



ADS-B Applications

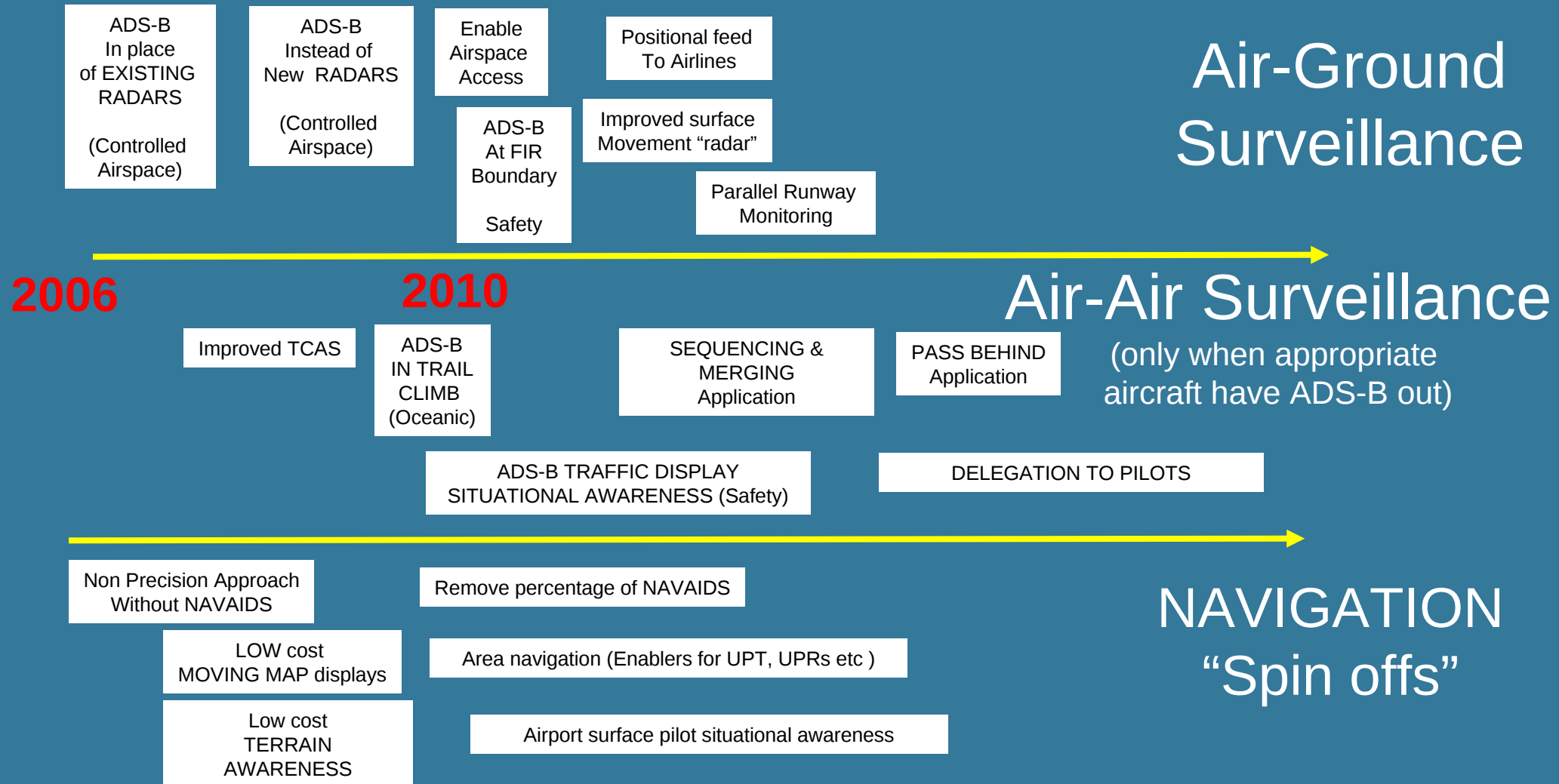
APANPIRG ADS-B TASK FORCE SEMINAR
Nadi , Fiji

Greg Dunstone
Technology Development
Airservices Australia

from the ground up



ADS-B & Related Applications





RFG Package 1 applications

- Documents being developed by RFG (FAA-Eurocontrol)
- Initial **Ground Surveillance** applications
 - ATC surveillance for radar airspace (ADS-B-RAD);
 - ATC surveillance in non-radar areas (ADS-B-NRA);
 - Airport surface surveillance (ADS-B-APT); and
 - Aircraft derived data for ground tools (ADS-B-ADD).

