



# ADS-B Operations - Overview

Jeff Cochrane  
Director – Navigation and Airspace  
April 27, 2015



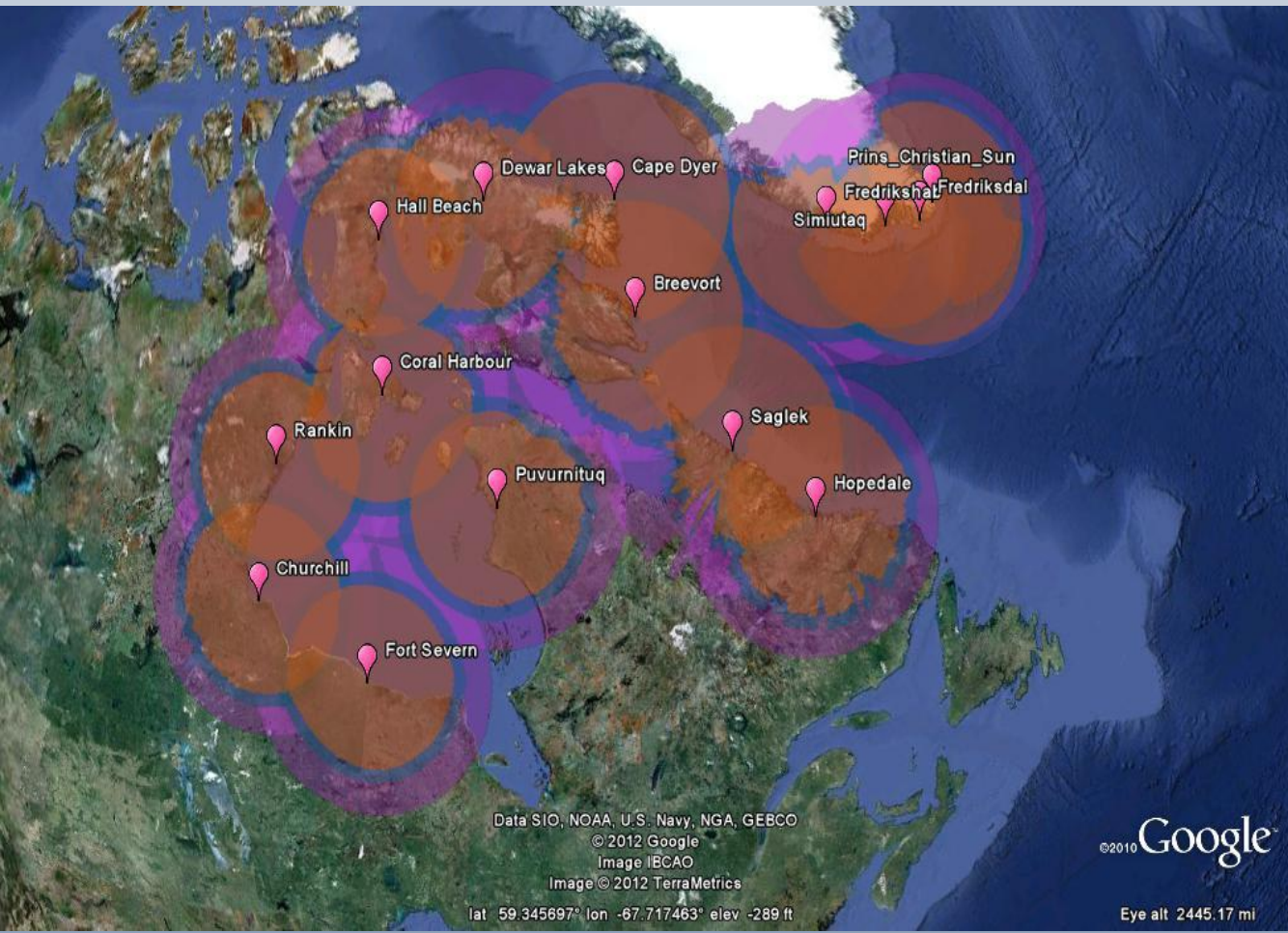
## Outline

- Ground-based surveillance network
- Regulator approvals
- Service Delivery using ADS-B Out
- Anomaly reporting
- Service Delivery Future - Aireon space-based ADS-B





# Current Ground-based surveillance network



- 15 ADS-B Sites
- Approximately 1.5 Million Sq. Miles Covered
- ADS-B Data sent to ATC in Gander, Edmonton and Montreal



