


ADS-B OUT presentation - ADS-B Task Force - Singapore April 2011




ADS-B task force - Singapore

ADS-B OUT

(Airborne Dependant Surveillance Broadcast)



Presented by
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ADS-B Applications

ADS-B OUT



ADS-B OUT:
Capability to transmit ADS-B data



- ADS-B data provided by transponder
- Need transponder ADS-B OUT capable



For ground use:

- ADS-B NRA: Non Radar areas
- ADS-B RAD: Radar areas
- ADS-B APT: Airport surfaces

ADS-B IN




ADS-B IN:
Capability to receive ADS-B data

- ADS-B data received by TCAS
- Need TCAS ADS-B IN capable

For airborne use:
ATSAW (Air Traffic Situational Awareness)

- Step 2A: ATSAW operation in air
- Step 2B: ATSAW operation on ground

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ADS-B OUT - Operational Benefits

• ADS-B NRA (step 1A):

- Traffic management as
- Capacity increase by r
- Cost effectiveness for

• ADS-B RAD (step 1B):

- Enables to decommiss
- surveillance service.
- Would be the primary
- Usable in combination

• ADS-B APT (step 1C):

- New tool for surface m
- Safety enhancement

- ↗ Flight efficiency
- ↗ Safety
- ↘ Fuel burn
- ↘ Environmental emissions

ADS-B OUT – NRA application (Step 1A)

• ADS-B NRA (step 1A): used in area not covered by SSR

- Safety enhancement
- Traffic management as SSR like
- Capacity increase by reducing the separation as SSR like (e.g. 5NM)
- Cost effectiveness for airlines (better flight level...)

• ADS-B RAD (step 1B): used in high density area (covered by SSR)

- Enables to decommission redundant SSRs providing the same level of surveillance service.
- Would be the primary mean of surveillance with radar as a back up.
- Usable in combination with other surveillance sensors (WAM, SSR, or PSR)

• ADS-B APT (step 1C): used on airport surface

- New tool for surface movement surveillance
- Safety enhancement

ADS-B OUT – Airbus aircraft configuration for NRA

- Conditions to transmit ADS-B parameters on Airbus aircraft:

A320 & A330/A340 aircraft family:

- EHS/ADS-B wiring provision (basic)
- Transponders capable of ELS/EHS/ADS-B:
 - ACSS: P/N 7517800-10005A (DO-260)
P/N 7517800-10100 (DO-260A)
 - Honeywell: P/N 066-01127-1402 (DO-260)
 - Rockwell Collins: P/N 822-1338-021 (DO-260)
 - All transponders proposed by Airbus in line-fit are ELS/EHS/ADS-B capable.
- MMR (any vendor) OR some GPSSU (not all)
 - In line-fit, Airbus aircraft are only fitted with MMR

- No need of pin programming to activate ADS-B data transmission.
- Need certification for operational use if required by regulation.

A380:

- EHS/ADS-B parameters provided by AFDX (basic)
- AESS H04S05 (compliant DO-260A)

ADS-B OUT – Certification status for NRA

- ADS-B OUT for NRA operation has been certified on Airbus aircraft by EASA in compliance with AMC-20-24:
 - A330/A340 aircraft family since April 2008
 - A320 aircraft family since July 2008
 - A380 since June 2009

ADS-B OUT – Certification status for NRA

- As per EASA AMC-20-24 some AIRBUS documentation are required for operational approval:
 - ▶ **Update of AFM:** Statement of compliance with AMC 20-24
 - ▶ **ADS-B OUT Capability declaration document:**
 - Providing description, interoperability, safety and performance demonstration, specificities...etc
 - Referenced in AFM.
 - Useful for airline discussions with its Authority
- Others Airbus documentation update (not required by EASA):
 - ▶ **FCOM:** System description.
 - ▶ **MEL:** As required by regulations. To refer to your Authority for dispatch conditions.