Bundaberg trial

- Deployed and operationally commissioned ADS-B
 - In a limited geographic area
 - Equipped 9 aircraft
 - Dh8, Shorts, B200, Jabiru
- Objective : Learn operational lessons
- One ground station (Sensis Corporation)
- CASA approved 5Nm separation services



Antenna for Receiver 1

Antenna for Receiver 2

A new era in air traffic surveillance

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Automatic Dependent Surveillance Broadcast

What the air traffic controller sees

Recorded ADS-B operations from
Brisbane Centre

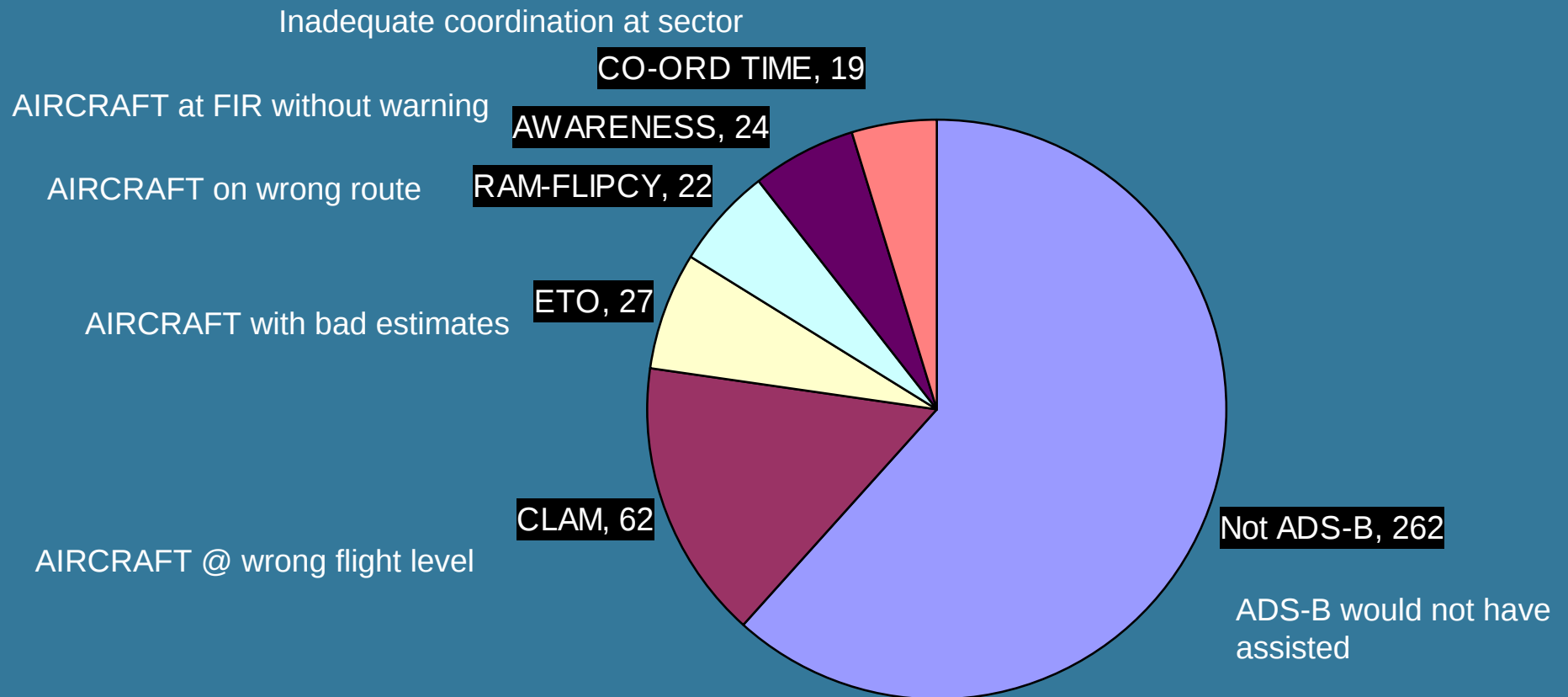
✕ = ADS-B derived position

○ = RADAR derived position



Incident review

Summary All Incidents





ATM Discontinuities

- Every FIR boundary represents a
 - Discontinuity
 - Different database
 - Risk, errors, different views of “true” situation
- Surveillance provides
 - Feedback (closes the loop)
 - Rather than 30 minute position & level reports
 - Detects errors/ blunders
 - ATC, pilot, other ATC
 - Minimises the IMPACT of errors
- ADS-B provides inexpensive means to share data
 - For co-operative aircraft
 - No threat to military