## NAV CANADA's Operational Approval


- Authority to provide ADS-B services under an exemption to the existing Canadian Aviation Regulations (CARs)
- Exemption refers to our Safety Assessment
- Revised safety case provided to Transport Canada (March 2012)
- Requirement for operational certification prior to receiving ADS-B services was removed





# Transport Canada – Internal Process Bulletin

- No requirement for operational approval
- Ops Spec is still available for Canadian operators that need to have an operational approval for other State's airspace

	<b>Transport Canada</b>	<b>Transports Canada</b>	Document No. /Document n° : IPB 2014-04
			Issue No. /Numéro d'édition : 01
			Date : 2014-08-22
			Page : 1 of/de 3
<i>Civil Aviation</i>		<i>Aviation civile</i>	
<b>INTERNAL PROCESS BULLETIN</b>		<b>BULLETIN INTERNE DE PROCÉDURES</b>	
<b>ATTENTION:</b>		<b>À L'ATTENTION DE(S) :</b>	
CIVIL AVIATION PERSONNEL INVOLVED IN ISSUING ADS-B AUTHORIZATIONS		EMPLOYÉS DE L'AVIATION CIVILE VISÉS PAR LA DÉLIVRANCE D'AUTORISATIONS ADS-B	
<b>THE REQUIREMENT FOR AIR OPERATORS AND PRIVATE OPERATORS TO OBTAIN OPERATIONS SPECIFICATION 609 OR 610 IN ORDER TO RECEIVE ADS-B SURVEILLANCE SERVICES IN CANADIAN AIRSPACE IS RESCINDED.</b>		<b>ANNULATION DE L'EXIGENCE OBLIGEANT LES EXPLOITANTS AÉRIENS ET LES EXPLOITANTS PRIVÉS À OBTENIR UNE SPÉCIFICATIONS D'EXPLOITATION 609 OU 610 AFIN DE RECEVOIR DES SERVICES DE SURVEILLANCE ADS-B DANS L'ESPACE AÉRIEN CANADIEN</b>	

**PURPOSE:**

The purpose of this Internal Process Bulletin (IPB) is to inform inspectors that there is no longer a requirement for air operators or private operators to obtain Operations Specification 609 or 610 in order to receive ADS-B surveillance services from NAV CANADA while operating in Canadian airspace.



## Service Delivery – AIP Canada ENR

### 1.6.3 Automatic Dependant Surveillance–Broadcast

Automatic dependent surveillance-broadcast (ADS-B) utilizes global navigation satellite system (GNSS) and aircraft avionics to accurately relay flight information to air traffic services.

All aircraft that emit position information using a 1090 MHz extended squitter (1090ES) may be provided surveillance separation services, provided they meet the airworthiness compliance requirements defined in:

1. European Aviation Safety Agency (EASA) AMC 20-24; or
2. European Aviation Safety Agency (EASA) CS ACNS; or
3. Federal Aviation Administration (FAA) Title 14 Code of Federal Regulations (14 CFR) section 91.227 or AC No. 20-165A (or replacement) – Airworthiness Approval of ADS-B; or
4. Configuration standards reflected in Appendix XI of Civil Aviation Order 20.18 of the Civil Aviation Safety Authority of Australia.



## Service Delivery – AIP Canada ENR

ADS-B Out systems that are unable to meet the above requirements must disable ADS-B transmission unless:

1. the aircraft always transmits a value of 0 (zero) for one or more of the position quality indicators (NUCp, NIC, NAC or SIL); or
2. the operator has received an exemption from NAV CANADA.

For information on radio communications failure, unlawful interference procedures and other emergency procedures, refer to the following publications:

*Canada Air Pilot, Volumes 1–7, or Restricted Canada Air Pilot*

*Canada Flight Supplement, Section F, “Emergency” or Water Aerodrome Supplement, Section E, “Emergency”*

A Flight ID that is an exact replica of the Aircraft Identification entered in field 7 of the ICAO Flight Plan must be programmed into the transponder or flight management system (FMS) in order to receive surveillance services. Airline aircraft will use the three-letter ICAO airline code, not the two-letter IATA code. In addition, field 10 should indicate ADS-B capability on the ICAO Flight Plan.

For a map of ADS-B coverage in Canada, see Figure 1.6.3, “Automatic Dependant Surveillance–Broadcast Coverage.”



