ADS-B Workshop – SP/16

Qantas ADS-B Experience

ICAO Regulators Workshop
Jakarta, 16-17 August 2010

Qantas Engineering.

QANTAS

Overview

- Introduction
- Qantas Fleet
- Operational Benefits
- Maintenance Aspects
- Minimum Equipment List
- Australian Regulations
- Regulatory Considerations
- Conclusion

Introduction

- Lewis Benham
  - Chief Engineer, Avionics, Qantas Widebody Fleets
  - Avionics Technical Services since 1989

- Qantas CEO, Alan Joyce June 2010:
  - "…we need to make the full transition to ADS-B (or automatic dependent surveillance - broadcast). AirServices Australia has already put Australia in a leading position with nationwide ADS-B coverage– a feat no other country has yet achieved. We need to capitalise on that effort."

- All Qantas mainline fleets are conducting ADS-B operations
  - except B767 and B737-400

Qantas Fleet

- ADS-B Activated & Approved for Operations
  - A330 (17) – activated on delivery from Jan04
  - B737-800 (21) – activated on delivery from Jul04 (w/GLS)
    - > 17 more to be activated in conjunction with GLS retrofit
  - B747-400 (27) – retrofitted 06/07 with ELS/EHS for Eurocontrol
  - A380 (6) - activated on delivery from Sep08 (w/GLS)

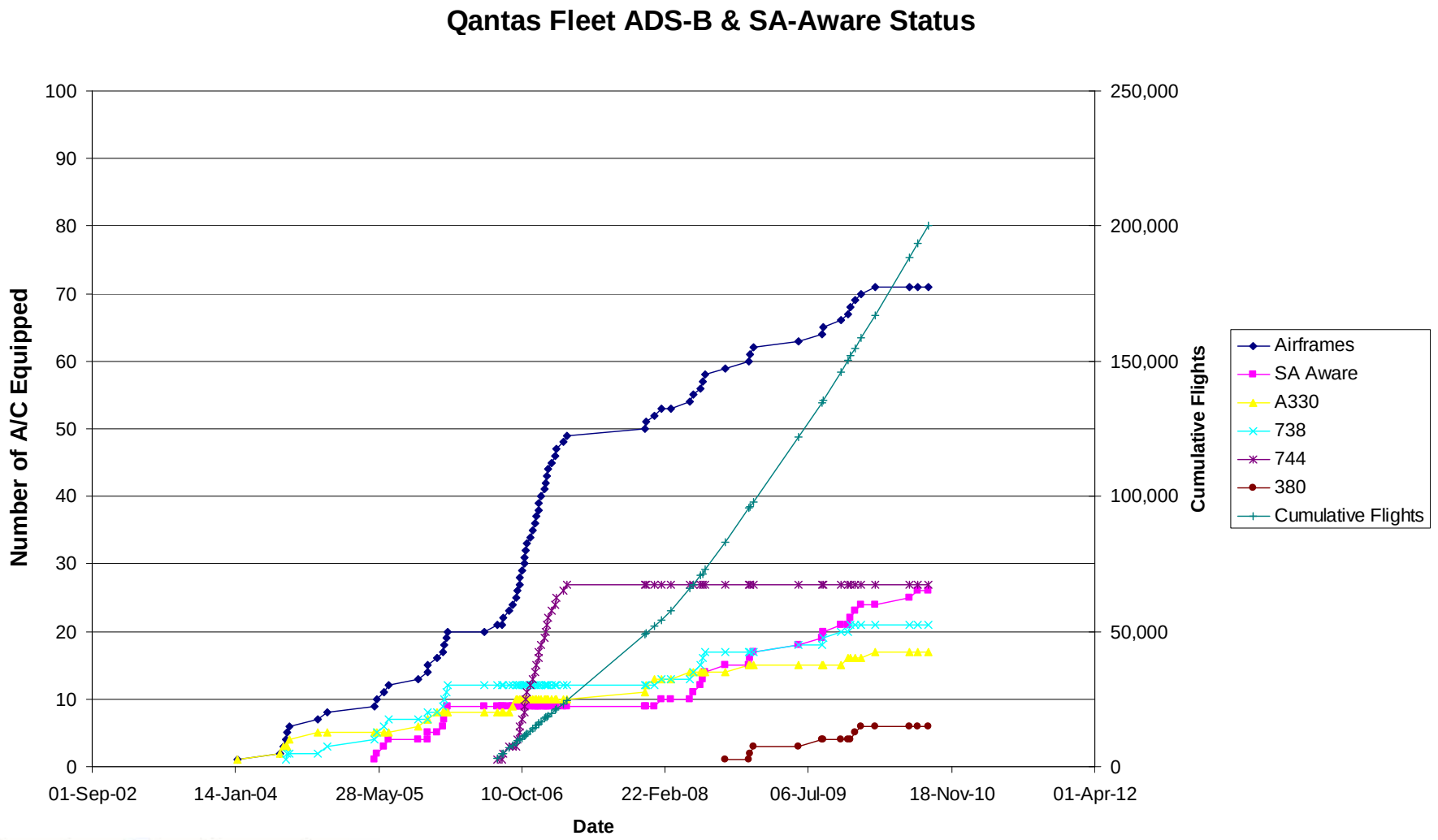
- All Qantas New Aircraft Deliveries
  - ADS-B equipped
  - AMC 20-24 certified
  - SA-Aware GPS

