CDO - Smart, Stable, Smooth, Safe

The Airways New Zealand CDO Journey

AIRWAYS
making your world possible

About Airways New Zealand

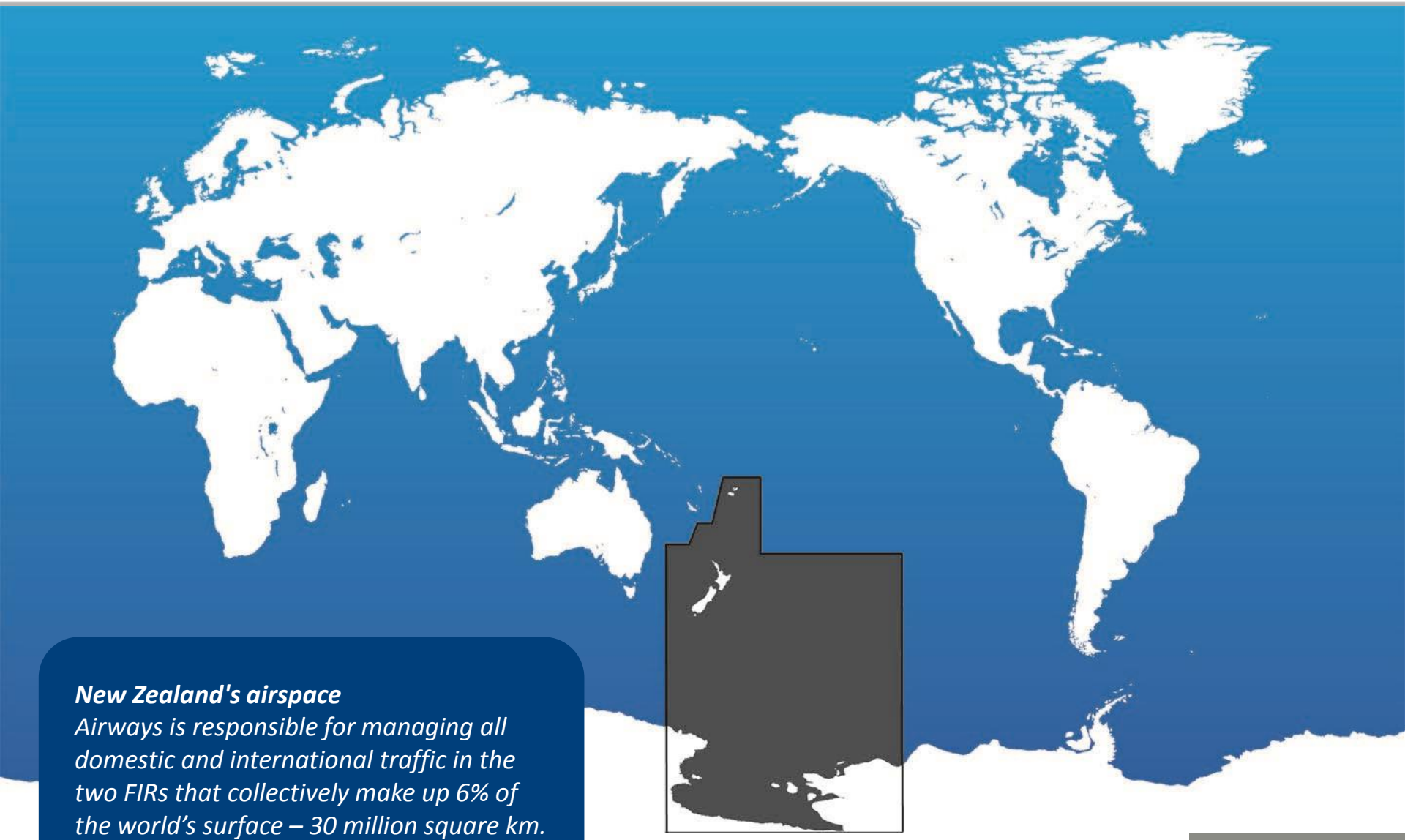
Airways is New Zealand's sole air navigation service provider and the world's first commercial ANSP

Airways provides all military and civil air navigation services in New Zealand's domestic Flight Information Region (FIR) and the Auckland Oceanic FIR

Airways is a State Owned Enterprise – a fully owned subsidiary of the New Zealand Government operating as a commercial business

Airways profile

- Over 1.1 million aircraft movements annually
- 14 million passengers annually
- 2 Radar Control Centres (Christchurch and Auckland), and 17 control towers
- 6 international airports
- Controls 30 million sq.km of airspace and two flight information regions – New Zealand and Auckland Oceanic
- 770 staff (400 ATS)



New Zealand's airspace

Airways is responsible for managing all domestic and international traffic in the two FIRs that collectively make up 6% of the world's surface – 30 million square km.

Why have CDO?

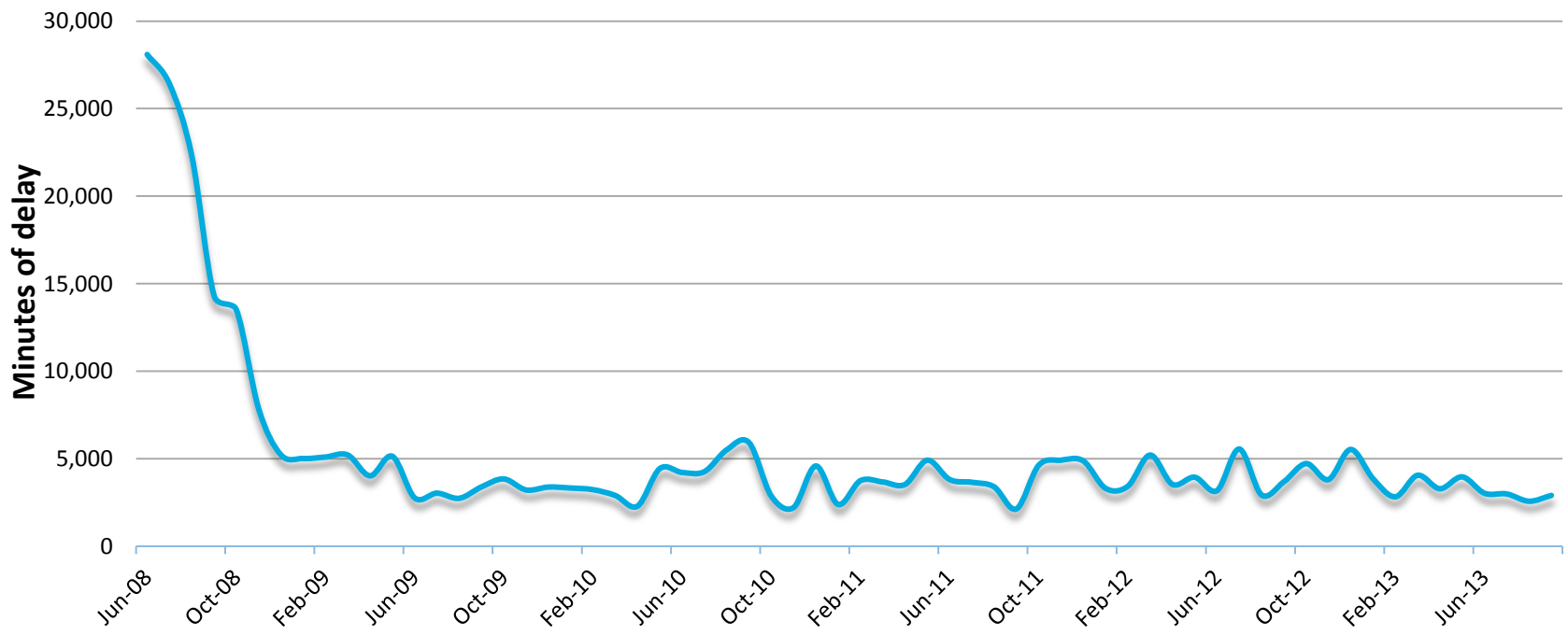
- NZ has five main RPT jet serviced airports
- Four of these have capacity demand balancing in use (CFM)
- Traffic levels are classed as medium to low
- Turboprops make up 60%+ of traffic numbers
- Significant opportunity to achieve CDO in normal operations

[redacted]

