

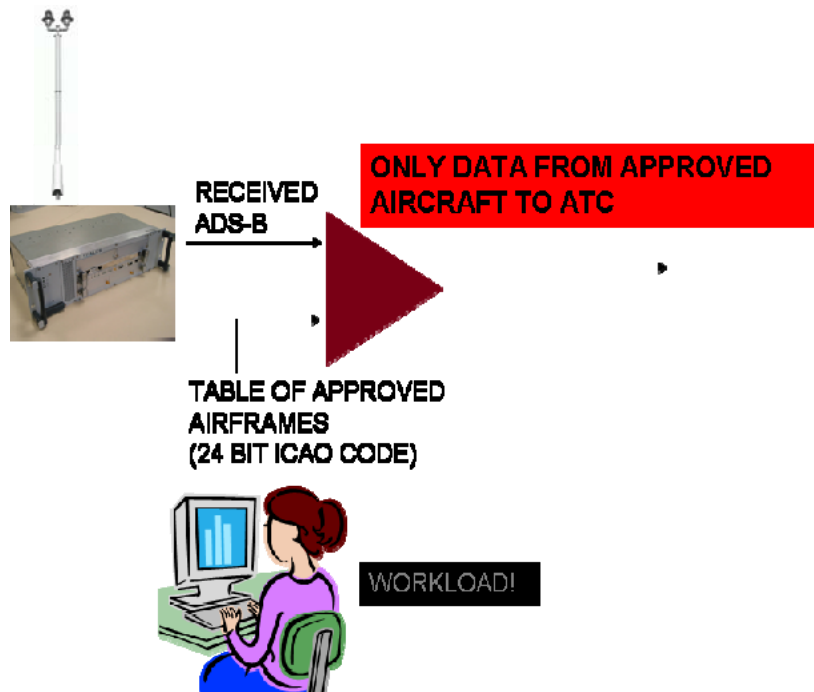


White list to Black List Plan by Australia

Greg Dunstone

Surveillance Program Lead

White list



- White list invented in early days of ADS-B (2006 commissioning)
- ATC don't see unapproved aircraft
- Appropriate at the time
 - Before regulations were in place
 - Before technology was known
- Aircraft by aircraft approvals are costly
- Aircraft by aircraft approvals deny benefits/safety to some
 - Especially foreign operators

Technical nature of change



RECEIVED
ADS-B

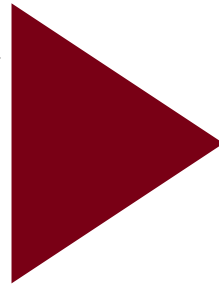
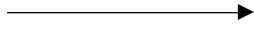


TABLE OF DISAPPROVED
AIRFRAMES
(24 BIT ICAO CODE)



- Change the data table stored in the ground stations
- List disapproved aircraft
- No software change required
 - Existing design envisaged this use

Airservices Responsibility

- Not an Airservices responsibility to check that operators follow regulations

- Airservices ATC does not check operators
 - Correct navigation avionics performance
 - Correct radio performance
 - Correct fuel or structural maintenance
 - Correct transponder maintenance

CASA published regulations regarding this issue in 2007.

After subsequent revision in 2009 to exclude NUC=0 airframes, the regulations currently state :

9B.6 If an aircraft carries ADS-B transmitting equipment which does not comply with an approved equipment configuration, the aircraft must not fly in Australian territory unless the equipment is:

- (a) deactivated; or
- (b) set to transmit only a value of zero for the NUCp or NIC.

Note It is considered equivalent to deactivation if NUCp or NIC is set to continually transmit only a value of zero.