- Jetstar
  - A330 activated & approved
  - A320 being retrofitted

Qantas B767 & B737-400

- Not currently equipped with GPS, ELS, EHS, ES
  - Retrofit options under evaluation
- Retrofit Options
  - STC GPS into transponder only
    - > Low cost
    - > ADS-B benefits only
  - Integrated Solution
    - > ADS-B plus all benefits of GPS in the Nav solution
    - > GPS navigation accuracy
    - > RNAV (GNSS), RNP, Primary Means GPS
- B767 – Integrated solution is preferred option
- B737-400 – cease operations prior to Dec 2013

Qantas Fleet - Chart



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Operational Benefits

- ADS-B
  - All domestic flights and international flights in & out of Australia
  - Radar-like surveillance in non-radar areas (most of Australia)
  - Flex-tracks & 5nm separation now in operation
  - Optimum altitude for longer
  - Reduced track miles
  - Reduced fuel burn, noise, CO2 emissions

- Associated Benefits of GPS in Navigation Solution
  - GPS navigation accuracy
  - RNAV (GNSS)
  - Primary Means GPS
  - RNP
  - Enabler for GLS

Maintenance Aspects

- Periodic Testing of all activated Qantas aircraft
  - 2 yearly in conjunction with FAR 43 App F Transponder test
  - IFR-6000 equipment selected

- AMM Test Procedures
  - Have been updated to cover ADS-B and new test equipment

- Differing Regulatory Requirements
  - Eurocontrol – draft final rule July 2010:
    > 2 yearly test mandatory by regulation - Article 6 paragraph 2
  - CASA – no explicit regulatory requirement
    > AC 21-45(0): “Should” test every 2 years
  - FAA – NFRM May 2010:
    > “The FAA will use the ground automation system to continuously monitor ADS–B functionality, which accomplishes the purposes of a recurrent inspection”

Minimum Equipment List

- Current baseline MEL is for Transponder only
  - If ADS-B in inoperative then MEL for entire transponder applied
- Data Source failure/MEL application
  - Eg GPS-1 failure may result in on-side transponder ADS-B sub-function being inoperative
  - All data sources to be considered: GPS, FMS, ADC, MCP/FCU etc
- Qantas A330 MEL has been expanded
  - Separate dispatch relief for Transponder, ELS, EHS, ES functions
  - Cross references from data source MELs
- Currently no separate fault annunciation for Transponder sub-functions like Extended Squitter
  - DAP failure usually detected and reported by ATC

Australian Regulations

- CAOs 20.18, 82.x Amended March 2007
  - ADS-B optional – equipment standards defined
  - SA Aware GPS required from 28 June 2012
  - AC 21-45(0) Appendix D Approved Equipment list
  - A good start in the absence of defined certification standards

- CAOs 20.18, 82.x Amended March 2009
  - ADS-B mandatory for aircraft flying at or above FL290
  - SA Aware GPS required from 28 June 2012

- CAO 20.18 updated December 2009
  - Automatic acceptance of certified equipment configurations
  - No longer required to add equipment P/N's to AC 21-45(0) App D
  - SA-Aware GPS required forward fit from 28 June 2012

    - "CAO" = Civil Aviation Order

Regulatory Considerations

- Qantas, like many other long haul international airlines, operates aircraft through many airspace jurisdictions

- With Canada, Australia, USA and Europe mandates effectively in place, other regulators should endeavour to align requirements to be compatible

- Comparison of equipment requirements and time frames
  - Australia: DO260 5 Years (2008->2013)
  - Europe: DO260B 7 Years (2010->2017)
  - USA: DO260B+NACp<0.05 10 Years (2010->2020)

Conclusion

- The Key aspect of ADS-B regulatory activities is **compatibility**
  - equipment standards
  - time frame - forward fit, retrofit
  - maintenance requirements
  - dispatch relief

- ADS-B services enhance the safety and efficiency of Qantas operations TODAY !

“I squit, therefore I am”