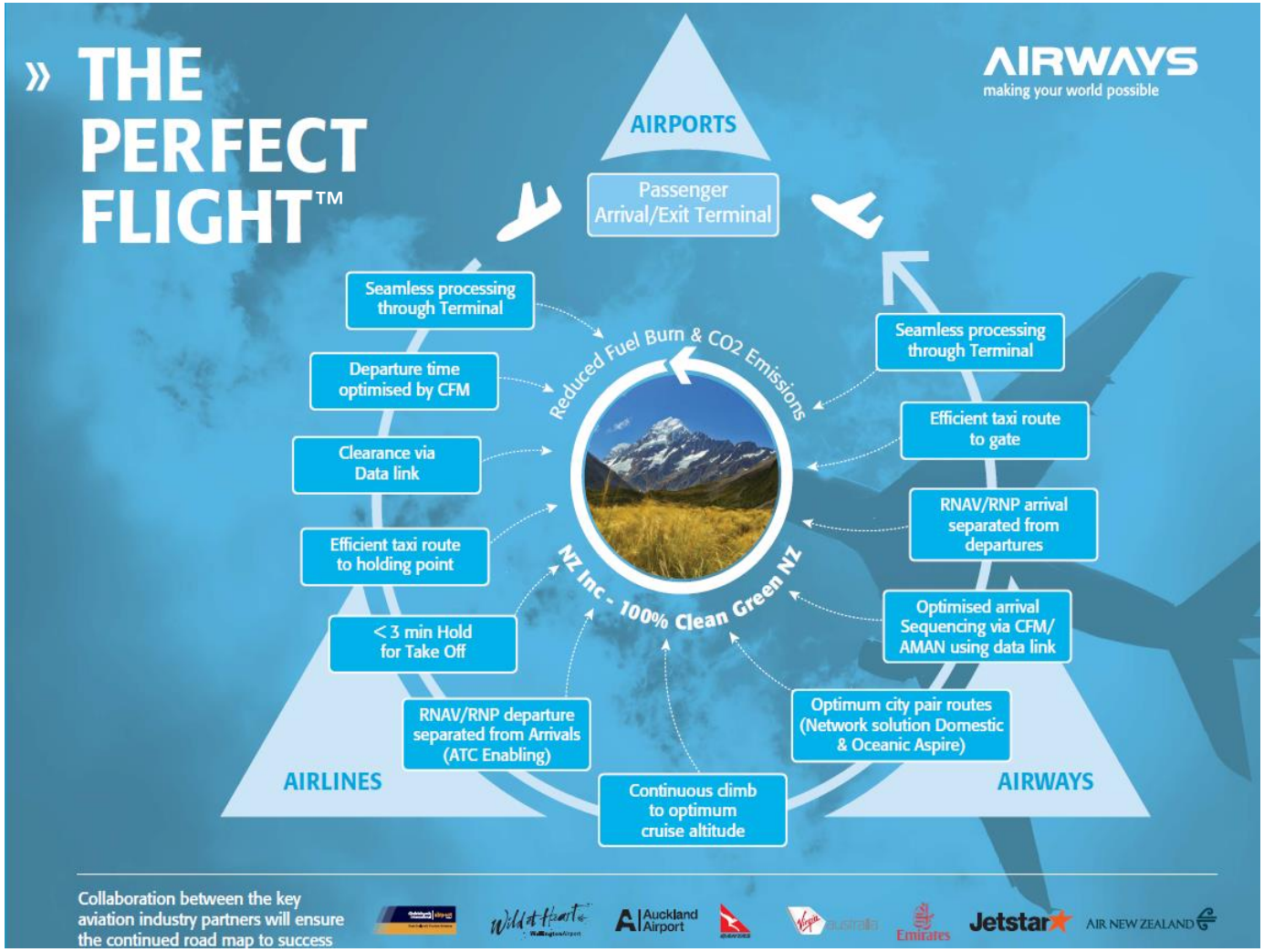
THE CFM EFFECT

Before CFM was activated combined delays into Auckland and Wellington city pair averaged 28,000 minutes per month. Since January 2009 delay average was just below 5,000 minutes per month, and since May 2013 the recorded delay averages are less than 3,000 minutes per month.

In-flight delay per month
(Auckland and Wellington city pair)



CDO – Getting started – having a plan



CDO - Creating the environment

When traffic demand is not the main driver

- Airlines want :
  - ✓ Reduced fuel burn/carbon footprint
  - ✓ Consistency
  - ✓ Predictability
  - ✓ Value for $$ spent

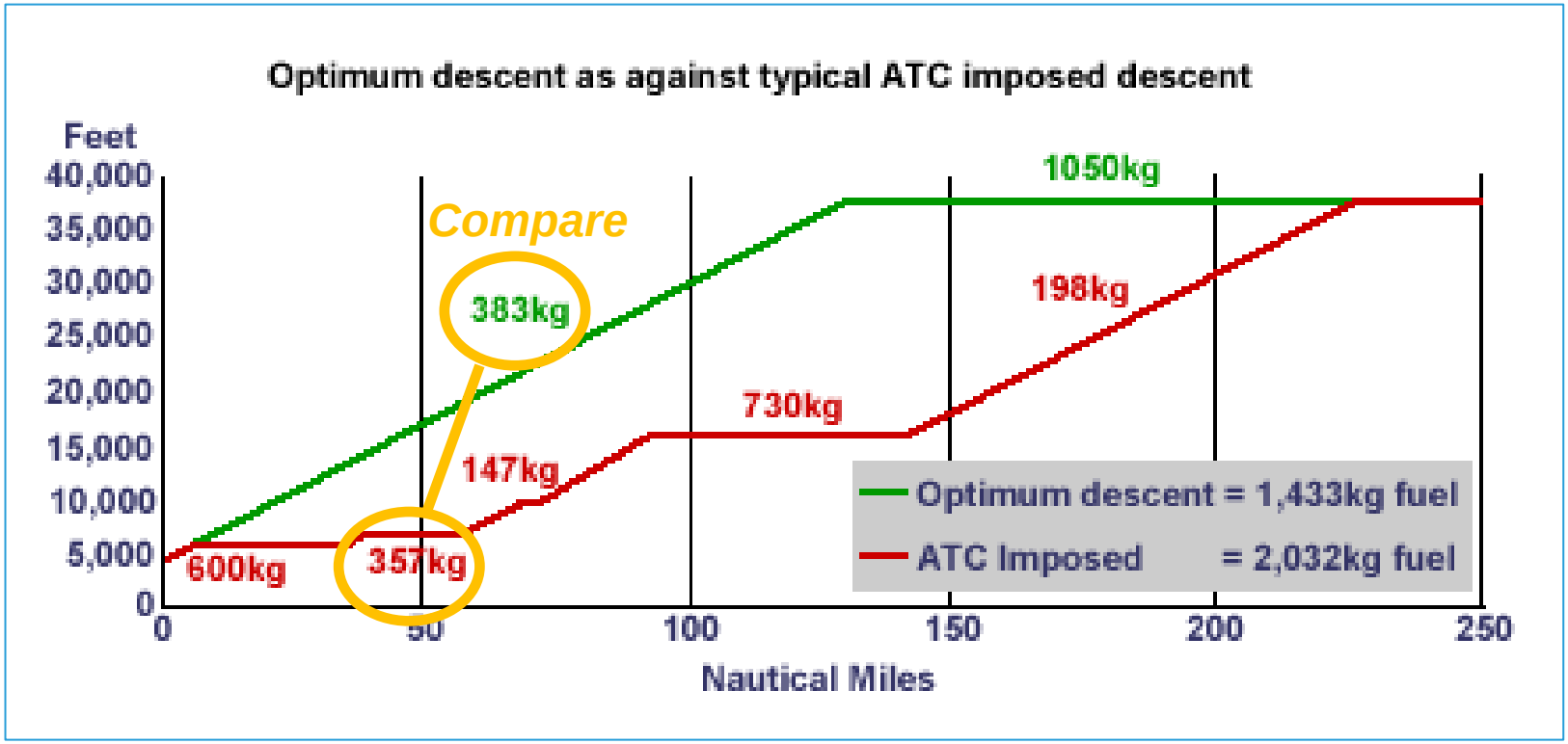
- Airports want:
  - ✓ Capacity utilised or maximised
  - ✓ Growth potential identified
  - ✓ Assets worked hard

- ANSP's want:
  - ✓ Industry health
  - ✓ Coordinated growth
  - ✓ System efficiency

CDO - Building the platform

- Clearly identify your efficiency or capacity ‘drivers’
- Collaborate with airlines and airports - get their buy-in
- Ensure alignment with your ANSP strategy
- Ensure Regulatory framework supports your aim
- CDO is a package of integrated parts (CFM, routes, approach)
- Create a simple plan that matches your aim - then follow it!