New CASA AC –released



http://www.casa.gov.au/wcmswr/_assets/main/rules/1998casr/021/021c45.pdf

Lists approved avionics (same as existing AC)

Lists disapproved avionics (new)

Table 2: Non-Compliant ATC Transponder and MMR/GPS Receiver Combinations – Not acceptable for continued use

Transponder Manufacture and Model	Transponder Part Number	MMR/GPS Receiver Manufacturer and Model	MMR/GPS Receiver Part Number
ACSS XS-950 Does not use HPL for calculation of NUC. ACSS have a Service bulletin to upgrade to Mod A.	7517800-1005/6 :	Any	
Any		Litton LTN2001Mk1 Does not properly transmit HPL	465205-0302-0303 465205-0402-0303 465205-0502-0304
Rockwell Collins TDR-94/94D pre -108 Rockwell advises that ADS-B should be disabled for these transponders by grounding discrete input P1-59		Any	
TPR901 Fitted to Boeing 747-400 generates incorrect Flight ID with a trailing "U" character. SB 503 is available to rectify.	822-1338-003	Any	

NFRM 1103AS published



http://www.casa.gov.au/scripts/nc.dll?WCMS:STANDARD::pc=PC_100828

Addition of provisions for flight with unserviceable ADS-B equipment in the ADS-B rule

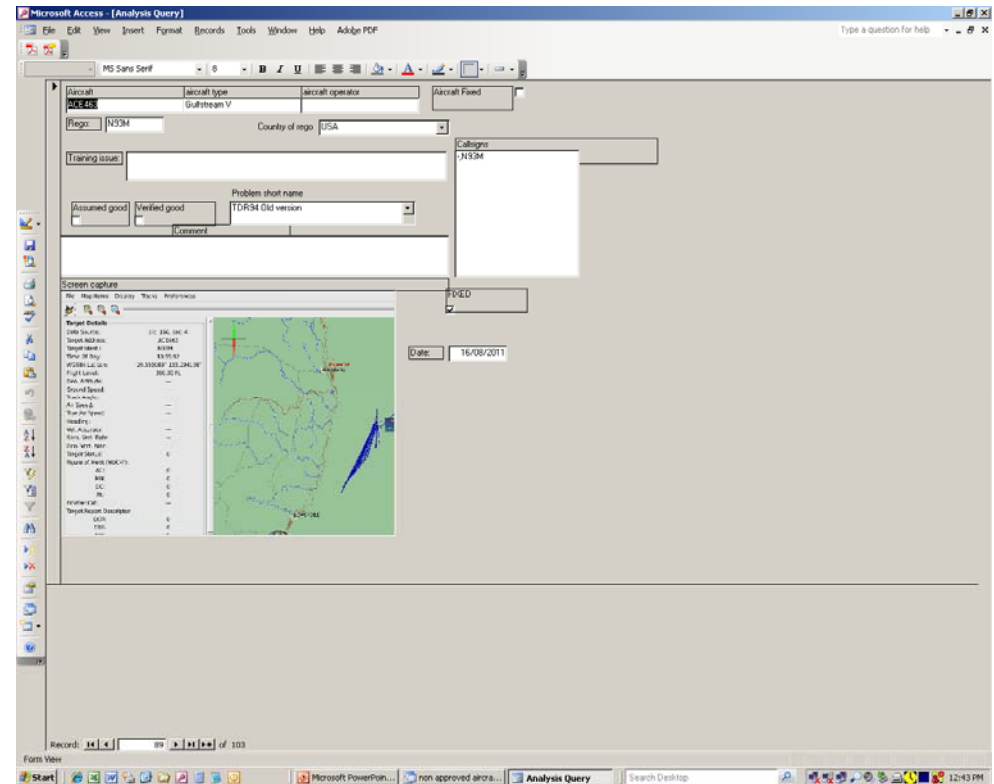
if:

- (a) the aircraft owner, operator or pilot has written authorisation from CASA for the operation of the aircraft without the ADS-B transmitting equipment;
or
- (b) the equipment is unserviceable for a flight, and each of the following applies:
 - (i) the flight takes place within 3 days of the discovery of the unserviceability; and
 - (ii) at least 1 of the following applies for the flight:
 - (A) flight with unserviceable instruments or equipment has been approved by CASA subject to such conditions as CASA specifies;
 - (B) the unserviceability is a permissible unserviceability set out in the minimum equipment list as approved by the NAA of the State of registration of the aircraft;
 - (C) CASA has approved the flight with the unserviceable equipment and any applicable conditions that CASA has specified in writing have been complied with; and
 - (iii) ATC clears the flight before it commences despite the unserviceability.

