



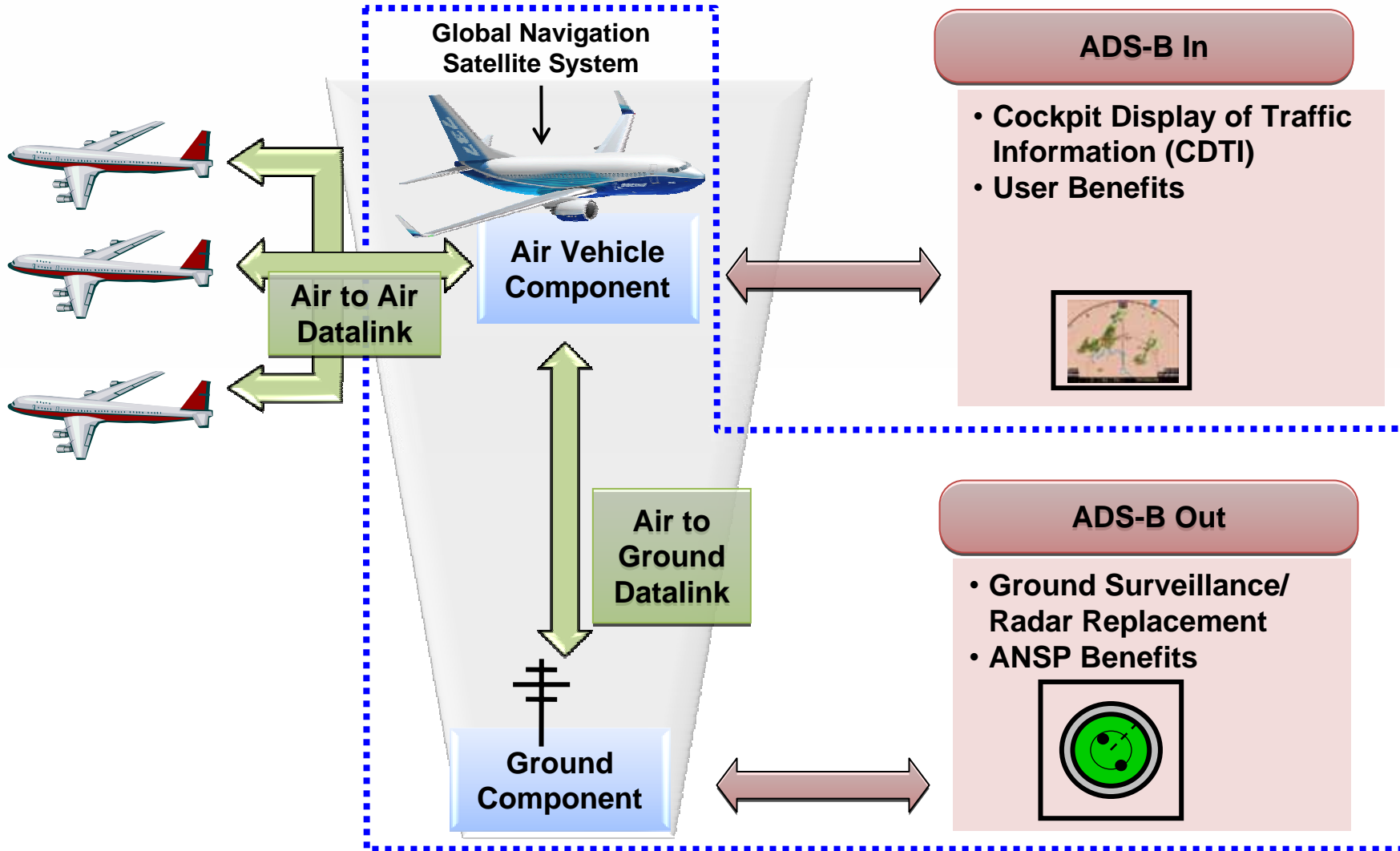
# Automatic Surveillance Broadcast (ADS-B)