CDO – Involving the airlines

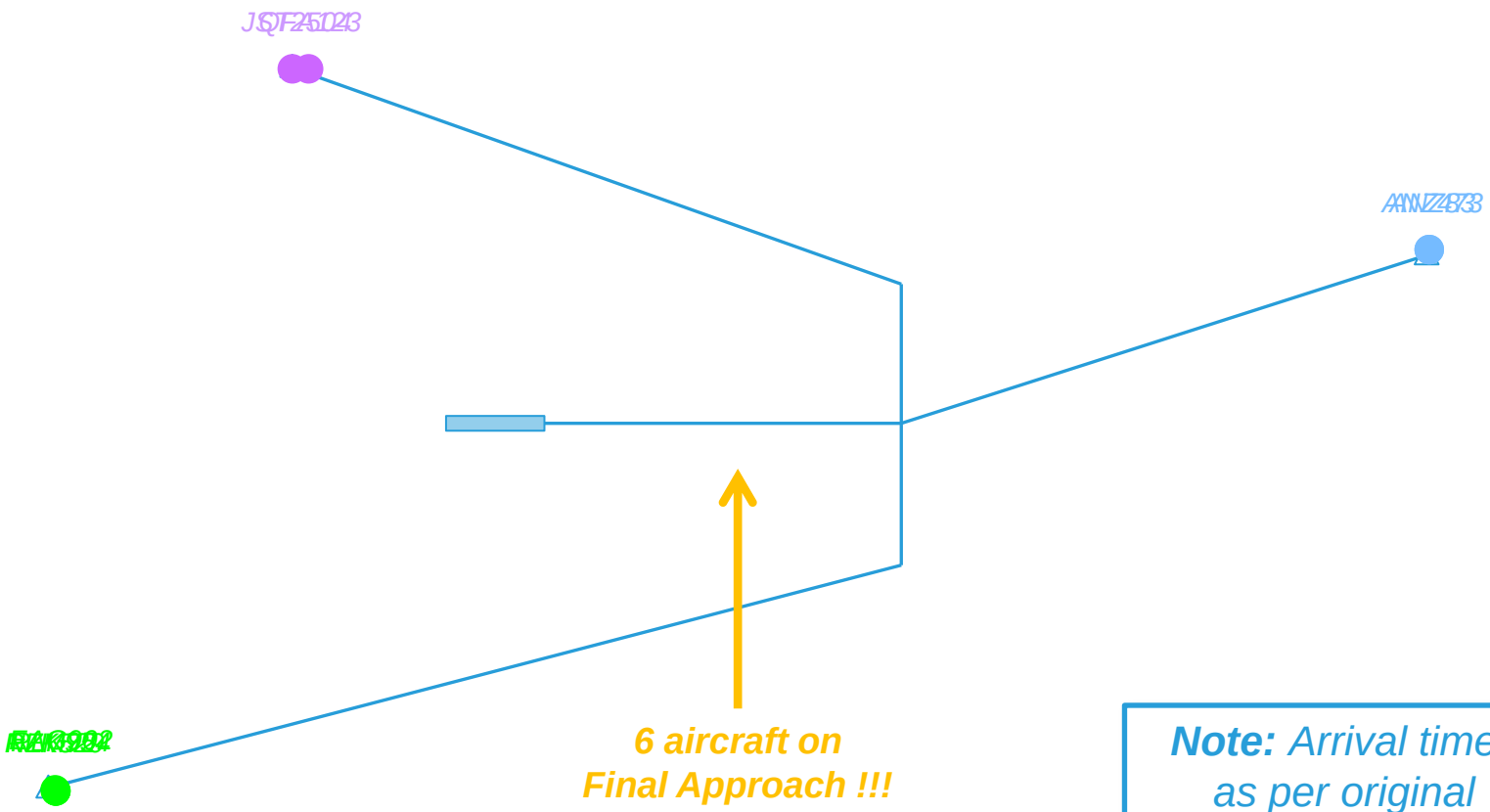


Airlines want efficient, low power, descent profiles – they show us why!

CDO – Involving the airports

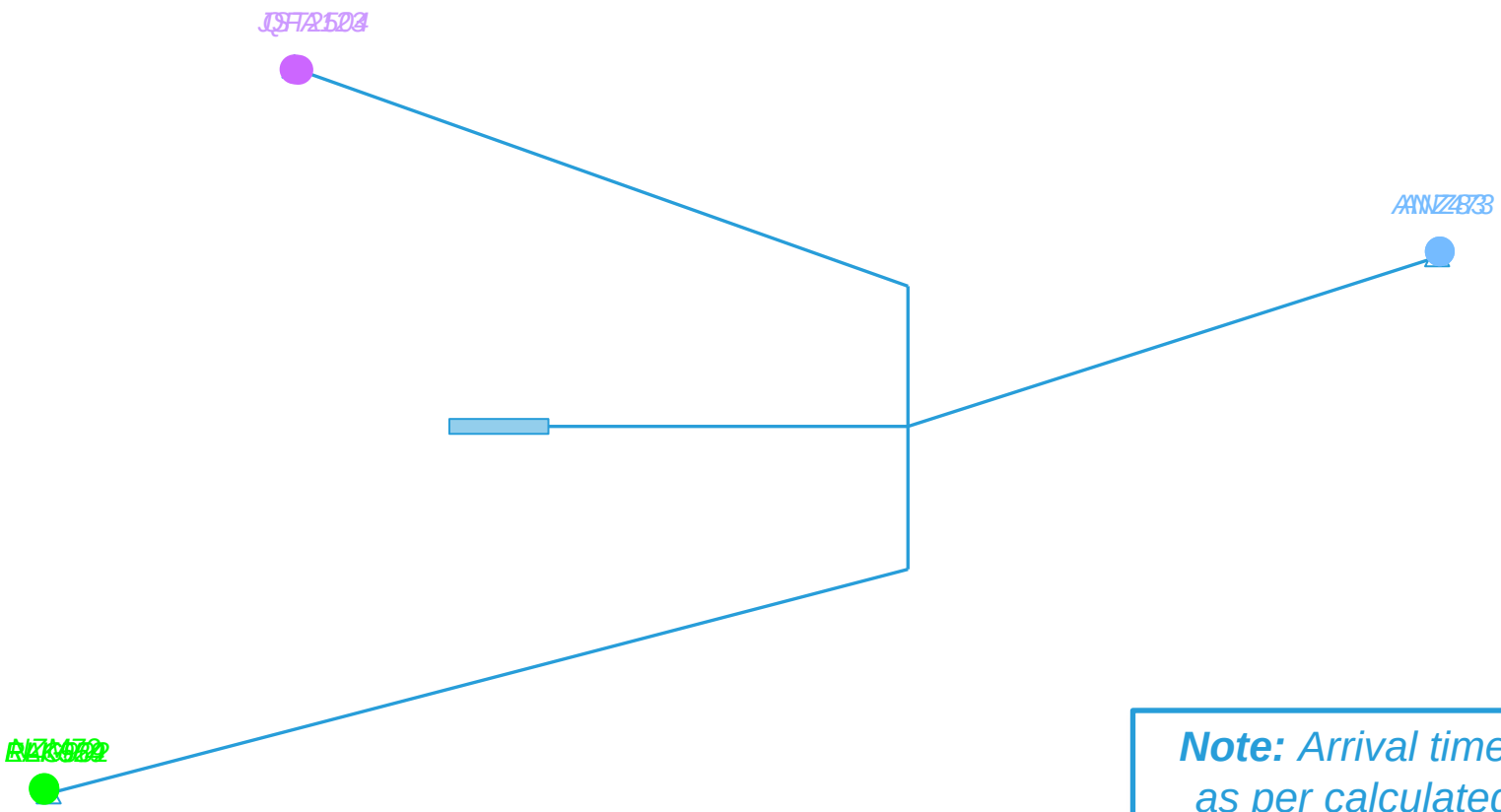
- Airport focus is not directed at ATC or airline efficiency aims
- They do want to maximise capacity, but there aims don't always align with ATC or airlines (political influences can be a factor)
- They need a lot more time to learn and understand what an airline or ANSP is trying to achieve
- In New Zealand, airports hold approval authority for creation and implementation of all IFR approach procedures (Part 139)