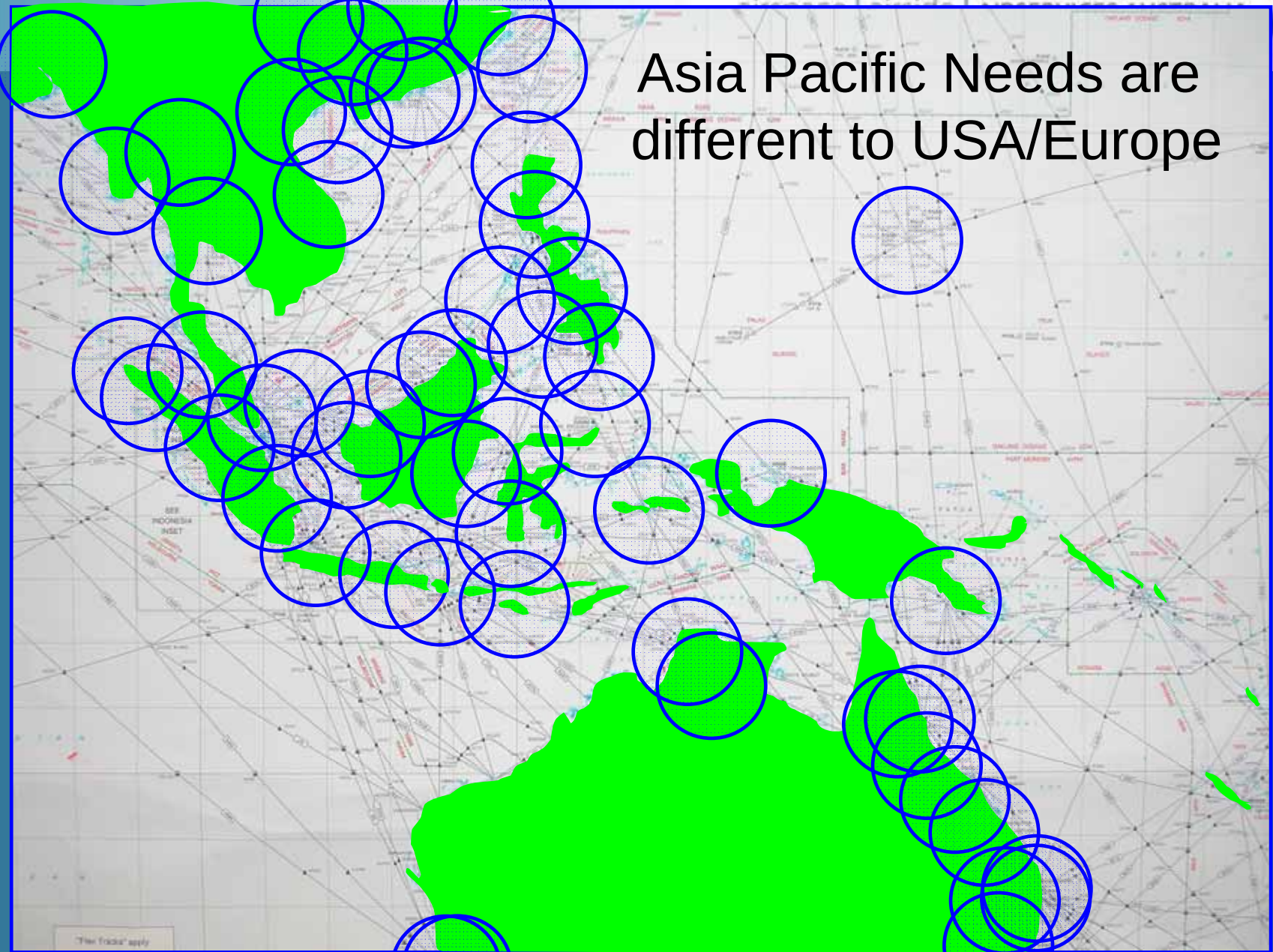


Asia Pacific Perspective

- Need for basic surveillance
- Need for low cost and low maintenance infrastructure
- ADS-B can provide immediate
 - Safety & efficiency benefits
 - Compared to procedural ATC
- Can enhance radar coverage in some states