ADS-B OUT – Certification status for NRA

Exemple of content of AFM page for A330/A340

Reference to compliance with AMC-20-24

ADS-B OUT

The extended squitter ADS-B Out function has been demonstrated to comply with airworthiness requirements for ADS-B Out in Non-Radar Areas contained in AMC 20-24. This approval is based on standards, descriptions, operational procedures and limitations contained in "ADS-B Out Capability Declaration" document reference X3452D07018335 (certification reference 00F340P5144/C0S) at the latest issue.

Note : 1. Direct ATC controller-pilot VHF voice communications must be available to conduct ADS-B out operations in non-radar areas.

2. Compliance with the above does not constitute an operational approval.

Reference to ADS-B OUT Capability Declaration

ADS-B OUT - Program Offerability for NRA

- Forward fit
 - ADS-B OUT certification proposed as an option on production aircraft
 - SA: CN.34.52.117 / 02
 - LR: CL.34.52.102 / 01
 - A380: CR.34.71.200 / 01
- Retrofit
 - Airbus Service Bulletin for ADS-B OUT certification available
 - SA: SB 34-1418
 - LR: SB 34-3219 (A330), SB 34-4223 (A340-200300), SB 34-5065 (A340-500600)
 - Contact SEUY department for retrofit (C.Vigier: christine.vigier@airbus.com)
 - For all equipments relative to ADS-B OUT

ADS-B OUT - ADS-B in-service aircraft status

- ADS-B in service installation status (March, 2011)

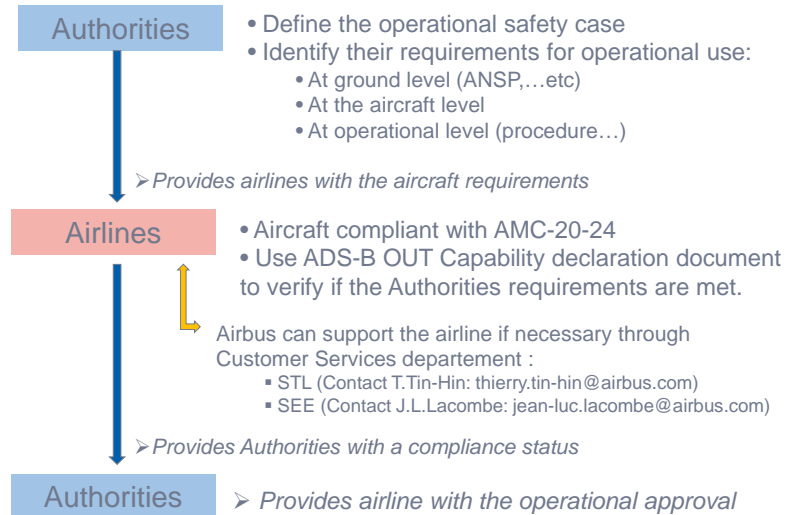
Does not include configuration changes managed through STC

Aircraft family	A320		A330/A340		A380	
Total number of a/c	4624		1152		45	
Nb of a/c NOT ADS-B OUT capable	1577	34%	118	10%	0	0%
Nb of a/c ADS-B OUT capable	3047	66%	1034	90%	45	100%
Nb of a/c ADS-B OUT capable but not certified with AMC-20-24	2636	57%	505	44%	15	33%
Nb of a/c ADS-B OUT capable and certified with AMC-20-24 (*)	411	9%	529	46%	30	67%

(*) means the AMC-20-24 compliance was requested by airline to Airbus

- More the a/c is recent more the a/c are ADS-B OUT capable
- Even if the a/c is capable, operators don't request official certification for AMC-20-24 compliance (→will change with the ADS-B mandate to come)

ADS-B OUT - Operational approval



ADS-B OUT – RAD application (step 1B)

- **ADS-B NRA (step 1A): used in area not covered by SSR**
 - Safety enhancement
 - Traffic management as SSR like
 - Capacity increase by reducing the separation as SSR like (e.g. 5NM)
 - Cost effectiveness for airlines (better flight level...)
- **ADS-B RAD (step 1B): used in high density area (covered by SSR)**
 - Enables to decommission redundant SSRs providing the same level of surveillance service.
 - Would be the primary mean of surveillance with radar as a back up.
 - Usable in combination with other surveillance sensors (WAM, SSR, or PSR)
- **ADS-B APT (step 1C): used on airport surface**
 - New tool for surface movement surveillance
 - Safety enhancement