CDO – Tactically Managed Sequence - "old" Sector based ATM

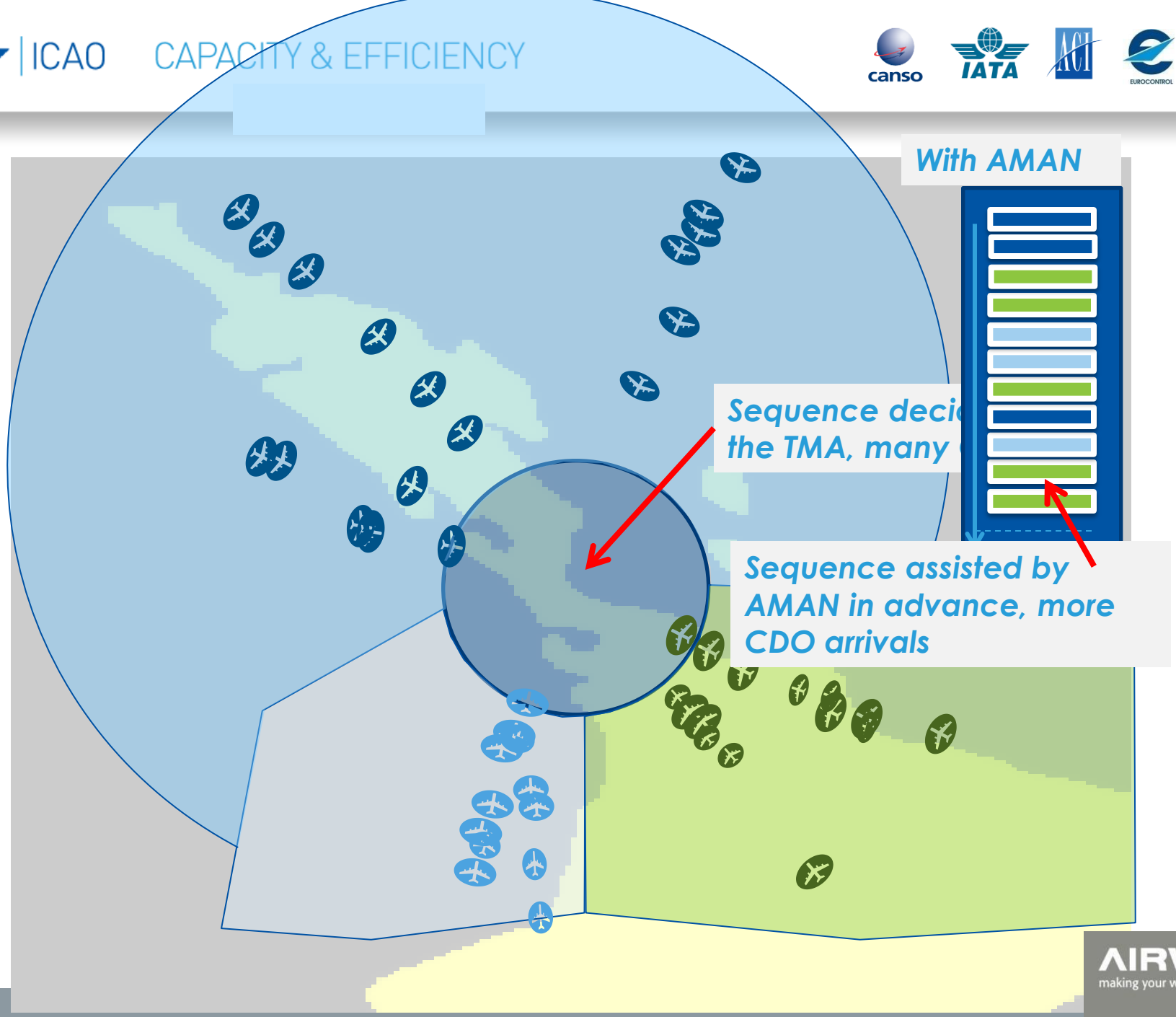


Note: *Arrival times as per original untouched ETA's*

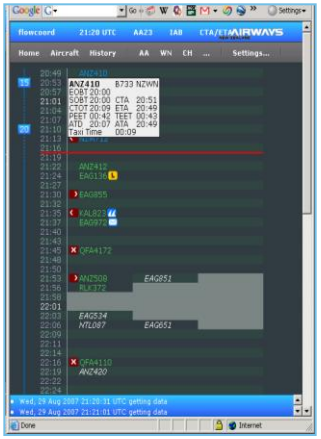
CDO – Strategic Sequence (ATFM is used to enable CDO)



Note: *Arrival times as per calculated RTA's at feeder fixes*

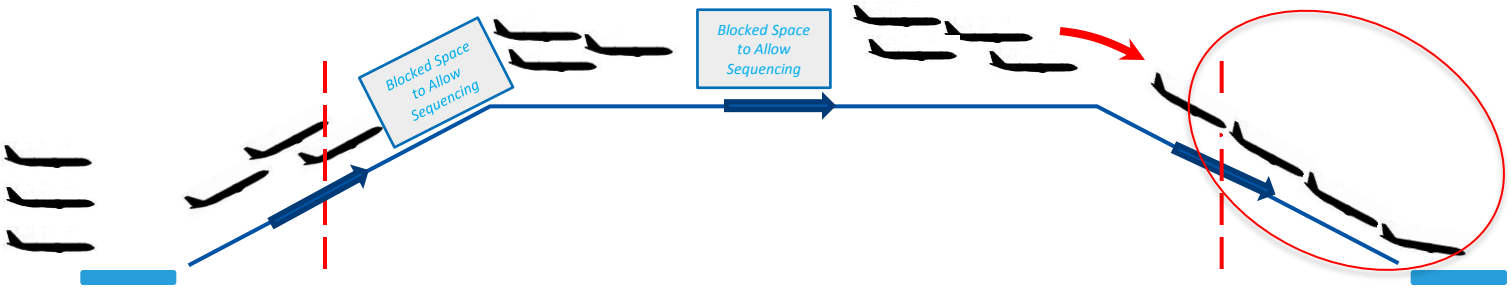

With AMAN
Sequence deci
the TMA, many
Sequence assisted by AMAN in advance, more CDO arrivals

CDO – In action with ATM system



CAM + AMAN = OSYRIS™ CFM

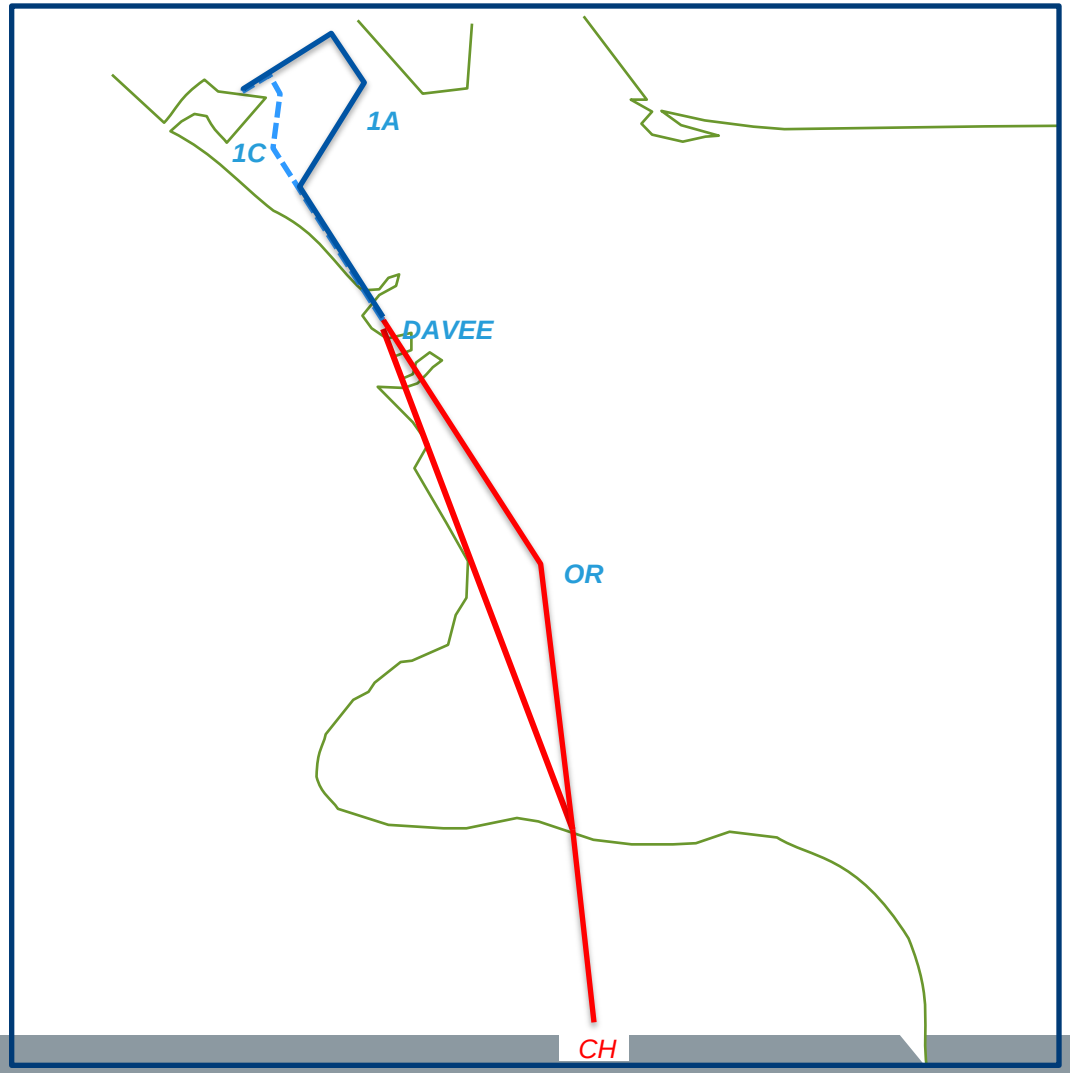
Aircraft enter the TMA in sequence on CDO