**IATA/AEA 50th JURG CONFERENCE  
CNS Performance Requirements  
and Investments**

**May 31, 2011**

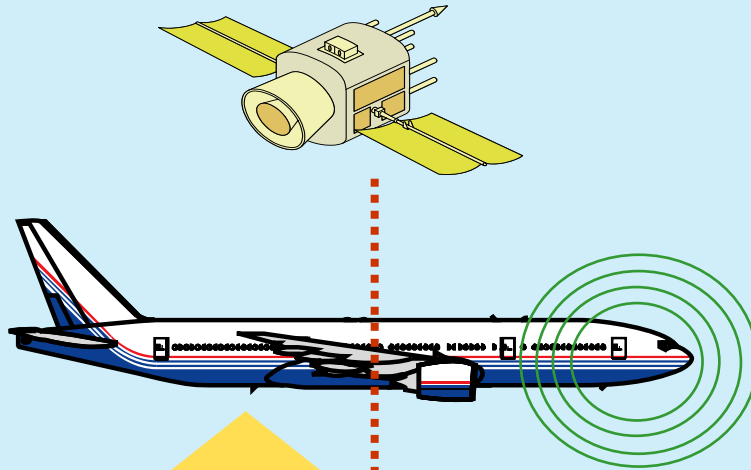
**Jessie Turner  
Senior Engineer  
Avionics & Air Traffic Management**

# ADS-B System Architecture



# Airborne Components for ADS-B-Out: What an Aircraft Needs to Transmit a Signal-Out

Global Navigation Satellite System



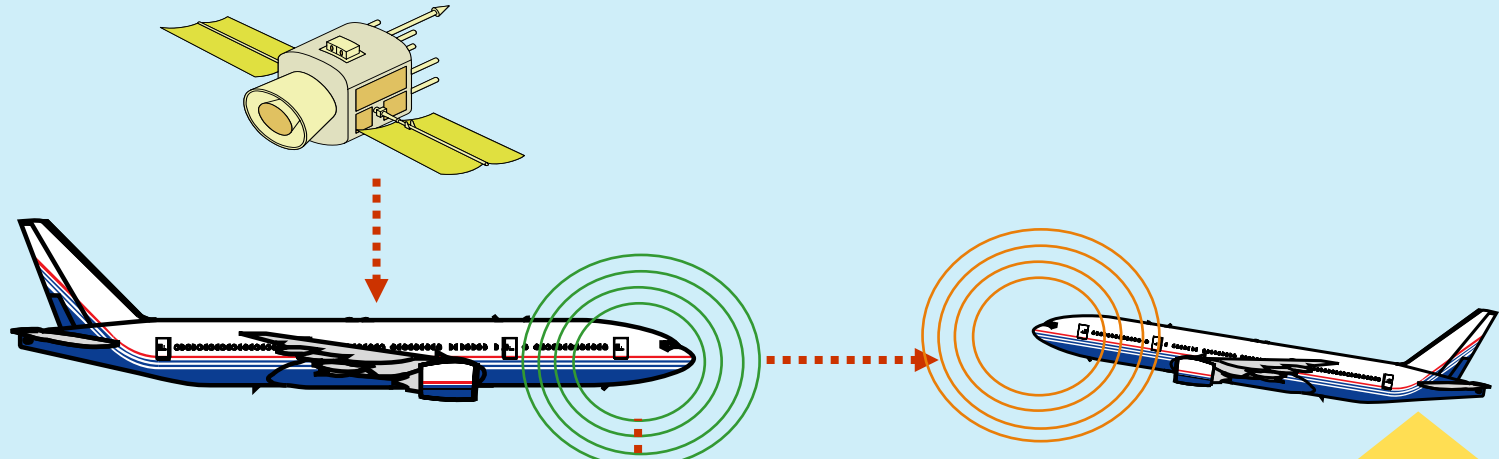
GNSS Receiver/Antenna



ATC Transponder/Antenna

# Airborne Components for ADS-B-In: What an Aircraft Needs to **Receive** a Signal-**In** From an ADS-B Equipped Aircraft and See Display