# Service Delivery – AIP Canada ENR

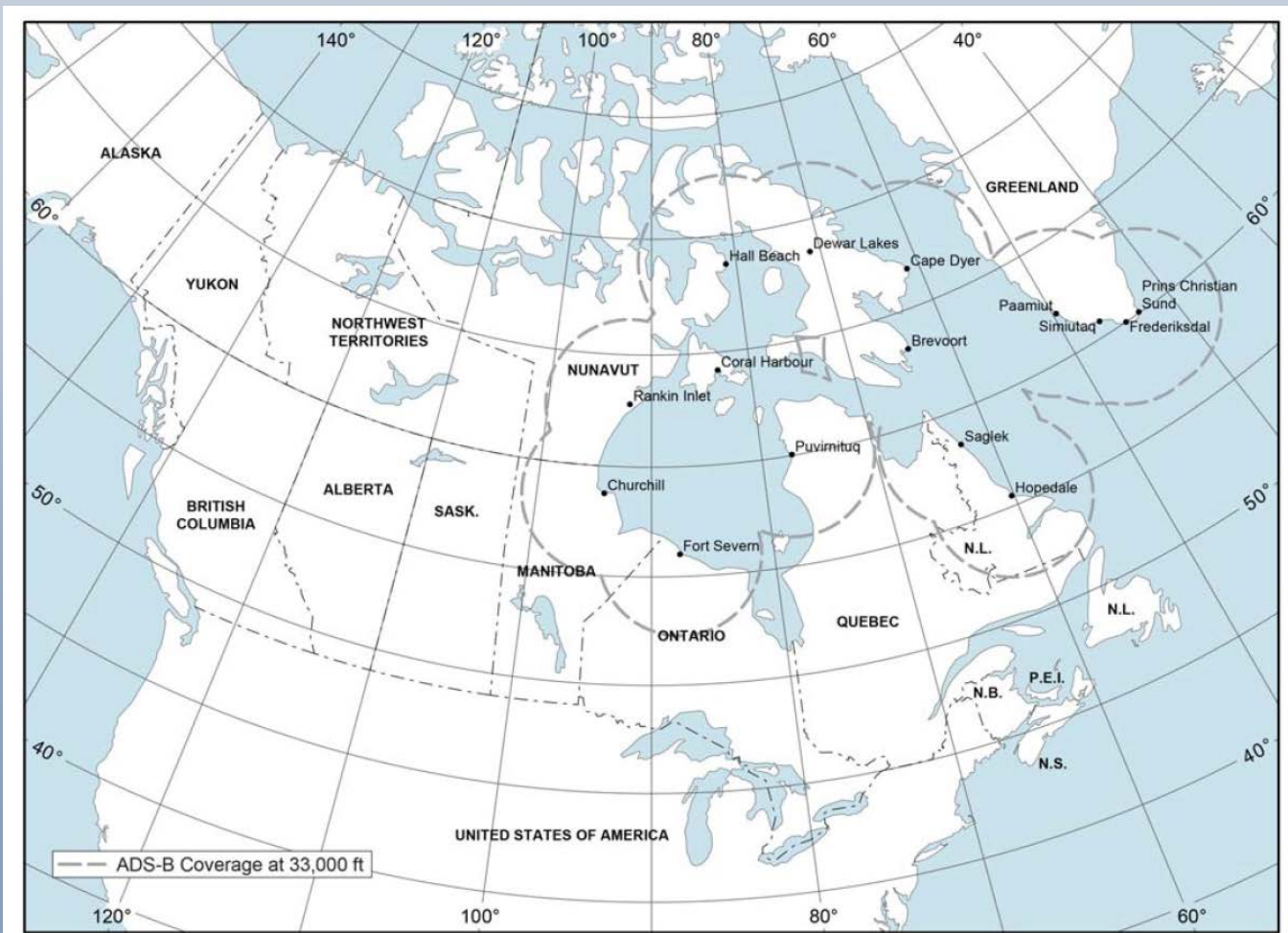


Figure 1.6.3, Automatic Dependant Surveillance–Broadcast Coverage





# Service Delivery – AIP Canada ENR

## 1.6.4.2 ADS-B Service in the Gander Oceanic Control Area

ADS-B has been used to provide flight level changes over southern Greenland in scenarios where the availability of ADS-B permits identified aircraft to climb or descend through the flight level of other ADS-B equipped aircraft. In addition, Gander ACC has been able to consider flight level requests that would result in eligible aircraft operating with in-trail spacing of 10 nautical miles.