Asia Pacific Needs are different to USA/Europe

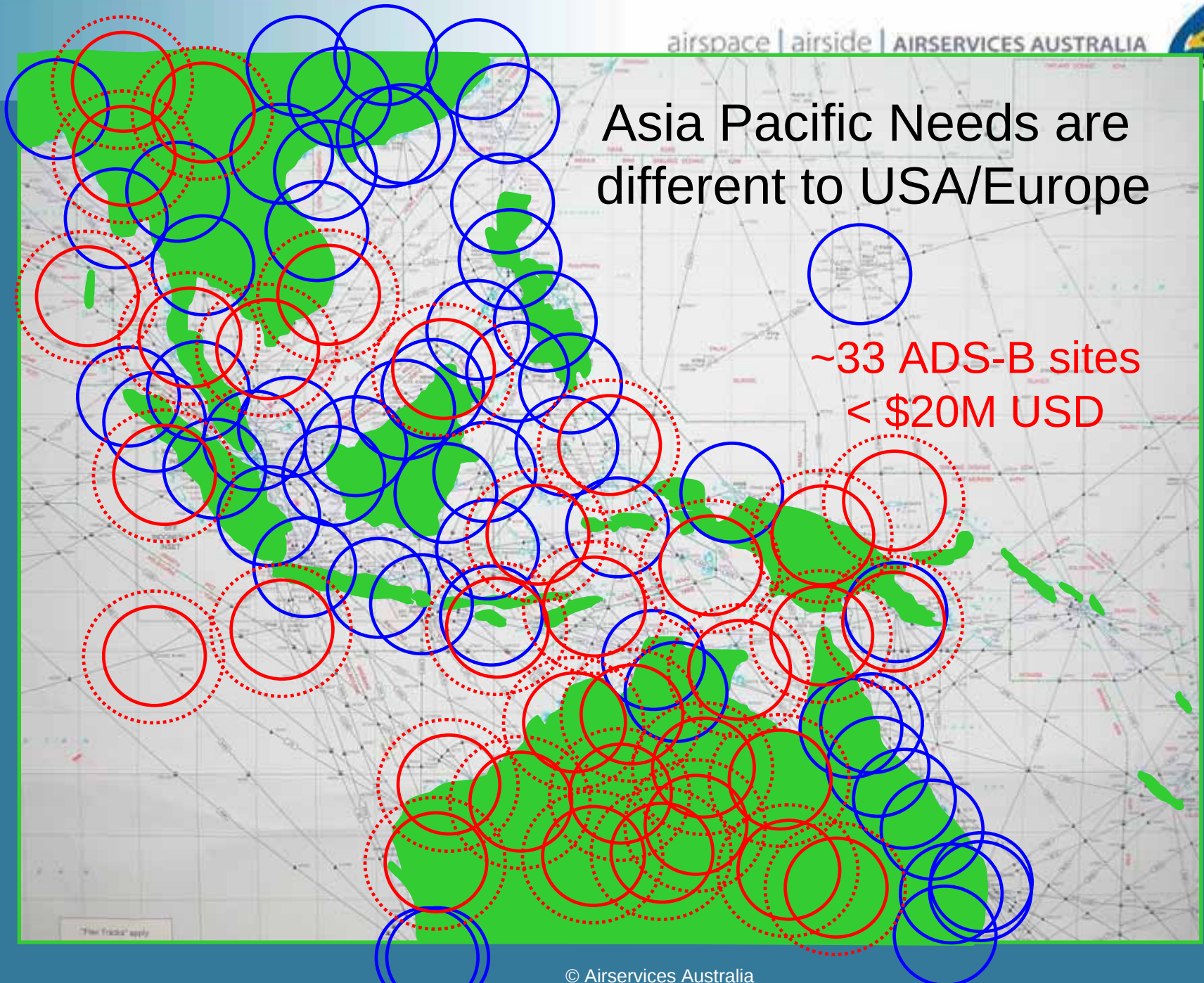


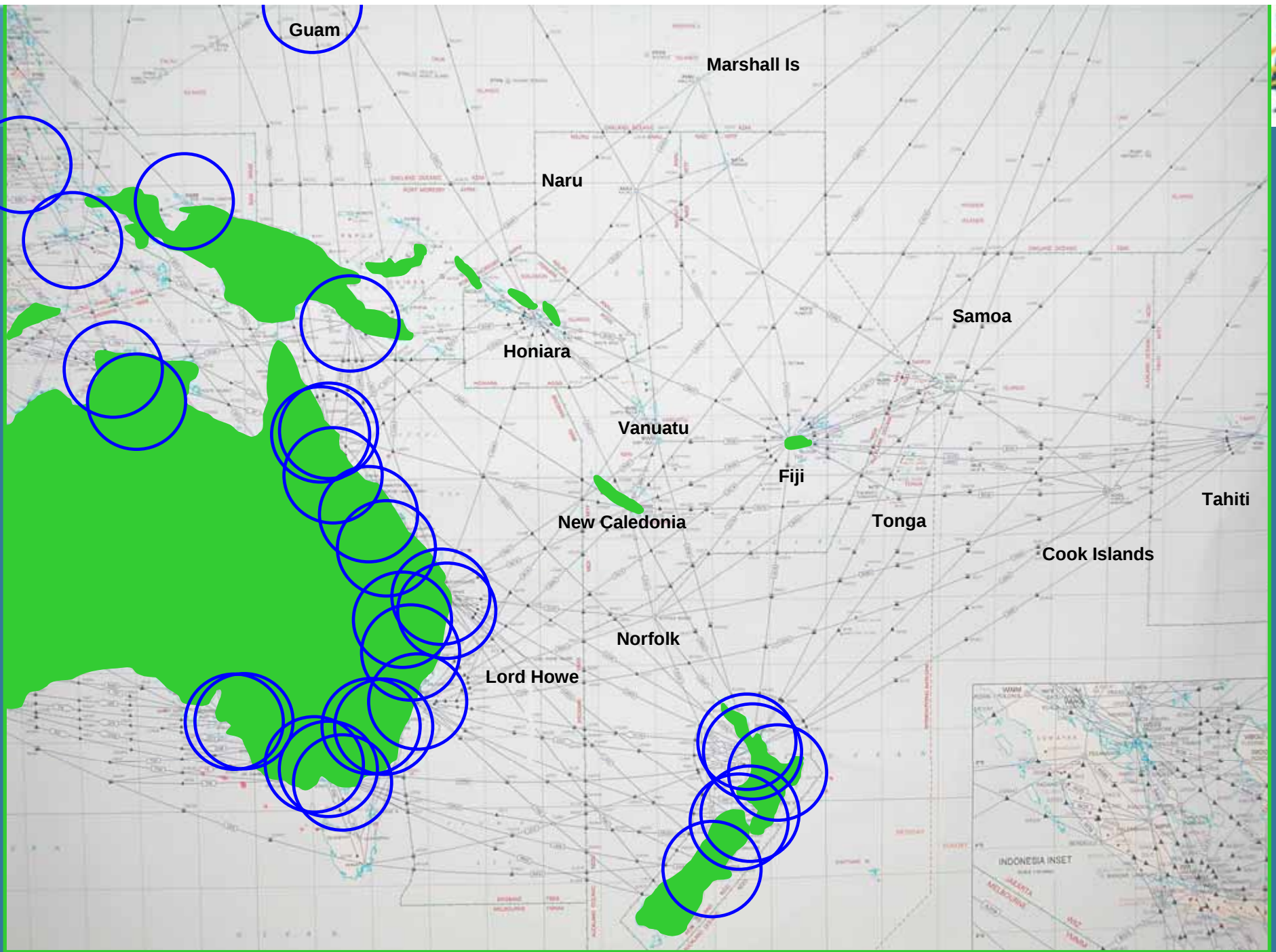