Examination of data



- ADS-B data from 43 ADS-B receiver sites in Australia
- Tools & Database developed
- From 21 January till 3 October 2011
- A number of problem aircraft found
 - Some in already approved aircraft (most)
 - Some in not approved aircraft



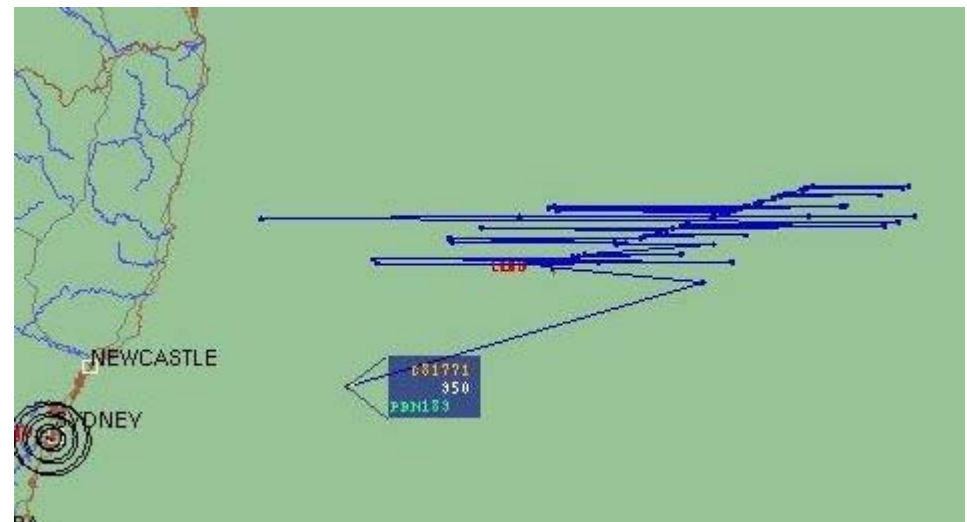
Number of issues is low



	Problem		Number of Airframes Jan-Sept 2011
1	TPR901 Jumps	Position jump/error	43
2	TDR94 Old version	Position jump/error	14
3	Flight ID corrupted	Coupling problem	11
4	Litton Mark I	Lack of integrity	8
5	Wrong 24 bit code	Not ADS-B specific	7
6	No Flight ID transmitted	Coupling problem	2
7	SIL programming error	No display	7
8	NUC climbs	Bali Ground station pb	7
9	Incorrect Flight ID programming inc Garmin	Coupling problem	3

Rockwell TPR Problem (43 airframes)

