Hudson Bay
ADS-B Out
Avionics Requirements

CNS Service Design

Frequently Asked Questions

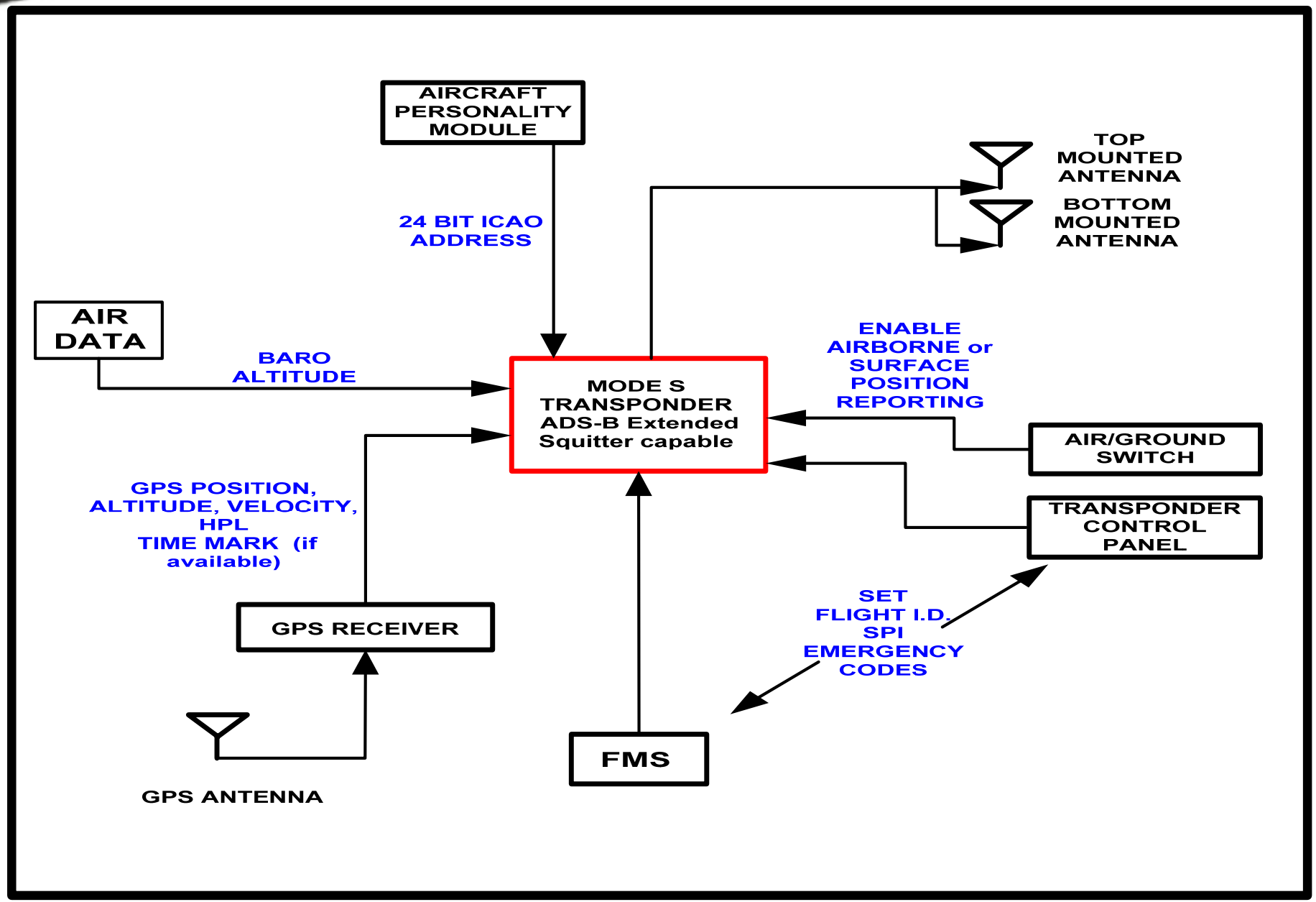
- **Q** *What does the ADS-B avionics do ?*
- **A** The avionics broadcasts the aircraft's own position, altitude, velocity and identity. Horizontal position and velocity are obtained from the onboard GPS receiver and altitude is obtained from the baro altitude source. High priority state vector messages are transmitted twice per second, and lower priority messages are transmitted at intervals of up to 10 seconds.
- **Q** *What avionics equipage do I need, in order to comply ?*
- **A** You will need a Mode S Transponder, configured for Extended Squitter, a GNSS Nav Source and a Baro Altimeter. The installation/wiring must satisfy ADS-B position and integrity requirements. In addition, you will need an ICAO 24 bit address (assigned by State of Registry), and a means for the Flight Crew to set Flight ID, SPI and Emergency Codes (FMS or Transponder Control Panel). The Air/Ground switch must be connected to the transponder, in order to enable Airborne/Surface position reporting.
- **Q** *The aircraft currently has a Mode S Transponder and GPS. How can I be sure that it complies with Nav Canada requirements ?*
- **A** ADS-B functionality requires an Extended Squitter Mode S transponder <u>with</u> the appropriate data sources. If the transponder complies with the European Elementary or Enhanced Surveillance mandate, it will very likely be extended squitter capable. It may only require an optional Extended Squitter enabling strap installed. All the major transponder manufacturers (ACSS, Honeywell, Rockwell Collins) produce extended squitter capable transponders for Regional and Business class aircraft.