But Wait There's More

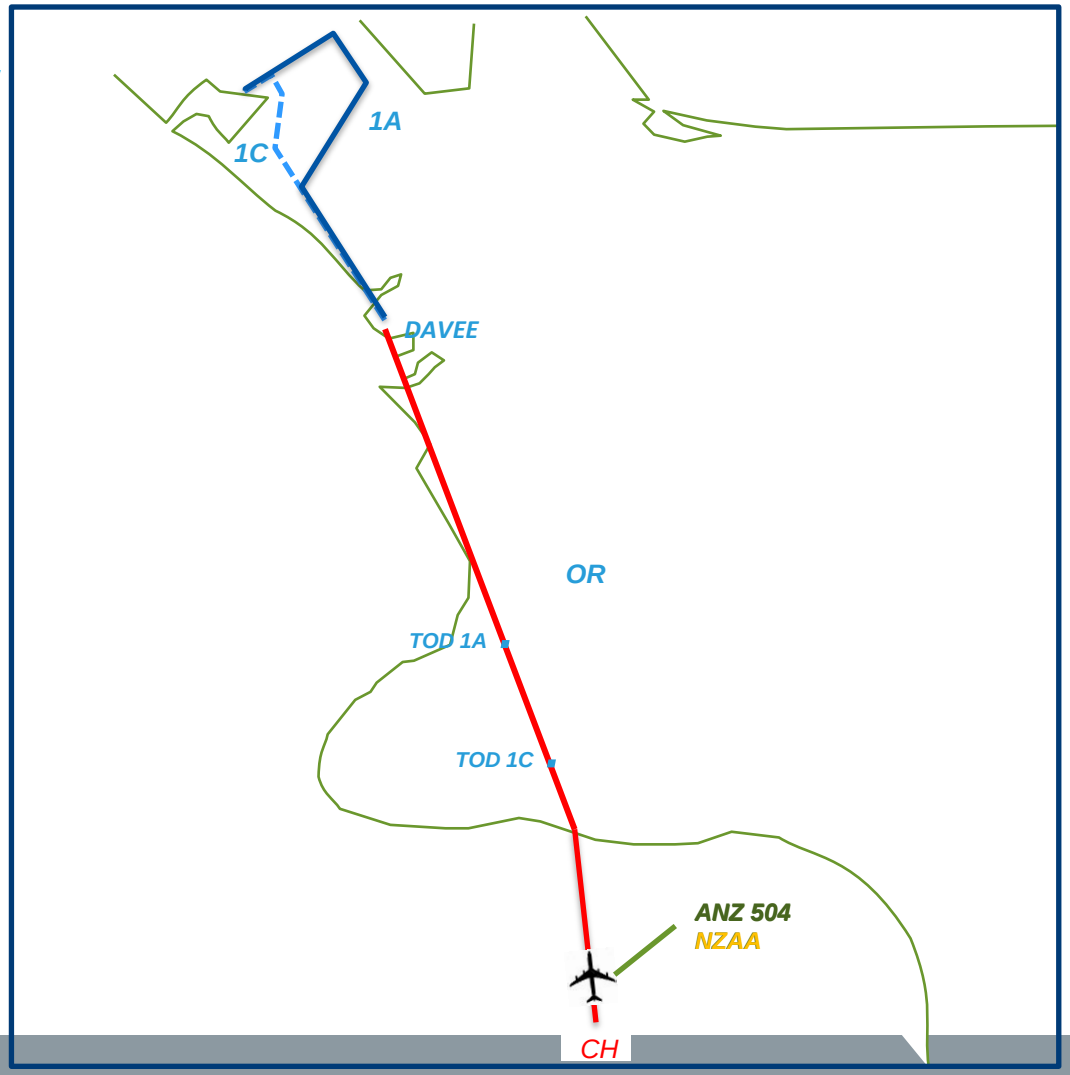
CDO – In action with ATM system

- Optimise the route using RNAV – jet only
- Connect RNAV route to STAR (1A) that joins with the instrument approach
- Create a shorter path (1C) that mimics a VISUAL approach
- Determine best option and permit CDO to RWY (closed path)
- Decision assistance tool is crucial for consistent CDO



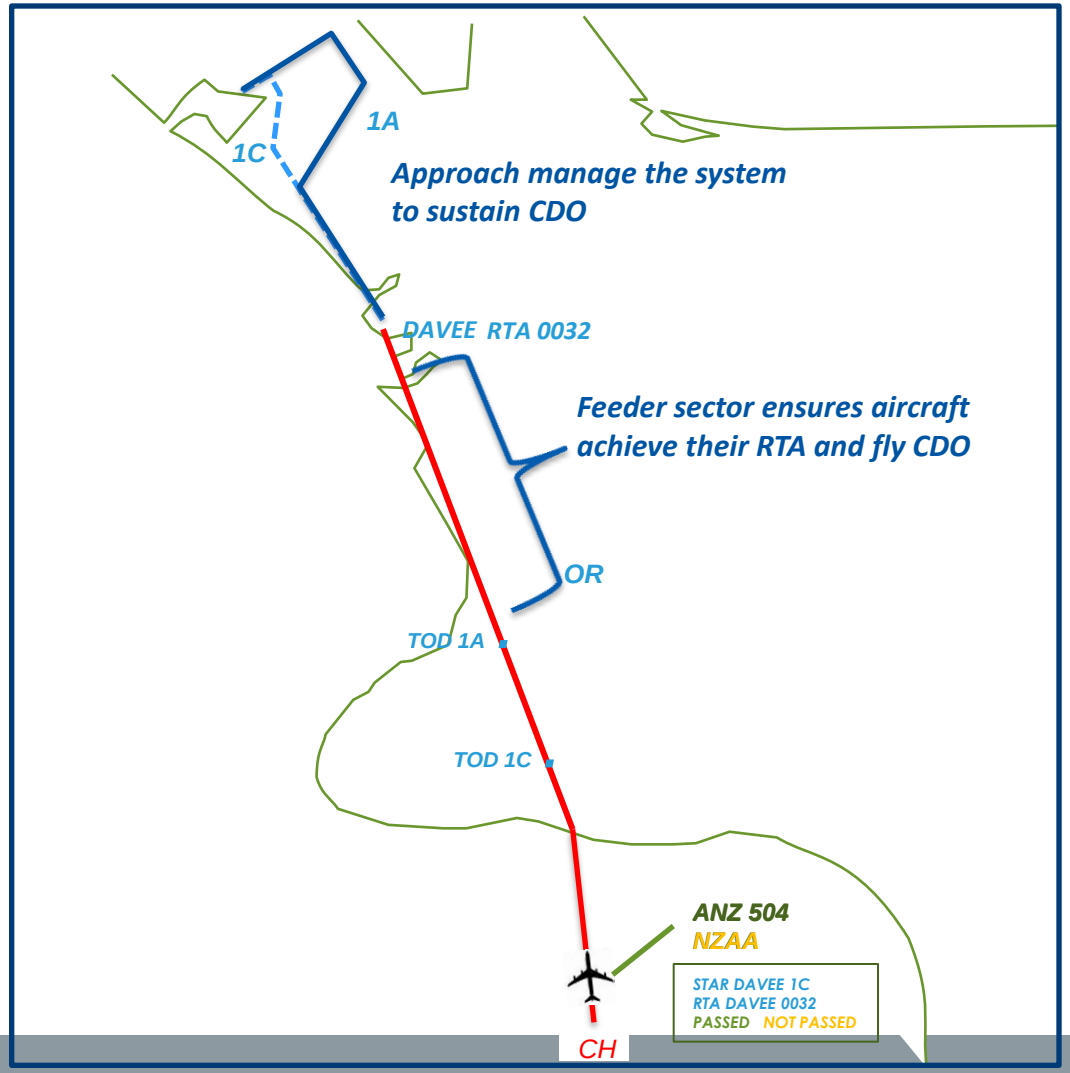
CDO – In action with ATM system

- Optimise the route using RNAV – jet only
- Connect RNAV route to STAR (1A) that joins with the instrument approach
- Create a shorter path (1C) that mimics a VISUAL approach
- Determine best option and permit CDO to RWY (closed path)
- Decision assistance tool is crucial for consistent CDO



CDO – In action with ATM system

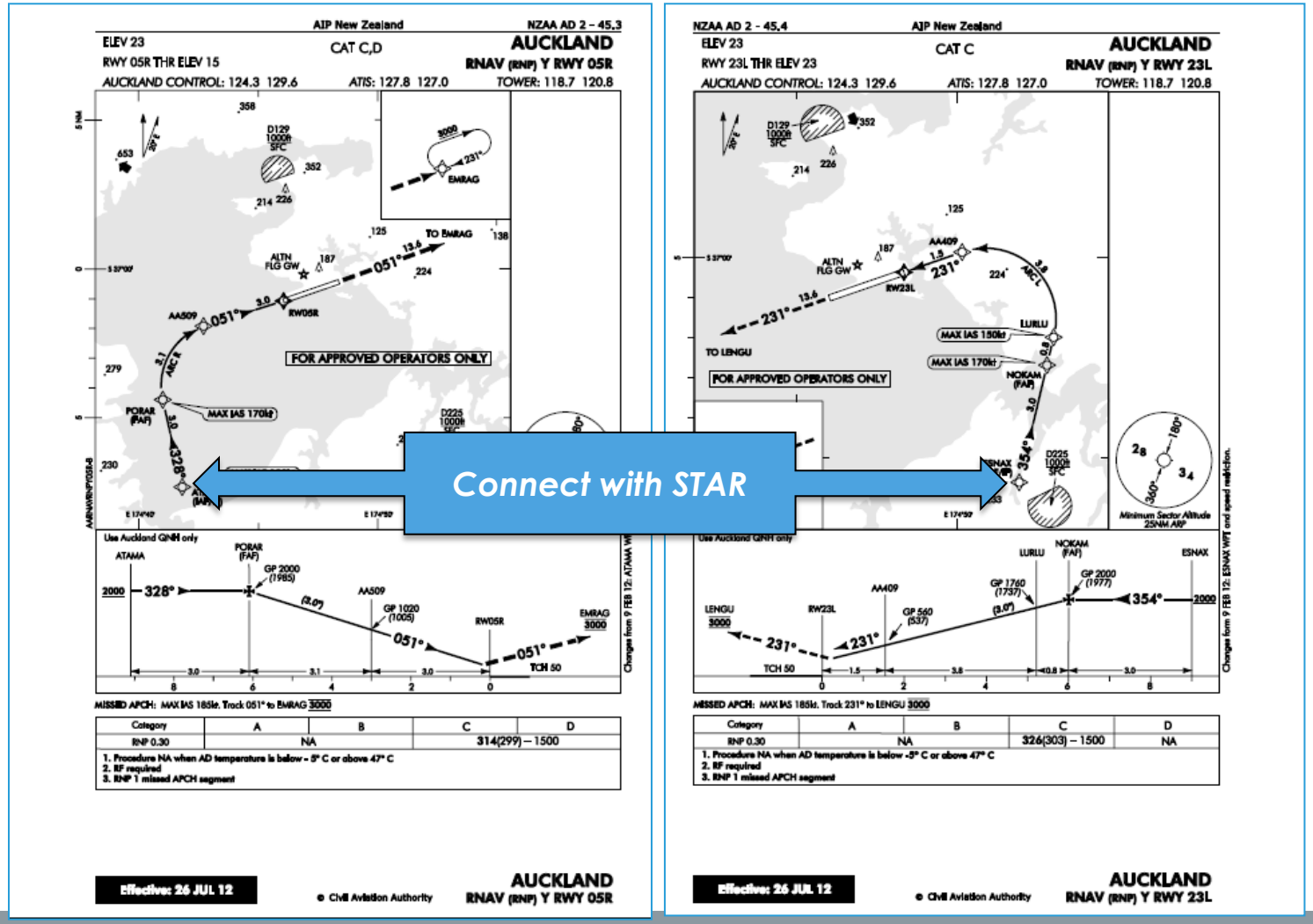
- Optimise the route using RNAV – jet only
- Connect RNAV route to STAR (1A) that joins with the instrument approach
- Create a shorter path (1C) that mimics a VISUAL approach
- Determine best option and permit CDO to RWY (closed path)
- Decision assistance tool is crucial for consistent CDO