Global Navigation  
Satellite System

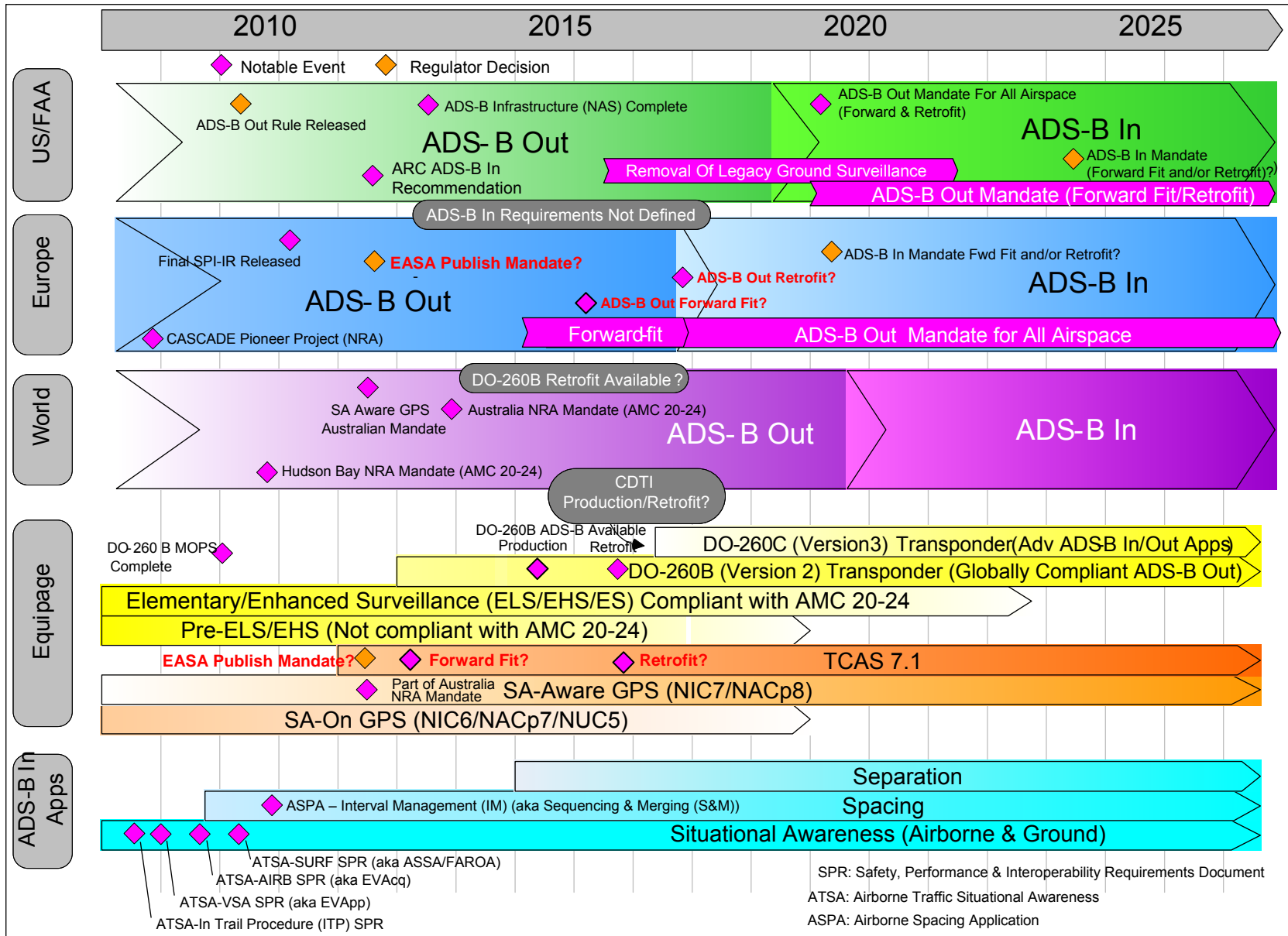


ACAS/TCAS/Antenna



Cockpit Display of Traffic Information (CDTI)