ADS-B OUT – RAD application (step 1B)

- **ADS- B OUT for RAD (*application for high density airspace*)**
 - Enables to decommission redundant SSRs providing the same level of surveillance service.
 - Would be the primary mean of surveillance with radar as a back up.
 - EASA & FAA requirements for RAD operations recently published:
 - Requirement to be compliant with DO-260B
 - Updates in ADS-B OUT set of messages/performance
 - NIC, NAC, Emergency status, mode A, latency<0.5sec,....
 - **Development of Airbus transponders DO-260B compliant planned to start in 2011.**
 - Software and hardware upgrade of current transponders will be needed
 - **All next transponders standards will be certified with DO-260B compliance.**

ADS-B OUT – APT application (step 1C)

- **ADS-B NRA (step 1A): used in area not covered by SSR**
 - Safety enhancement
 - Traffic management as SSR like
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- **ADS-B RAD (step 1B): used in high density area (covered by SSR)**
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ADS-B OUT – APT application (step 1C)

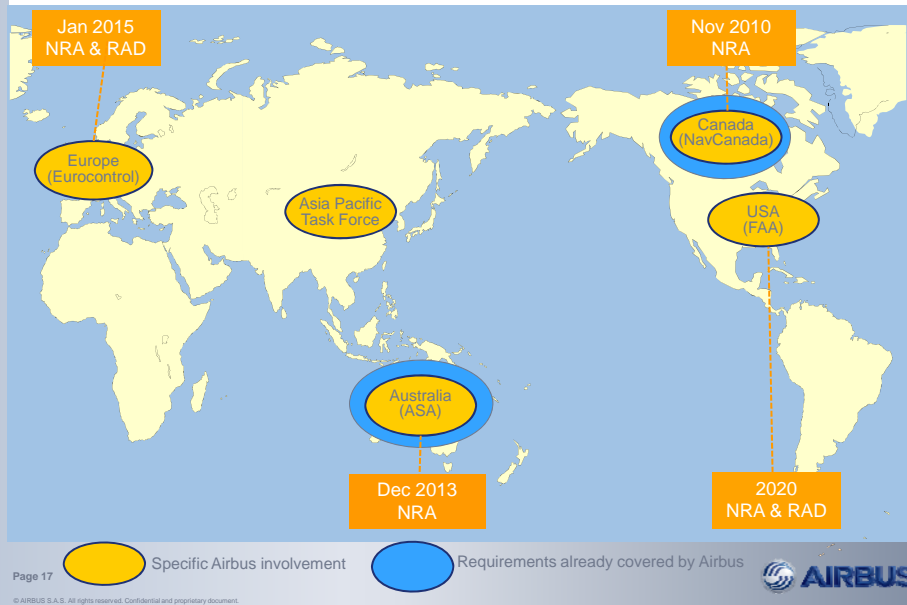
- **ADS- B OUT for APT** (*application for airports surface*)
 - New tool for surface movement surveillance
 - Standardization in progress
 - Light involvement from Airbus for the time being
 - DO-260B should fulfill APT requirements

- Airbus is aiming at minimizing implementation steps and ensuring cost effectiveness of standardized solutions

ADS-B OUT - Mandates

- **Canada** (Nav Canada): in the vicinity of Hudson Bay
 - Mandate for **NRA** operations: **November 2010** (first operations: January 2009)
 - **DO-260** at the minimum
- **Australia** (Airservices Australia):
 - Mandate for **NRA** operations: **December 2013**
 - **DO-260** at the minimum, GPS SA Aware
- **Europe** (Eurocontrol):
 - Mandate for **NRA & RAD** operations: **January 2015** (forward fit), **December 2017** (retrofit)
 - **DO-260B** required
- **US** (FAA):
 - Mandate for **NRA & RAD** operations: **2020**
 - **DO-260B** required, Requirements in accordance between US & Europe

ADS-B OUT Implementation



QUESTIONS?

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