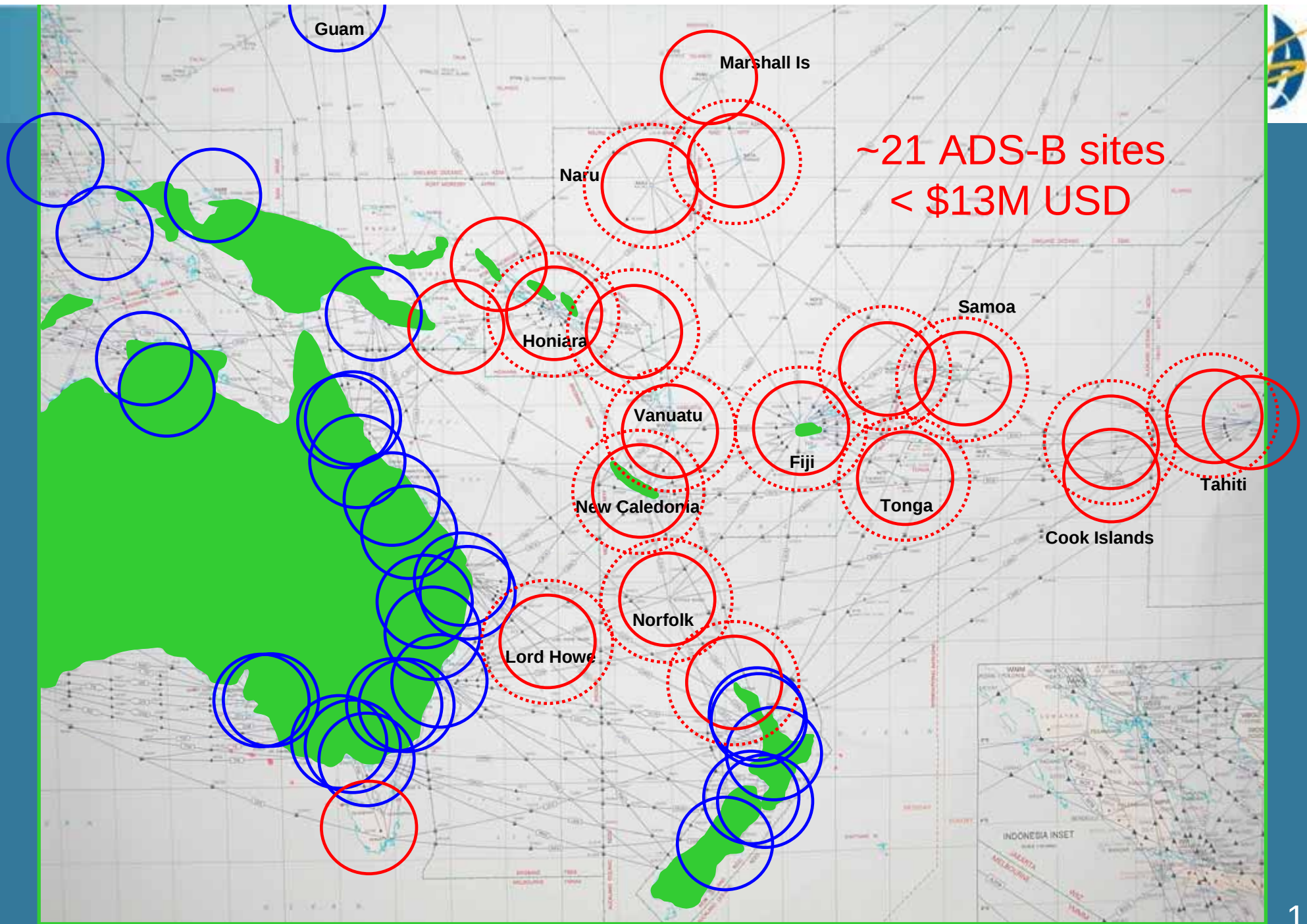
Asia Pacific Needs are different to USA/Europe