# ADS-B / Surveillance Timeline



# ADS-B Out Mandate Timeframe Summary (Canada/Europe/USA)

- Nav Canada is providing reduced separation using ADS-B Out for Hudson Bay between FL350 and FL400 since Nov 2010
  - Current Boeing production equipage meets requirements
- Eurocontrol/EASA draft rule (SPI IR – Version 3.0) mandates ADS-B Out in production in Jan 2015 and for entire European airspace (retrofit) in Dec 2017
  - Requires new transponder standard (DO-260B)
  - Current SA-On GPS equipage meets requirements
  - Need final rule published by Jan 2012 to allow airframers time to incorporate.

**Don't want a repeat of TCAS 7.1 where production mandate of March 2012 is still in draft and is not published!**

- USA (FAR 91.225) mandated ADS-B Out for Class A, B, C airspace and Class E airspace ( $\geq 10$ Kft MSL) on 1 Jan 2020
  - Requires new transponder standard (DO-260B)
  - Requires update to GPS sensor (TBD) with a minimum of SA Aware
  - Draft AC 90-ADSB requires use of a service availability prediction tool (SAPT) to determine the ability of the positioning source (GPS) to meet the position accuracy and integrity requirements for the entire flight plan.

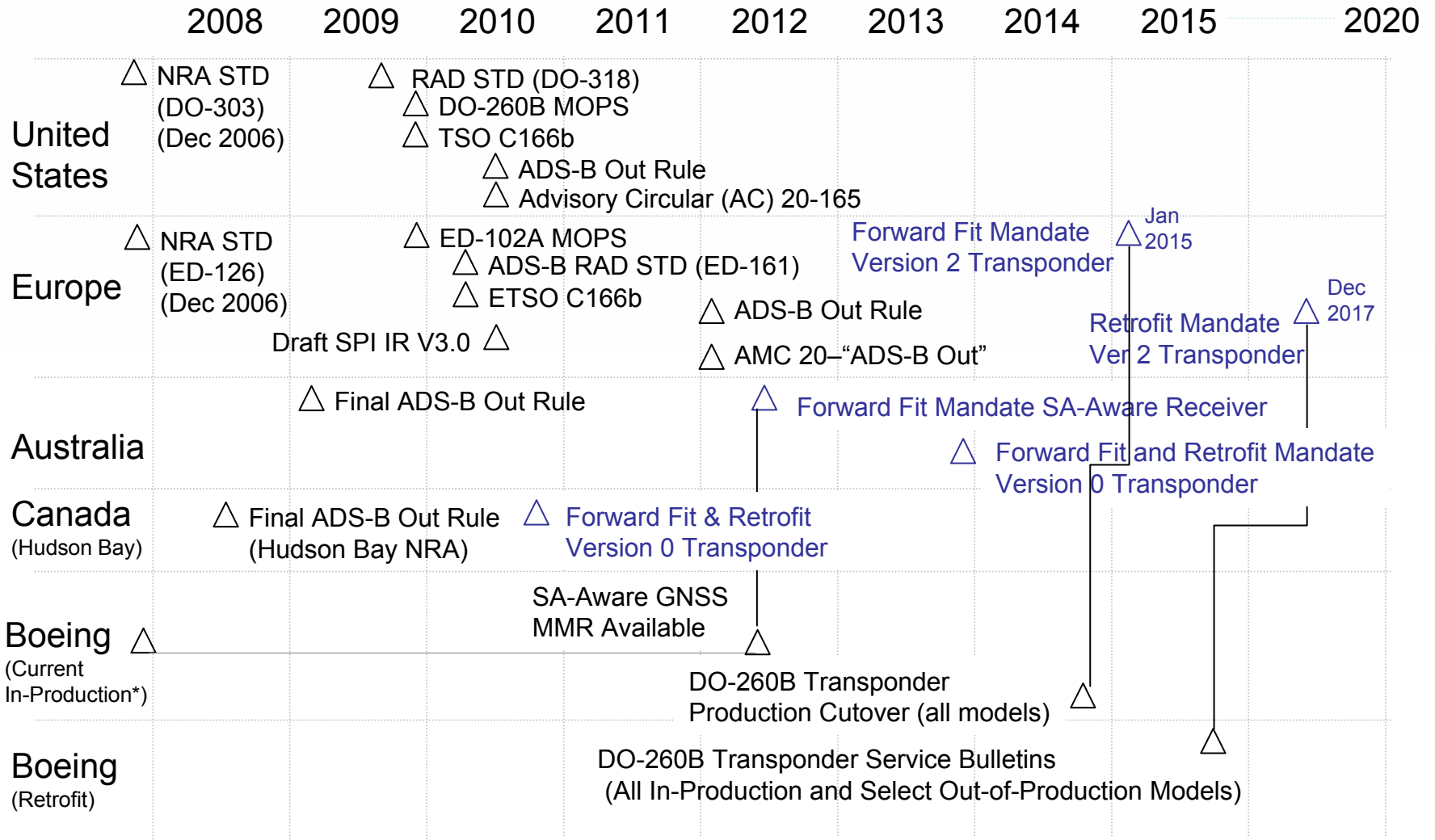
# ADS-B Out Mandate Timeframe Summary (Asia-Pacific Region)