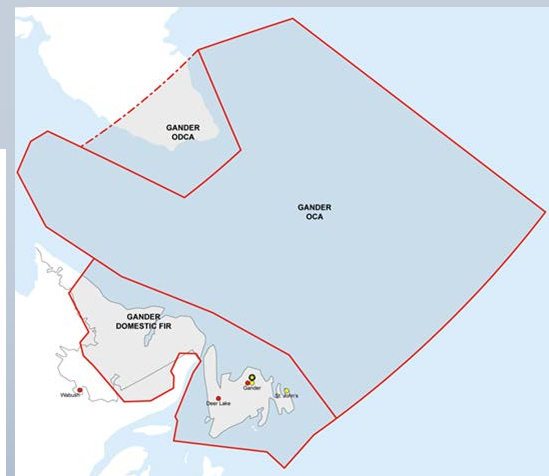
Because of non-homogeneous aircraft surveillance equipment, all aircraft intending to transit the southern Greenland portion of the Gander OCA are expected to continue to flight plan in accordance with procedures outlined in NAT Doc 007, Guidance concerning Air Navigation in and above the NAT MNPSA, published by the International Civil Aviation Organization (ICAO). As always, flight crews are encouraged to request any changes, including flight level, to optimize their flight profile.

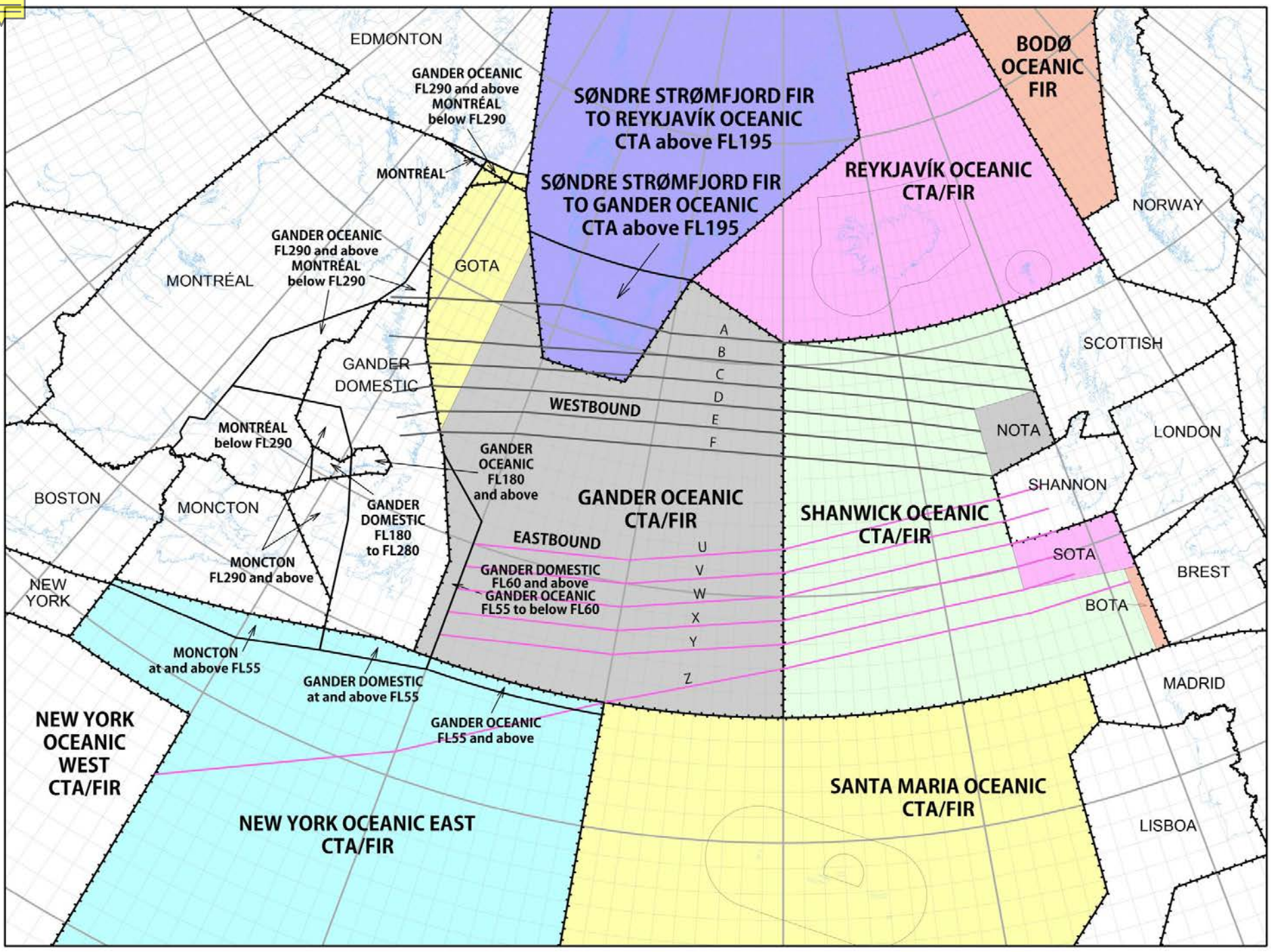
Where it is determined, following a request from the flight crew, that a flight level change can be approved because of the availability of ADS-B, the following steps can be expected:

- A very high frequency (VHF) control frequency will be assigned to the required flights by ATC, either directly via controller-pilot data link communications (CPDLC) or via high frequency (HF) voice through the Gander international flight service station (IFSS) (Gander Radio).
- Once VHF contact has been established, the flights involved will be informed by ATC that identification has been established.
- The requested climb or descent clearance will be issued by ATC either via CPDLC or through the assigned VHF control frequency.

For climb and descend through scenarios, after the flight level change has been completed and vertical separation re-established, flight crews will normally be informed by ATC that surveillance services are terminated and they will subsequently be returned to their previously assigned frequency.

Flight crews are advised that aircraft will not normally be informed of ADS-B identification unless a specific operational advantage, such as a flight level change, can be attained.

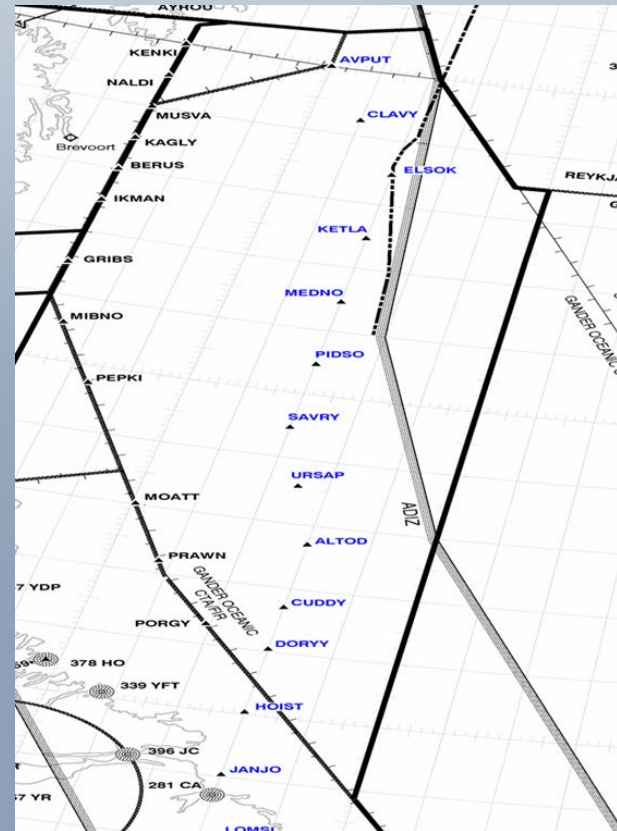






# Gander Oceanic Transition Area (GOTA)

- Added ocean entry/exit fixes
- Aligned with application of ½ degree separation (RLatSM)
- Supported by ADS-B surveillance and CPDLC service
- Benefits
  - Optimum route choices and shortened oceanic tracks
  - Increased access to higher flight levels
  - Longer route segments at preferred airspeeds