AIRWAYS
making your world possible

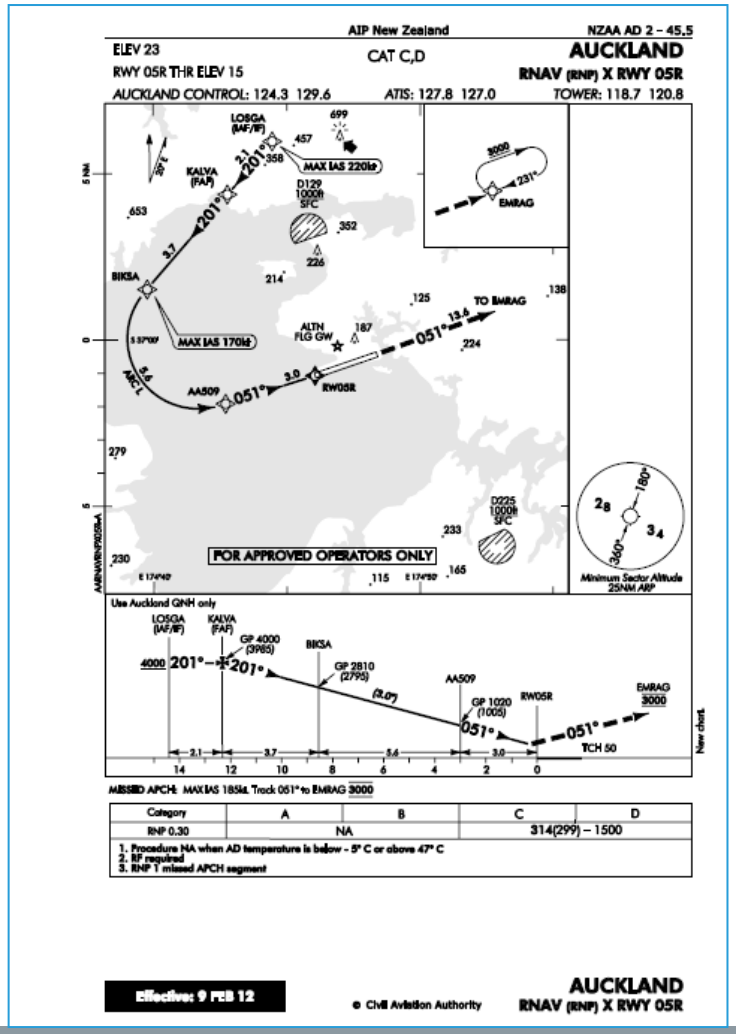
CDO – In action with RNAV RNP Y at Auckland

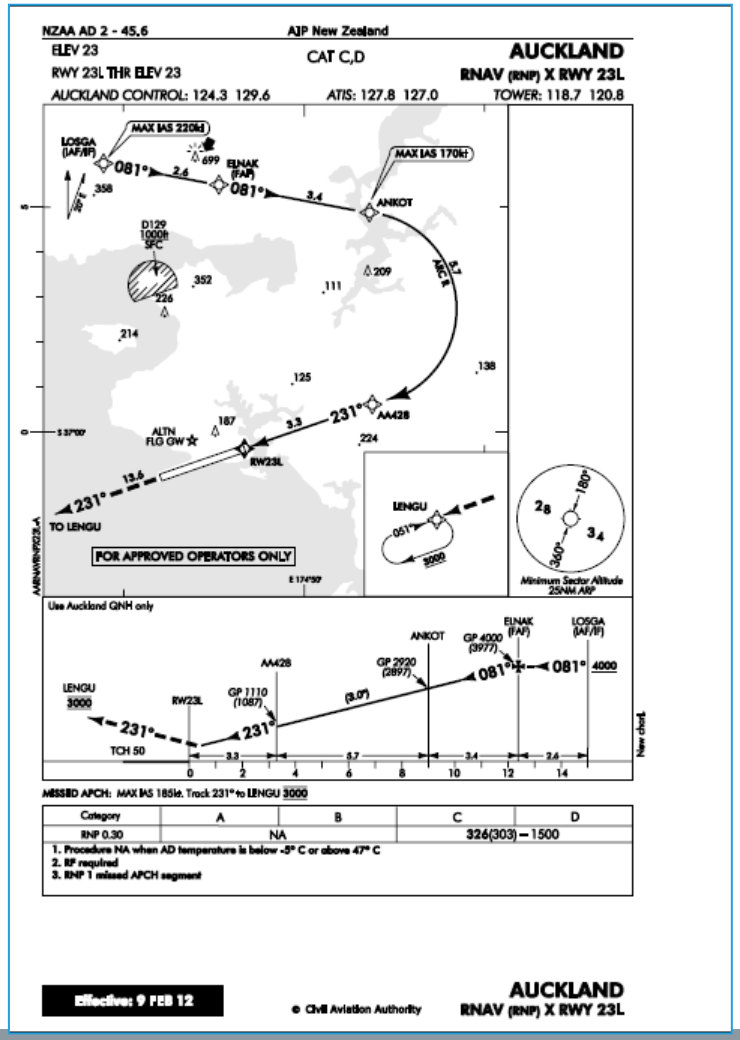
- RNAV RNP Y - in use since JULY 2011
- Flown by ANZ A320 & B733 and JST A320
- Mimic VISUAL approach in all weather
- Emanate from custom "short" C/D STAR's;
- Speeds critical to success of RWY operations



CDO – In action with RNAV RNP X at Auckland

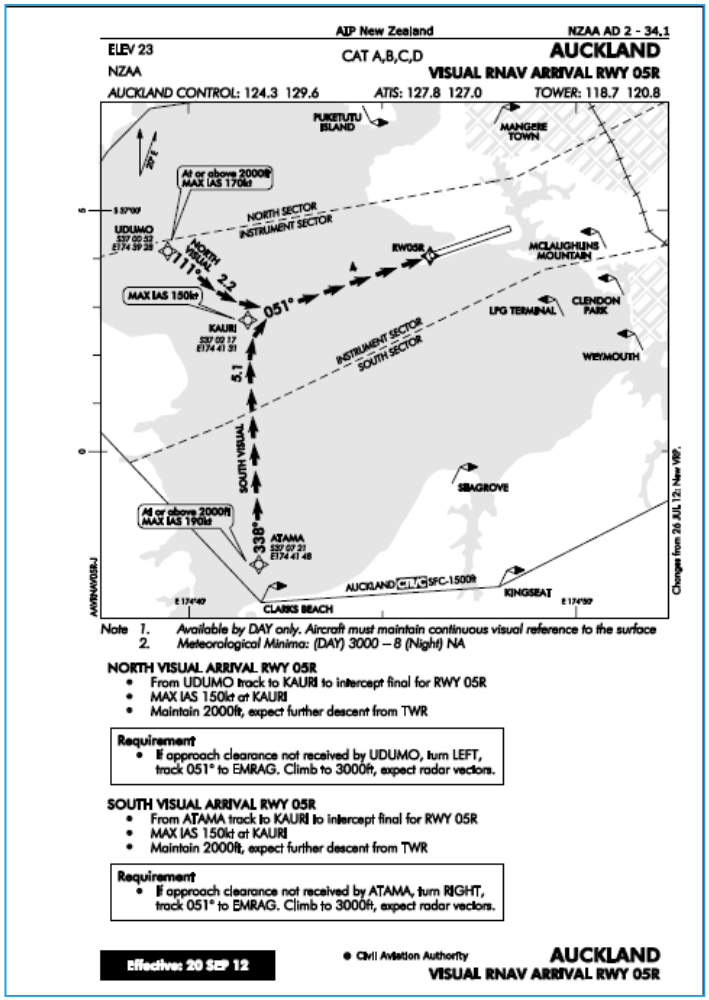
- RNAV RNP X – trial use for 12 months
- Flown by A320 & B777 (ANZ), A320 (JST), B738 (QFA-JC)
- New noise areas under flight paths
- 50% shorter than long STAR to ILS
- Emanate from custom "short" C/D STAR's