- Australia (CAO 20.18, Amend Order No. 3, dated Dec. 2009)
  - Mandates ADS-B Out for upper airspace ( $\geq$ FL290) in Dec 2013
  - Current Boeing production equipage meets transponder requirements
  - SA-Aware GPS receiver will be required in production 28 June 2012
    - Boeing Fleet Team Digest article published Sept 2010 providing operators a list of equipment that are SA-Aware
    - Honeywell RMA-55B Multi-Mode Receiver is not SA-Aware and will not be modified to make it SA-Aware
  
- Hong Kong (Airworthiness Notice 102F, Issue 2, 28 Feb 2011)
  - Implement the use of Automatic Dependent Surveillance Broadcast (ADS-B) Out:
    - After 31 Dec 2013 for aircraft flying over PBN routes L642 or M771 between FL290 and FL410
    - After 31 Dec 2014 for aircraft flying within Hong Kong FIR between FL290 and FL410
  - Must meet DO-260 (Version 0) requirements of ICAO Annex 10 and ICAO Doc 9871 Chapter 2, or DO-260A (Version 1) requirements of ICAO Doc 9871 Chapter 3
  - Means of compliance per EASA AMC 20-24 or CASA CAO 20.18 Appendix XI
  - Current Boeing production equipage meets requirements
  
- Singapore (CAAS AIC 14, 28 Dec. 2010)
  - Implement the use of Automatic Dependent Surveillance Broadcast (ADS-B) Out after 12 Dec 2013 within certain parts of the Singapore FIR ( $\geq$ FL290)
  - Must meet EASA AMC 20-24 or CASA CAO 20.18 Appendix XI, otherwise must fly at <FL290
  - Current Boeing production equipage meets requirements
  
- Other Asia Pacific Regulatory Agencies
  - Expected to follow ADS-B Avionics Requirements template per APANPIRG Conclusion 21/39
  - Template states: Must meet EASA AMC 20-24 or CASA CAO 20.18 Appendix XI

# Worldwide ADS-B Out Certification Plan

(Implementation dates for Version 2 transponders are dependent on publication of EASA Rule)

Boeing equipage dates are not yet committed.



\* Future in-production aircraft (787-8 & 747-8) will both have Version 1 Transponder and SA-Aware GPS at Entry into Service (EIS)



# Conclusions

- Support ADS-B Out. We will meet ADS-B Out mandates.
- Coordinate with Air Navigation Service Providers (Canada, Australia, Europe, US) to ensure common airborne requirements global harmonization.
- Engage with airlines and industry partners on rulemaking around the world.
- Continue industry standards support.

## **Boeing Aero Magazine Article on ADS-B:**

[http://www.boeing.com/commercial/aeromagazine/articles/qtr\\_02\\_10/2](http://www.boeing.com/commercial/aeromagazine/articles/qtr_02_10/2)