-B information is being transmitted. The transmitted data consists of the following parameters:

- Flight ID
- ICAO 24 bit aircraft address
- Special Position Indicator (SPI) (similar to the transponder IDENT)
- Horizontal position (latitude and longitude)

- Emergency status
- Forward and vertical velocity
- Ground track
- Barometric altitude
- Other technical data

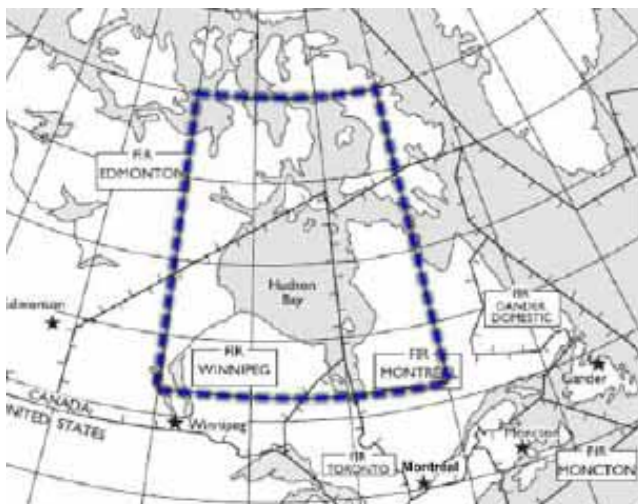
Note: Flight ID, SPI and emergency flag (status) are the only elements that can be modified by the flight crew.

Note: The ADS-B information transmitted is totally independent from any datalink information transmitted as a result of FANS/CPDLC operations.

Hudson and Minto Sectors

NAV Canada employs the use of ADS-B surveillance in the Hudson and Minto Sectors of northern Canada. Only aircraft that are transmitting ADS-B will be allowed to use airspace specifically segregated for ADS-B equipped aircraft. ADS-B airspace will be between FL350 - FL400 with expansion to FL410 as demand requires. Eventually, when most aircraft are properly equipped, NAV Canada will extend the benefits of ADS-B separation down to FL290.

ADS-B transition airspace consists of the airspace bounded from 70°W to 100°W and 56°N to 64°N. This includes airspace controlled by Edmonton, Winnipeg and Montreal Area Control Centers.



Operating Procedure

Preflight

Delta's flight plan will include two surveillance codes indicating the aircraft is ADS-B authorized and equipped.

L: Mode S, aircraft ID, altitude, enhanced surveillance, and extended squitter.

B1: ADS-B Out 1090Hz



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(FPL-DAL630-IS  
-B744/H-SDE2E3FGHIJ3J7M3RWXYZ/SLB1D1  
-RPLL2230  
-N0496F370 DCT MIA B462 CAB N884 ALBAX Y533 AZAMA Y579 ONC  
B597 ALC Y53 MADOG M750 IMPAL Y755 CARDS DCT  
-RJGG0315 RJOO  
-PBN/A1B1CD1L101 REG N676NW  
EET/RJJJ0056  
SEL/HKAC  
RMK TCAS AGAC EQUIPPED
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To allow correlation of the Flight ID to the ATC flight plan, the Flight ID must be entered in to the FMC exactly as it appears on the flight plan (e.g., DAL630).

If inoperative, the following MEL items will affect flight planning into ADS-B airspace:

- Inertial Reference Units (34-21-01)
- Distance Measuring Equipment (34-55-01)
- Both ATC Transponder & Automatic Altitude Reporting Systems (34-53-01D)
- Both ADS-B Extended Squitter Transmissions (34-53-01G)
- Both Global Positioning Systems (34-58-01B)
- Both Flight Management Computing Systems (34-61-01A)

Enroute

ADS-B information is transmitted through the transponder; however, transponder functionality and procedures are unaffected. Normal transponder procedures apply in ADS-B surveillance areas.

Note: VHF voice communications must be maintained at all times while flying under ADS-B surveillance.

The software installed on the 747-400's allow for the transmission of an ADS-B ident (Special Position Indicator) by pressing the transponder IDENT button. The SPI provides a similar function to the "squawk Ident" feature.

The table below gives an overview of the new radar and ADS-B phraseology for Canadian Controlled Airspace.

Phraseology	
Existing "Radar" Phraseology	New Generic "Surveillance" Phraseology
RADAR SERVICE TERMINATED (non-radar routing if required)	SURVEILLANCE SERVICE TERMINATED (non-surveillance routing if required)
RADAR SERVICE TERMINATED DUE TO (reason)	SURVEILLANCE SERVICE TERMINATED DUE TO (reason)
SECONDARY RADAR OUT OF SERVICE	ADS-B SURVEILLANCE OUT OF SERVICE DUE TO (reason)
MODE CHARLIE NOT VALIDATED	PRESSURE ALTITUDE NOT VALIDATED
MODE CHARLIE IS INVALID	PRESSURE ALTITUDE IS INVALID
RADAR SERVICE TERMINATED	SURVEILLANCE SERVICE TERMINATED
(aircraft ident) RADAR IDENTIFIED (position if required)	(aircraft ident) IDENTIFIED (position if required)
(aircraft ident) RADAR IDENTIFICATION LOST	(aircraft ident) IDENTIFICATION LOST
	CONFIRM ADS-B ELIGIBLE? and if necessary - UNABLE TO ISSUE CLEARANCE INTO ADS-B EXCLUSIONARY AIRSPACE, MAINTAIN (altitude)
	NEGATIVE ADS-B DUE TO EQUIPMENT FAILURE.
	IF ABLE, CHANGE YOUR FLIGHT ID TO (flight ID)
IF YOU READ, (appropriate instructions). Then - (Action) OBSERVED, WILL CONTINUE RADAR CONTROL.	IF YOU READ, (appropriate instructions). Then - (Action) OBSERVED, WILL CONTINUE SURVEILLANCE CONTROL.

Non-Normal Procedures

Failure of a single piece of equipment (typically detected by ATC), may result in a situation that can be resolved by switching to the other transponder. If switching to the other transponder does not resolve the situation, ATC must be notified that the aircraft is “negative ADS-B”. Surveillance separation standards will be based on continued reception of ADS-B messages from the aircraft. Aircraft that are unable to broadcast the requested ADS-B message-set may be rerouted to avoid entering ADS-B airspace. Aircraft experiencing an ADS-B related failure after entry in to ADS-B airspace may receive an amended clearance out of ADS-B airspace.

Emergency Procedures

Upon activation of the transponder emergency code (i.e., 7700, 7600 and 7500) by the flight crew, a generic emergency status signal is sent to ATC via ADS-B. In ADS-B coverage only, the emergency signal does not differentiate which emergency code has been set in the transponder.

Approved by:

Pat Dever
747-400 Fleet Captain
pat.w.dever@delta.com
(404) 715-0313

Steve Hanlon
747-400 CLCP
steven.j.hanlon@delta.com
(404) 715-0308

Michael Mannino
747-400 Technical Manager
michael.mannino@delta.com
(404) 715-0320

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