~33 ADS-B sites
< \$20M USD







~21 ADS-B sites
< \$13M USD



1st Tier “Radar like” services

- Radar like performance
 - For separation
 - For vectoring
- High performance
 - Reliability
 - Integrity
 - Latency

ADS-B



**DUPLICATED ADS-B GROUND
AT NEW or OLD SITE**

**DUPLICATED
DATA FEED**





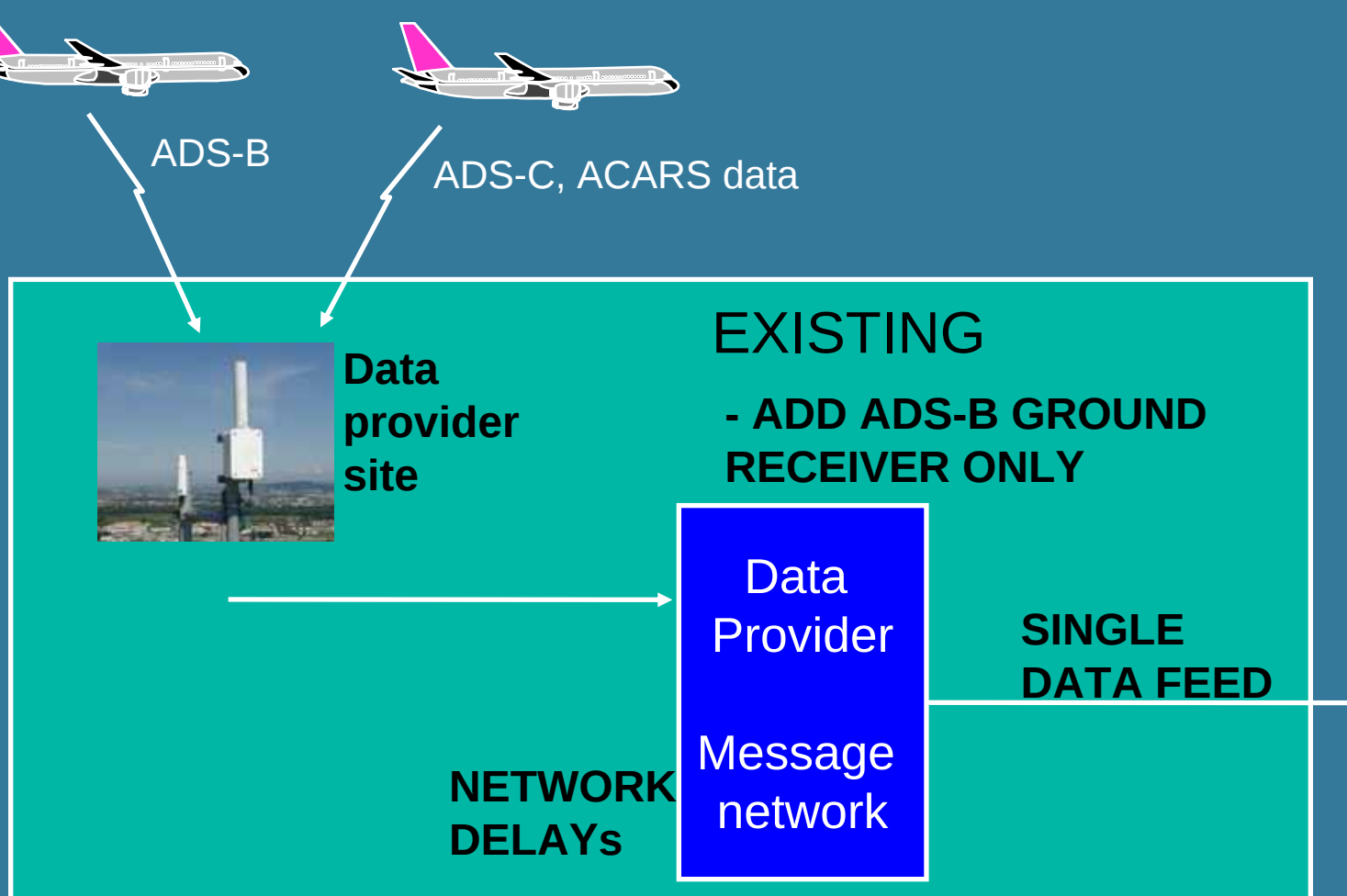
Second Tier service concept

- Where it is too expensive for
 - High reliability (eg duplicated)
 - Low latency (say 10 seconds)
- Could use a third party communications provider
- Reduced services
 - Eg No vectoring and perhaps increased separation