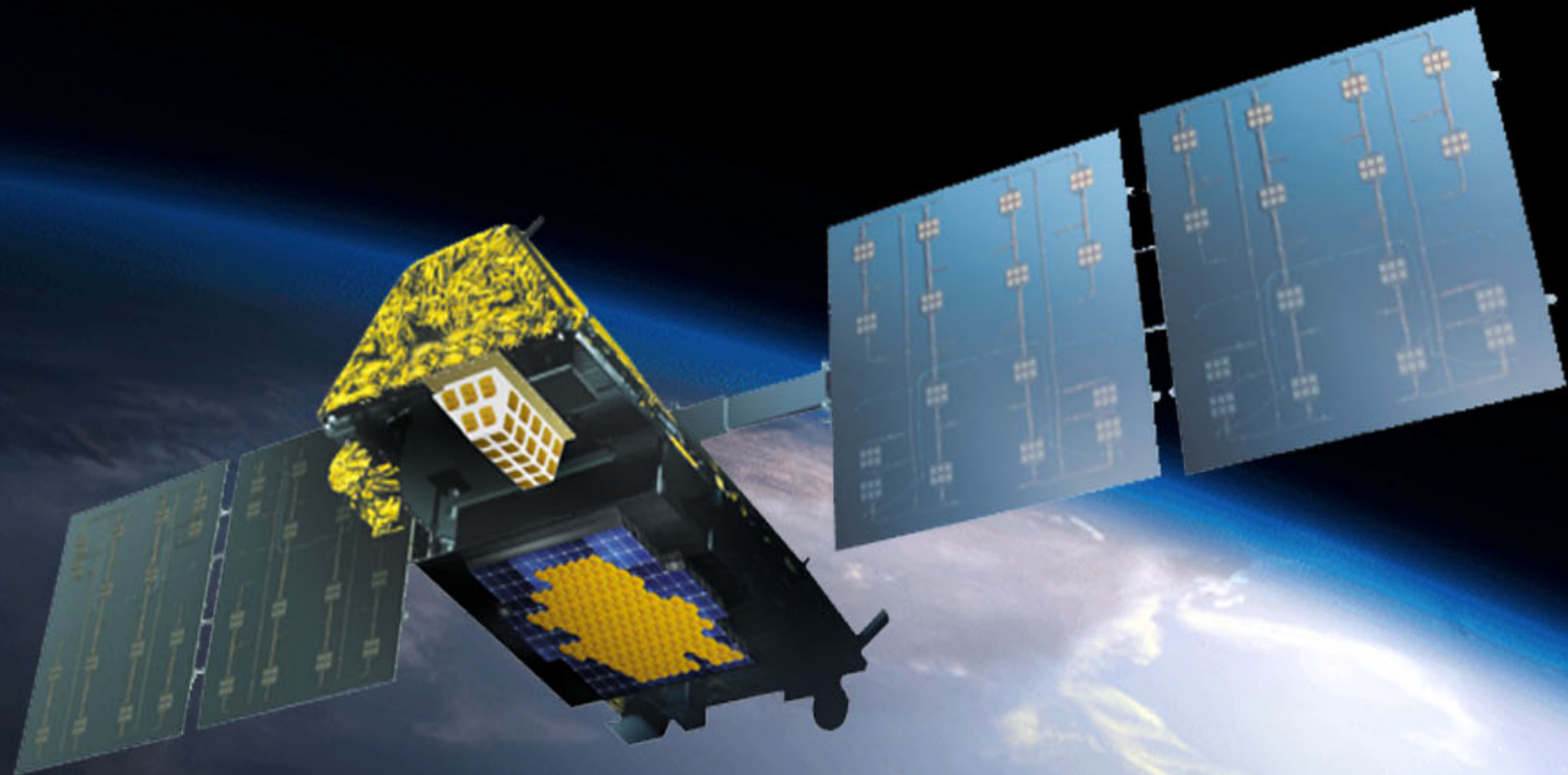
## Avionics anomalies – NAV CANADA process

- ATC attempt to rectify in flight
  - Switch to second transponder
- Internal notification comes to Systems Integration
  - Investigate to ensure root cause is not internal
  - If deemed an aircraft avionics fault
    - Aircraft 24 bit address added to list that disallows ADS-B surveillance
    - Airline notified
    - Transport Canada notified (may also go to the CAA of state of aircraft registry)
    - Official notification to NAV CANADA from airline required to reinstate aircraft
- Airlines may wish to consider MEL review depending on criticality for availability of ADS-B services in their operations



## Avionics anomalies – not meeting performance

- Rockwell Collins TPR901 position jumps
  - Boeing aircraft - Service Bulletin
  - Airbus aircraft – Procedural fix
- B787-800
  - ADS-B position reported ~40nm from actual position
  - Failure of Rockwell Collins Processor Unit (P/N 822-2120-101)
  - Separation services based on ADS-B temporarily suspended for B787
  - Service Bulletin being prepared



## Space-Based ADS-B



Questions?



Everything should be made as  
simple as possible,  
but not simpler

(Albert Einstein)

Jeff Cochrane  
Director, Navigation and Airspace  
Jeff.Cochrane@navcanada.ca

SERVING A WORLD IN MOTION



A bright sun in a blue sky with white clouds and a contrail from an aircraft.

Thank you

Jeff Cochrane

Director, Navigation and Airspace

[jeff.cochrane@navcanada.ca](mailto:jeff.cochrane@navcanada.ca)