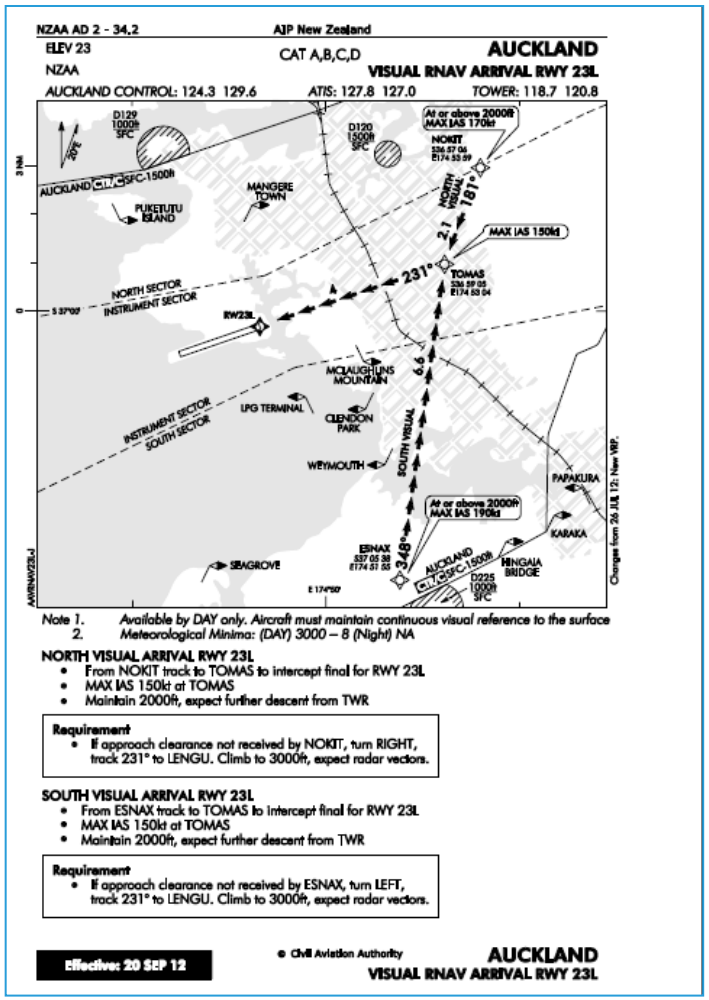




CDO – In action with VISUAL RNAV Arrivals at Auckland

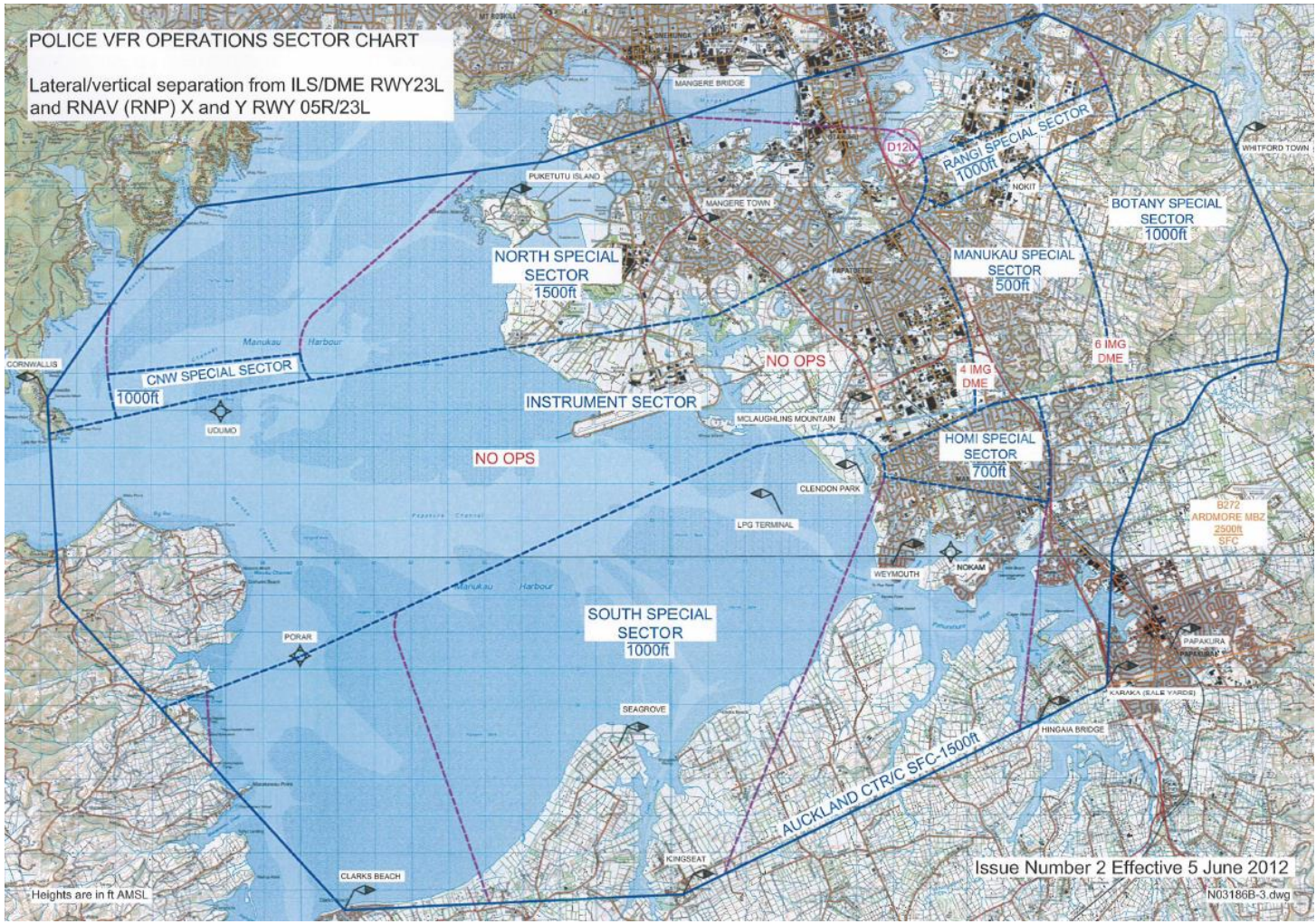
- Designed for turboprops but can be flown by jets
- Similar ground path and speed profile to RNAV RNP approach
- Emanate from same custom "short" C/D STAR's
- Provide predictability for TWR and pilots
- **Day Only** at present.





CDO – In action with Control Zone sectors at Auckland

- Designed so VFR operations don't impede IFR
- Full sector or visual segment separation
- Medium WTC can overfly VFR below
- Provide predictability for TWR and pilots
- Gives certainty of CDO to the RWY