Envisaged 2nd Tier

- Situational awareness
- Safety net alerts
- Search & Rescue
- Not 5nm separation





2nd Tier is useful & safe

- High integrity is retained (CRC, error correction, time tagged)
- Functions available
 - Safety alerts
 - Search & Rescue
 - ATC Situational awareness
 - FIR crossing coordination
 - Update FDP estimates
 - Support procedural standards (eg: aircraft passed)



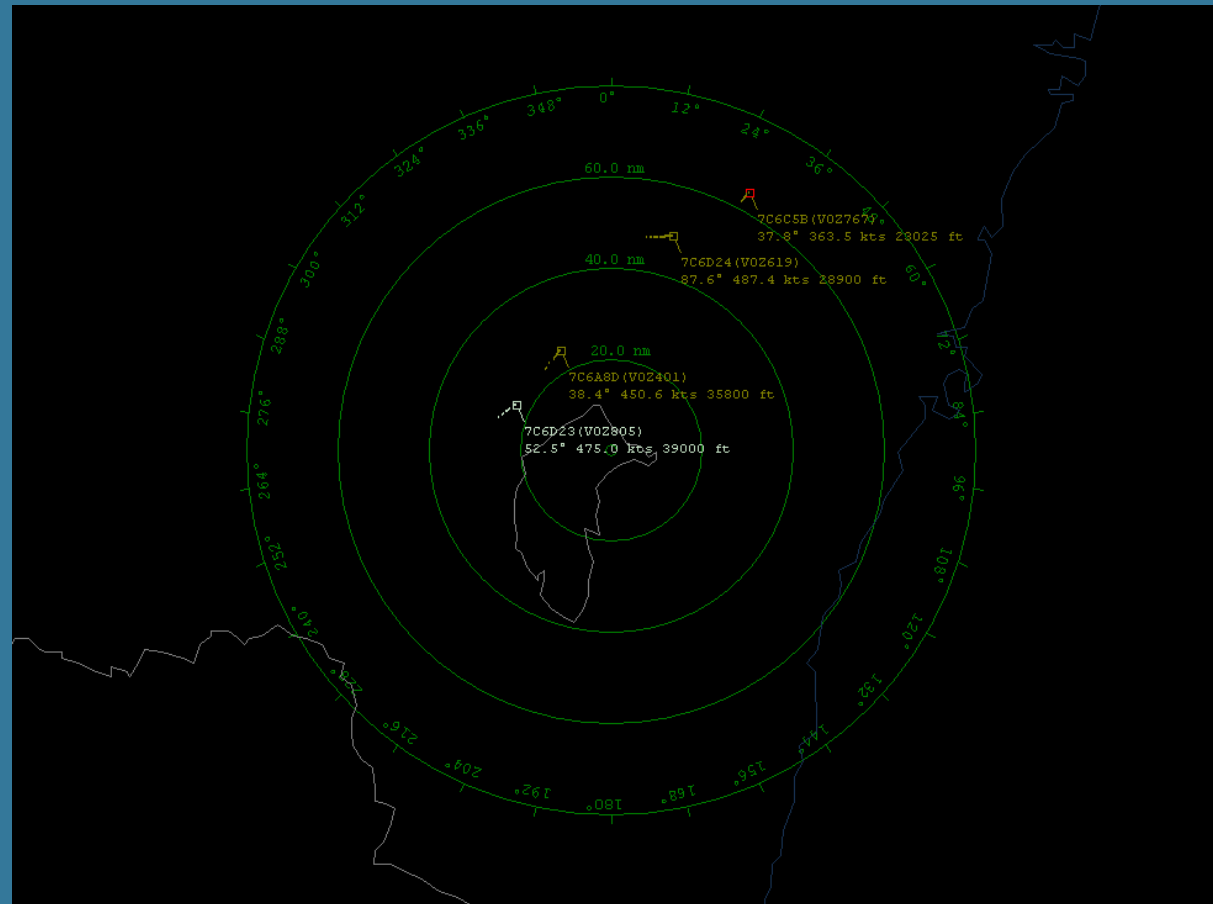
Operational control

Airline Fleet management

- Obtain a “feed” from your ATC provider
or
- Your own ADS-B Ground station



~\$1200 USD on Internet



Radar

Domestic

International

Hangars

**SURFACE MOVEMENT RADAR
SUPPORT AT LOW COST**



Cockpit Display Traffic Indicator CDTI



CDTI & TCAS becoming available

- Garmin AT Certification flight of ADS-B avionics integrated with TCAS in UPS B767
- Other vendors have similar products available now or soon