Technical Requirement

Basic ADS-B Capability Consists of:

- Required Data Sources
- ADS-B 1090 MHz Mode S Transmitter

Avionics Block Diagram



Minimum Required ADS-B Out Data Set

• ICAO 24 bit aircraft address	In every ADS-B msg Position (ES Surface/Airborne Position Message)
• Position integrity info	(NUC_P <u>or</u> NIC, NAC as transmitted in the Type Code of ES Surface/Airborne msgs)
• Pressure altitude	(In ES Airborne Position msg)
• Identity (FLIGHT ID)	(In ES Identity and Category msg)
• Special position indicator	(Surveillance Status Subfield of the ES Airborne Position msg)
• Emergency flag	(Surveillance Status Subfield of the ES Airborne Position msg)

<u>For DO-260A ONLY</u>

• Version Number, SIL, NAC_P	(ES Operational Status)

Desirable ADS-B Out Data Set

• Emergency/Priority Status	In ES Aircraft Status Msg (DO-260/260A or the Target State and Status Message DO-260A)
• Mode 3/A Code	With Geographic filter removed as per latest version of TSO-C166, In ES Test Message DO-260A

Documentation Standards

- **The transmitted message formats <u>MUST</u> be DO-260 or DO-260A MOPS compliant**

Equipment Standards

- Transponder compliant with:
  - ARINC 718A
  - TSO C112 or DO-181C
  - EUROCAE ED73B or DO-181C
  - JTSO-2C112a
  - ETSO-2C112a
- GNSS Position source compliant with:
  - TSO-C129a
  - TSO-C145a
  - TSO-C146a
  - FDE and SA Off are <u>desirable</u> features.

NOTE: Equipment marked as compliant with TSO-C166 or TSO-C166a, are capable of transmitting ADS-B data which will meet our requirements.

Additional Information

Positional Integrity

- The GNSS Position Source (or equivalent) must provide HPL (HIL) to the ADS-B function (DO-260 and DO-260A) (ARINC label 130)
- The GNSS Position Source (or equivalent) must provide HFOM to the ADS-B function (DO-260A) or for brief periods when HPL is not available (DO-260) (ARINC label 247)
- For DO-260A implementations, HPL and HFOM are required by the ADS-B Function to set NIC,NAC

Baro Altitude

- Baro altitude must be provided to the ADS-B function, as per current SSR environment. 25' encoding preferred.

Flight Crew Capabilities

The Flight crew must have the capability to set the following parameters:

- FLIGHT ID - via Transponder Control Panel or FMS and must match Flight Plan. In flight capability to set FLIGHT ID is highly desirable.
- SPI - via Transponder Control Panel
- Emergency Indicator - via Transponder Control Panel

NOTE: If more than one ADS-B system is installed, only one may be permitted to transmit at any given time.