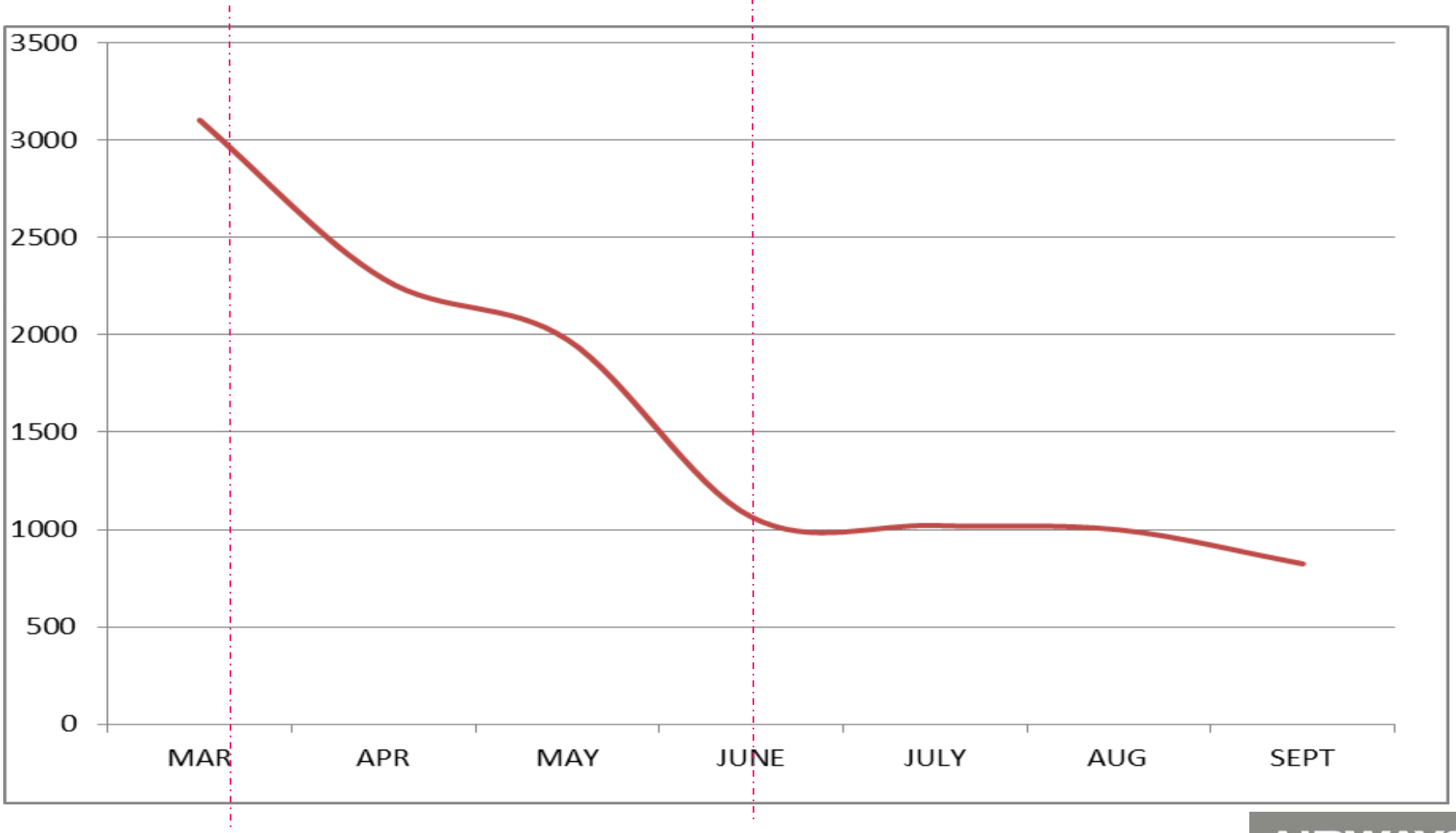
CDO – Who benefits at Auckland

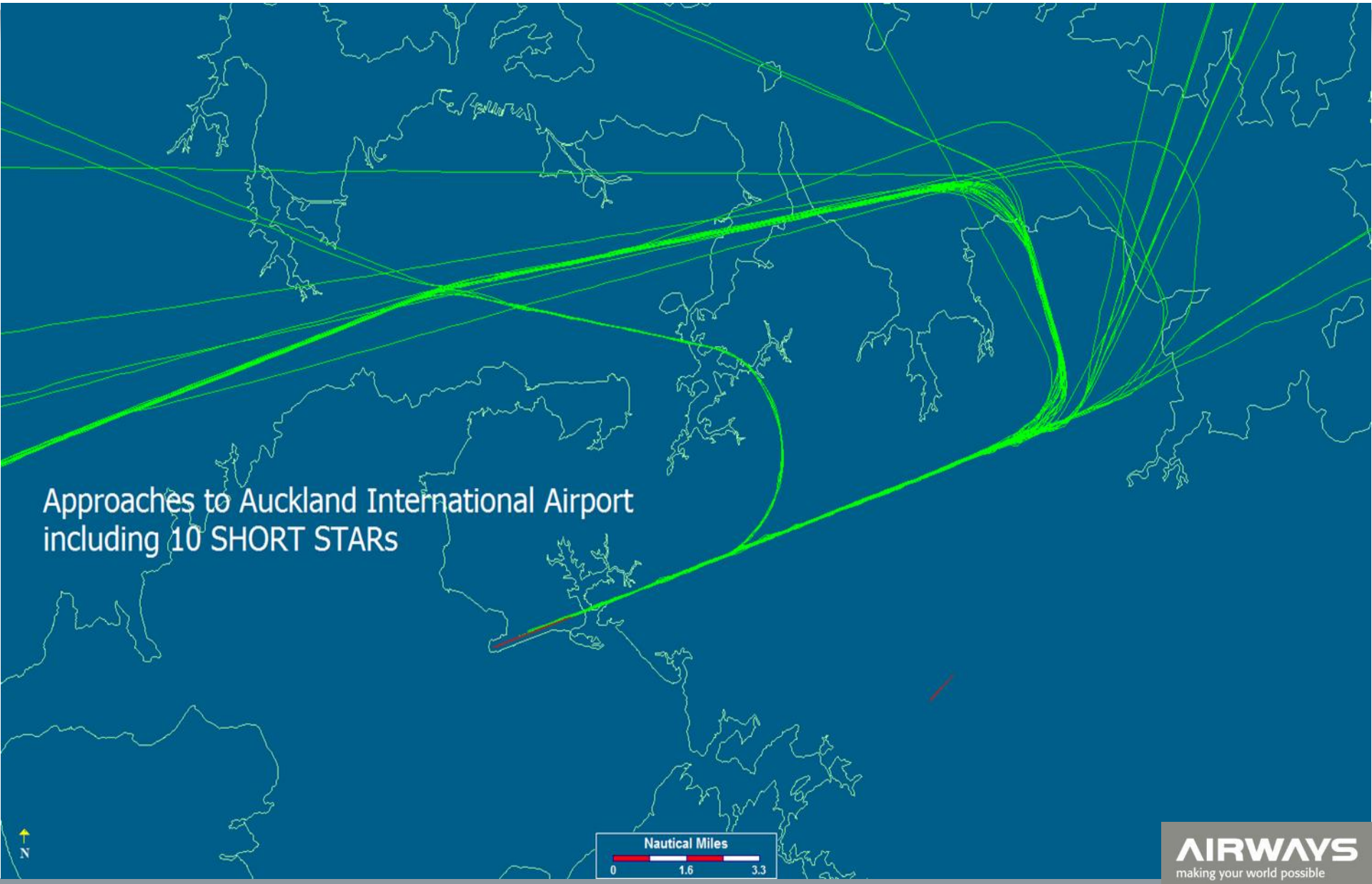
- 15-20% of arriving aircraft international jets
- 5% of those are heavy (B763 to A388)

} 50%↓ in airborne delay

- Jets receive priority for CDO to RWY – 80% fly CDO, target 90%+
- Turboprops receive CDO options to RWY – 80% fly CDO, target 90%+
- Terminal airspace more efficient, reduced ground holding
- Airline OTP is more assured, better insight

CDO – Minutes of delay at Auckland post April 2013 with AMAN/CFM introduction




Approaches to Auckland International Airport
including 10 SHORT STARs
Nautical Miles
0
1.6
3.3
N

CDO – Outcomes - New Zealand Savings

Since Collaborative Flow Manager (CFM) was introduced in New Zealand,(Nov 2008) the participating airlines using CDO have saved:

- 62 million kgs of fuel
- 196 million kgs of CO_2 emissions
- **$USD50 million in fuel costs**
- Savings equate to 6% for most airlines

CDO – What our airline customers have to say

"With the high level of airline collaboration and compliance, CFM has delivered a dramatic reduction in airborne delays. The CFM/AMAN system, combined with the use of continuous descents and track shortening RNP AR arrivals, means Airways New Zealand is well on the journey to creating a truly optimum terminal arrival experience"

Capt. David Morgan,
Chief Pilot - Air New Zealand

AIR NEW ZEALAND

AIRWAYS
making your world possible

CDO – What we learned in New Zealand

Consistent and repeatable CDO is the end product of:

- Properly researched drivers for efficiency
- Identified common aims for ANSP, airlines, airports (WIIFM)
- High levels of collaboration and trust by stakeholders
- A well thought out, agreed, staged plan to achieve aims
- Connected infrastructure (airspace, routes, STAR, approach, airport)
- A collaborative demand management tool (if possible)
- Some flexibility and choice for airlines in using the system
- A robust, transparent reporting system for all stakeholders
- Measureable value for stakeholder efforts

CDO – Problems encountered in New Zealand

Some of the problems we encountered:

- ATC - buy-in to new “hands off” procedures
- ATC - integration of curved RNP AR approach with straight-in ILS
- ATC - acceptance of decision making tools sequences
- Pilot - CTOT conformance; speed profiles; STAR profiles
- ATC/Pilot - a lack of ICAO phraseologies that impart unambiguous intent, especially when profiles can be “opened”
- ATC/Pilots – true understanding of the capability of aircraft FMGCS
- ATC – resourcing of time and people to integrate routes, STAR’s and approaches to fit AIRAC cycles

CDO – Future Growth in New Zealand

Just some of our near term future plans:

- Increasing % of CDO flown to RWY (Jets & Props – target 90%+)
- Developing cooperative CCO elements (DMAN)
- Fine tuning of decision support tools (AMAN/CFM)
- Fine tuning of RNAV STAR profiles and RNAV RNP approaches
- Fine tuning of aircraft systems (FMGCS and auto-throttle)
- Identifying opportunities for DOM/INTL, UPR→CDO→TA→RWY→Gate
- Add network connection of NZWN (WLG),NZCH (CHC),NZQN (ZQN),NZDN (DUD)
- **Increased** automation of ATS system (AMAN/DMAN/CFM – ACDM)

Thank you

Andy Boyd
Manager Terminals
Airways New Zealand Ltd