Photo : Courtesy : UPS
Movie : Courtesy of Garmin AT





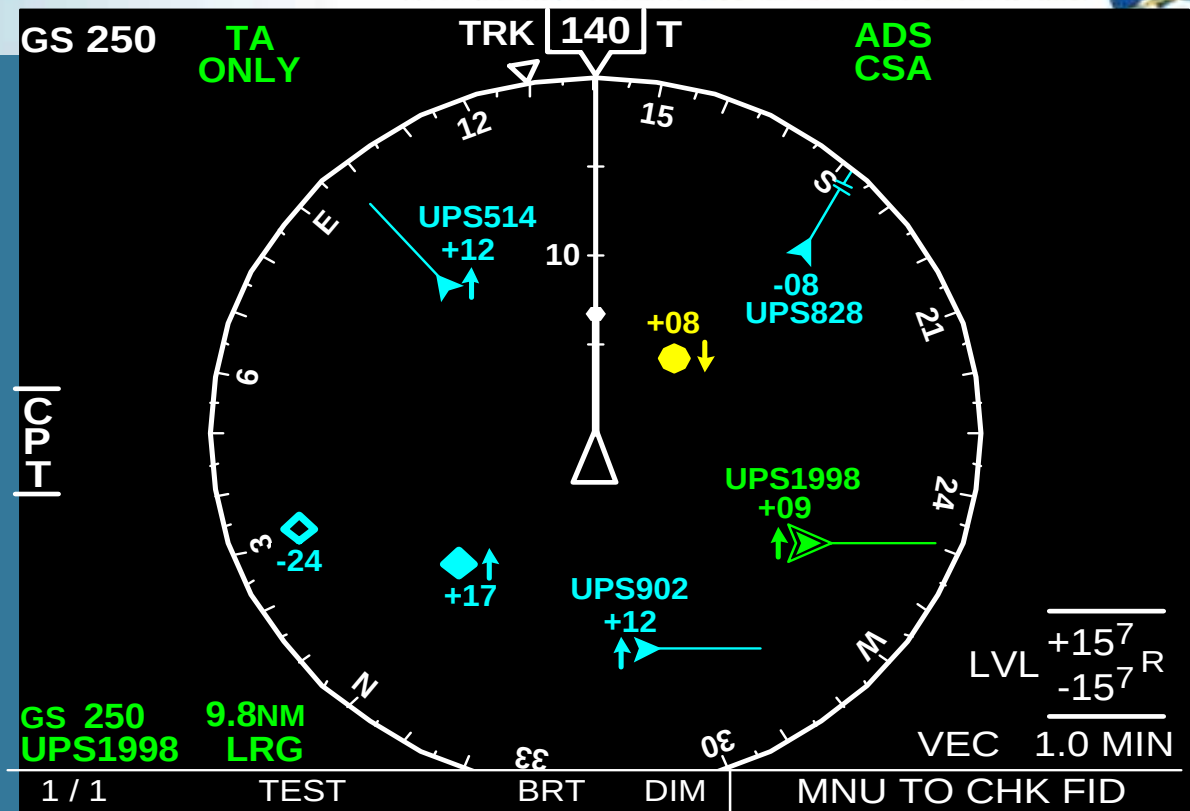
CDTI is being used

Email from UPS IPA Pilot to UPS Management

"Well, I've seen the light..."

Last Friday night, I was flying into the SDF sort around midnight and the ADS-B/CDTI was showing almost all the inbound traffic as ADS-B equipped. The parade of inbounds could be easily seen on the screen. The reason for the occasional turn and/or speed reduction could be anticipated by a near radar like view of the traffic surrounding us and the flow to the final segment (NAV function displayed on CDTI). The situational awareness of the ATC environment was dramatically increased...

Pretty neat stuff"



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Cockpit Display of Traffic Information



ADS-B receiver & display
in Baron VH-NSK



PDA version for low end GA with moving terrain map





BAe Systems : Pass Behind application demo





Airbus Video



ADS-B will change Air Traffic Management

- The world is adopting ADS-B
 - Significant impact on ATC, Procedures, Airspace, and Technology
 - In Europe
 - Air-Ground : Eurocontrol just ordered 5 Thales ADS-B Ground stations & 4 Raytheon ADS-B ground stations
 - Air-air surveillance : Significant work in progress & trials
 - In USA
 - Significant investment in “Safe Flight 21 Project”
 - Discussing replacement of enroute SSR radars with ADS-B





Discussion

More details on Airservices Website

<http://www.airservicesaustralia.com/pilotcentre/projects/adsb/adsb.htm>

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