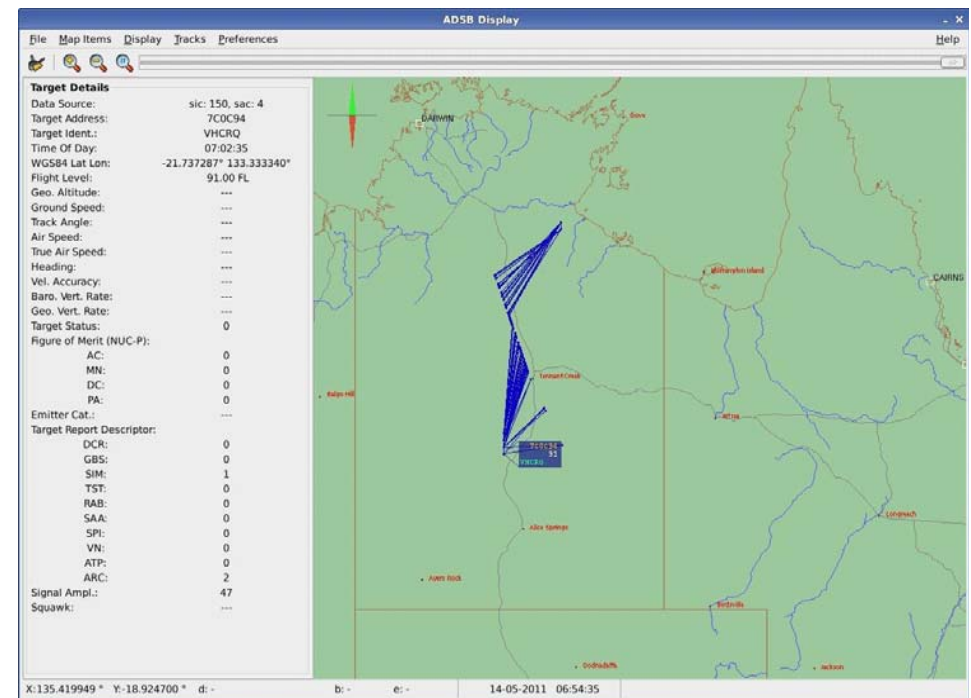
- Wild positional jumps
- Detected on APPROVED aircraft
- Misleading data – must be corrected
- Large percentage NUC=0 (not displayed)
- Obvious and annoying problem
- Fix available
- Black list will be used if not fixed.
- United (now fixed), Delta, Korean, Pacific Blue, VirginAustralia (B777)



Rockwell Collins TDR94 Old version

(14 airframes)

- Software version before -108
- Not APPROVED (transmission contrary to Regs)
- Misleading data – must be disabled
- Large percentage NUC=0 (not displayed)
- Obvious and annoying problem
- Fix available – disable or upgrade.
See Service Information Letter 1-05 July 19, 2005
- Black list will be used if not fixed.
- USA based Gulfstream V biggest offenders
- Could ask CASA for Airworthiness Directive



Litton GPS (7 airframes)

- Incorrect integrity data
- Not APPROVED (transmission contrary to Regs)
- Large percentage NUC=0 (not displayed)
- Positional data looks good but without “proper integrity” protection
- Expensive fix – replace GPS
- Black list will be used if not fixed.
- Indonesian A330s

FlightID corruption (11 airframes)

Trailing “U” problem

- B744 additional “U” character in Flight ID

Flight IDs received: GT615 ,GT615U ,NEB033 ,NEB033U ,QF7550 ,QF7550U ,QF7583 ,QF7583U ,QF7585 ,QF7585 ,QF7585U ,QF7594 ,QFA7521 ,QFA7531 ,QFA7531 ,QFA7531U ,QFA7532 ,QFA7532U ,QFA7532N ,QFA7550 ,QFA7552 ,QFA7581

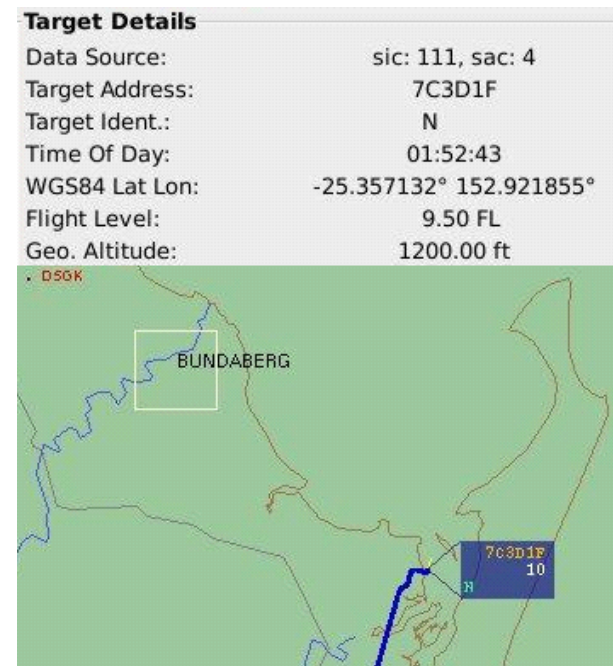
- Not on approved aircraft
- Causes coupling problems
- Obvious and annoying problem
- Fix available
- Black list will be used if not fixed.

Incorrect 24 bit code (7 airframes)

- A generic Mode S transponder issue rather than ADS-B related
 - ADS-B ground station can't process 2 aircraft on same 24 bit code
 - TCAS can't either
- Risk is if two aircraft with same code operate within coverage at the same time.
- Detections have been aircraft in Indonesia & PNG
- Cannot use Black list because it would disable aircraft on correct code

Flight ID Garmin "N" Problem (1 * airframe)

- Incorrect installation procedure.
Reports Flight ID as "N"
- FAA advised
- Obvious and annoying problem
- Easily fixed (Front panel entry)
- Black list will be used if not fixed.



Other incorrect programmed Flight ID

(2 airframes)

- Obvious and annoying problem
- Easily fixed
- Black list will be used if not fixed.

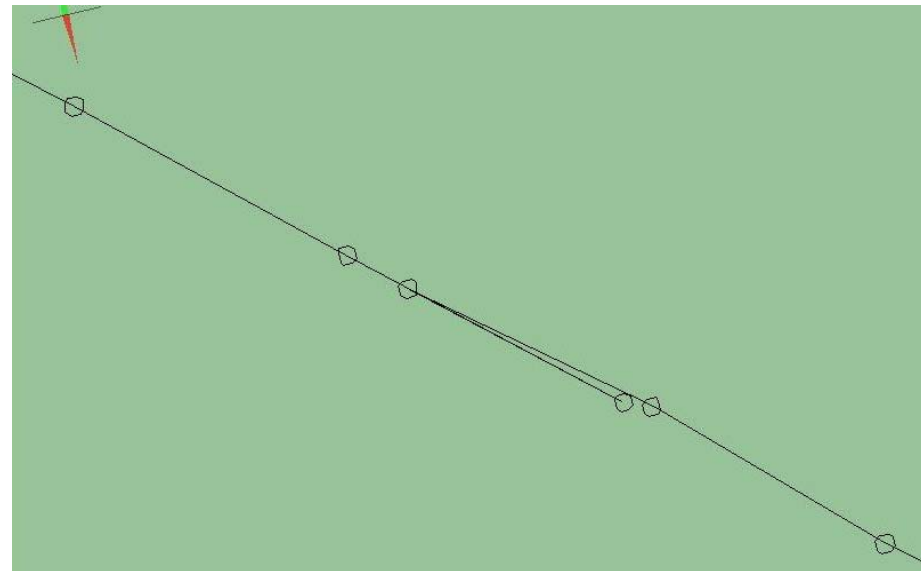
SIL programming error (7 airframes mainly choppers)

- DO260A aircraft only
- Results in FOM=0 and aircraft not displayed to ATC.
- Consequence is no ATC display

Older Airbus

- Very small position jump backwards
- One in 100 reports
- Size ~0.1 Nautical mile

- Root cause not fully analysed



ACSS Transponder 10005/6 without Mod

- Not approved **(0 airframes detected)**
- This is a “heavy aircraft” transponder model. Not used in GA.
- Regulations require ADS-B transmission be disabled from these transponders
- Positional data is good.
- Does not have HPL integrity protection in case of faulty satellite ranging signal. (has occurred once in life of GPS)
- Cannot be detected “on ground”
- If known, black list could be used. Similar to use of an unapproved ATC transponder.

How many issues?



**Number of “new”
unapproved problem
aircraft detected**

**6 / month (after initial
capture in Jan/Feb)**

**243 airframes
unapproved aircraft that
appear “good”.**

January	40
February	24
March	6
April	2
May	5
June	6
July	4
Aug	11
Sept	3
Total	101

Foreign Regulator Approvals

The meeting may consider the consequences of the plan

- that Foreign Aircraft approvals will have NO impact on ATC.
- If an aircraft transmits ADS-B with good NIC/NUC – it WILL be displayed.
- CASA & Foreign regulators to ensure that operators comply with regulations

Questions?

