
ICAO
INTERNATIONAL CIVIL AVIATION ORGANIZATION
A UN SPECIALIZED AGENCY
RECONNECTING THE WORLD

NEW ZEALAND ADS-B IMPLEMENTATION.

ANDY ALFORD

HERMAN WEZENBERG

AIRWAYS NEW ZEALAND.

ICAO

THE INTENT OF THIS PRESENTATION IS TO SHOW HOW THE NEW ZEALAND IMPLEMENTATION OF ADS-B FOLLOWS THE PROCESSES DESCRIBED IN THE PRESENTATIONS PREVIOUSLY GIVEN FROM NEW ZEALAND IN THIS WORKSHOP.

IMPLEMENTATION OF ADS-B FROM START TO NOW.

1 CHAPTER 1

CONCEPT PHASE

2 CHAPTER 2

DEVELOPMENT / ACQUISITION PHASE

3 CHAPTER 3

PRODUCTION PHASE

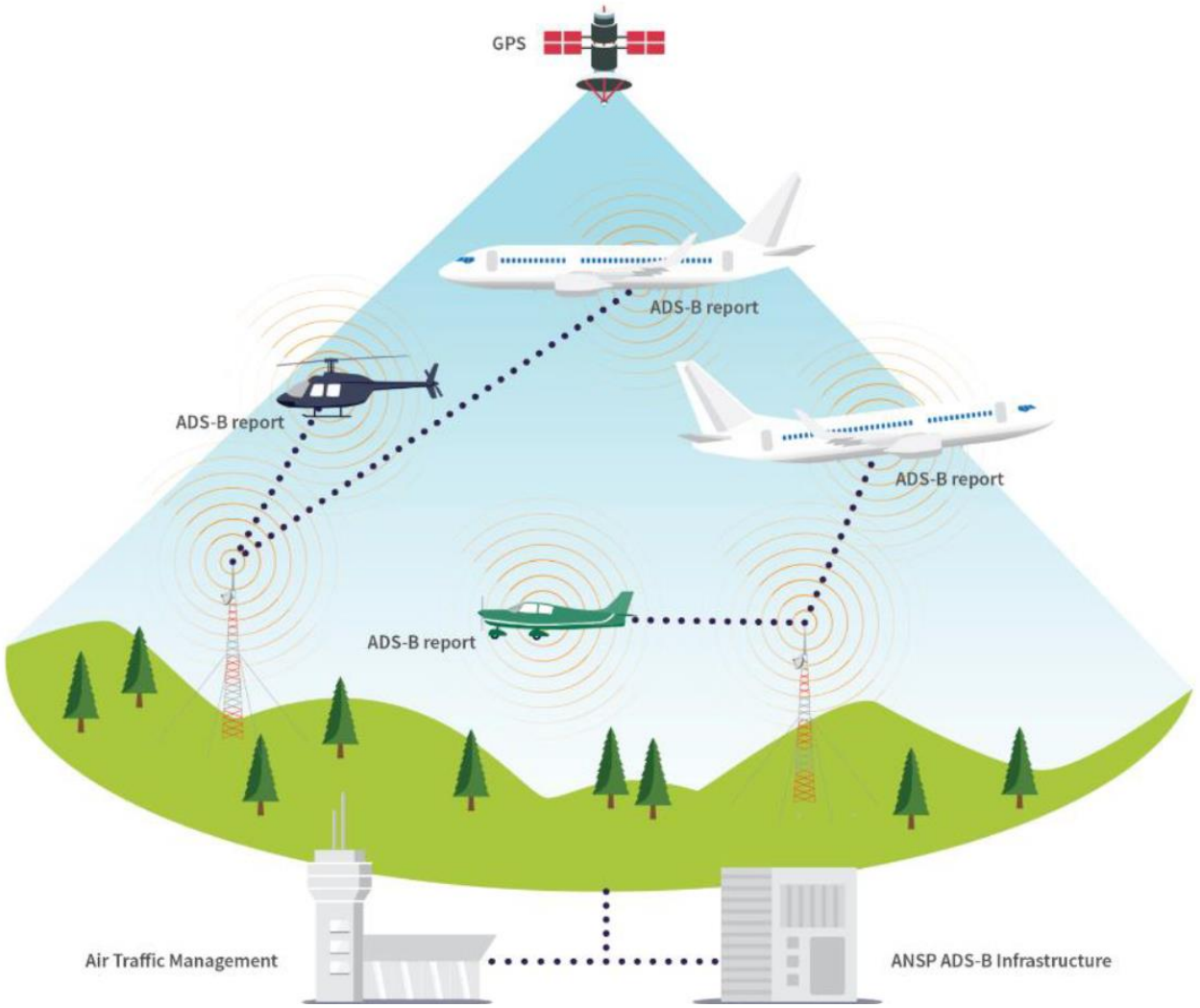
4 CHAPTER 4

UTILISATION PHASE

ICAO

CHAPTER 1

CONCEPT PHASE



CATALYST.

- IN 2014 NEW ZEALAND'S PSR/MSSR RADAR SYSTEM WAS 25 PLUS YEARS OLD AND WOULD REACH END OF LIFE BY 2021. A SOLUTION GOING FORWARD WAS REQUIRED BY AIRWAYS.

- AT THE SAME TIME, THE NEW ZEALAND GOVERNMENT'S NEW SOUTHERN SKY (NSS) PROGRAME PRODUCED THE NATIONAL AIRSPACE AND AIR NAVIGATION PLAN. NSS PROVIDED A CLEAR DIRECTION (FROM GOVERNMENT) ON ENCORPORATING NEW AND EMERGING TECHNOLOGIES INTO THE AVIATION SYSTEM INCLUDING:
    - SATELLITE NAVIGATION, ALLOWING AIRCRAFT POSITIONS TO BE DETERMINED MORE PRECISELY.
    - ALLOWING RADAR NETWORKS TO BE REPLACED BY AIRCRAFT BASED SURVEILLANCE SOLUTIONS.
    - ALLOWING FOR AIR TRAFFIC CONTROL SYSTEMS SUPPORTING MORE PRECISE AIR TRAFFIC MANAGEMENT.

- THE NSS PLAN SIGNALLED AN INTENTION TO REPLACE NEW ZEALAND'S PRIMARY AND SECONDARY SURVEILLANCE WITH AUTOMATIC DEPENDENT SURVEILLANCE-BROADCAST (ADS-B) AS THE PRIME SOURCE OF SURVEILLANCE.

- ADS-B SYSTEMS, INCLUDING MODE S 1090 EXTENDED SQUITTER TRANSPONDERS WILL BE INSTALLED IN AIRCRAFT FLYING IN CONTROLLED AIRSPACE ABOVE 24500 FEET (FL245) BY 2018, AND IN ALL CONTROLLED AIRSPACE BY 2021.
- AT THE TIME THIS FOLLOWED SIMILAR MOVES BY AUSTRALIA AND THE EUROPEAN UNION BY 2017 AND THE UNITED STATES BY 2020.
- TO ASSIST WITH ACHIEVING THIS PLAN, THE NEW ZEALAND GOVERNMENT, THROUGH THE MINISTRY OF TRANSPORT (MOT) AND THE NEW ZEALAND CIVIL AVIATION AUTHORITY(NZCAA), PROVIDED AN ADS-B TRANSPONDER REBATE SCHEME FOR AIRCRAFT WITH A MCTOW OF LESS THAN 7500KG (BOTH COMMERCIAL AND NON-COMMERCIAL)

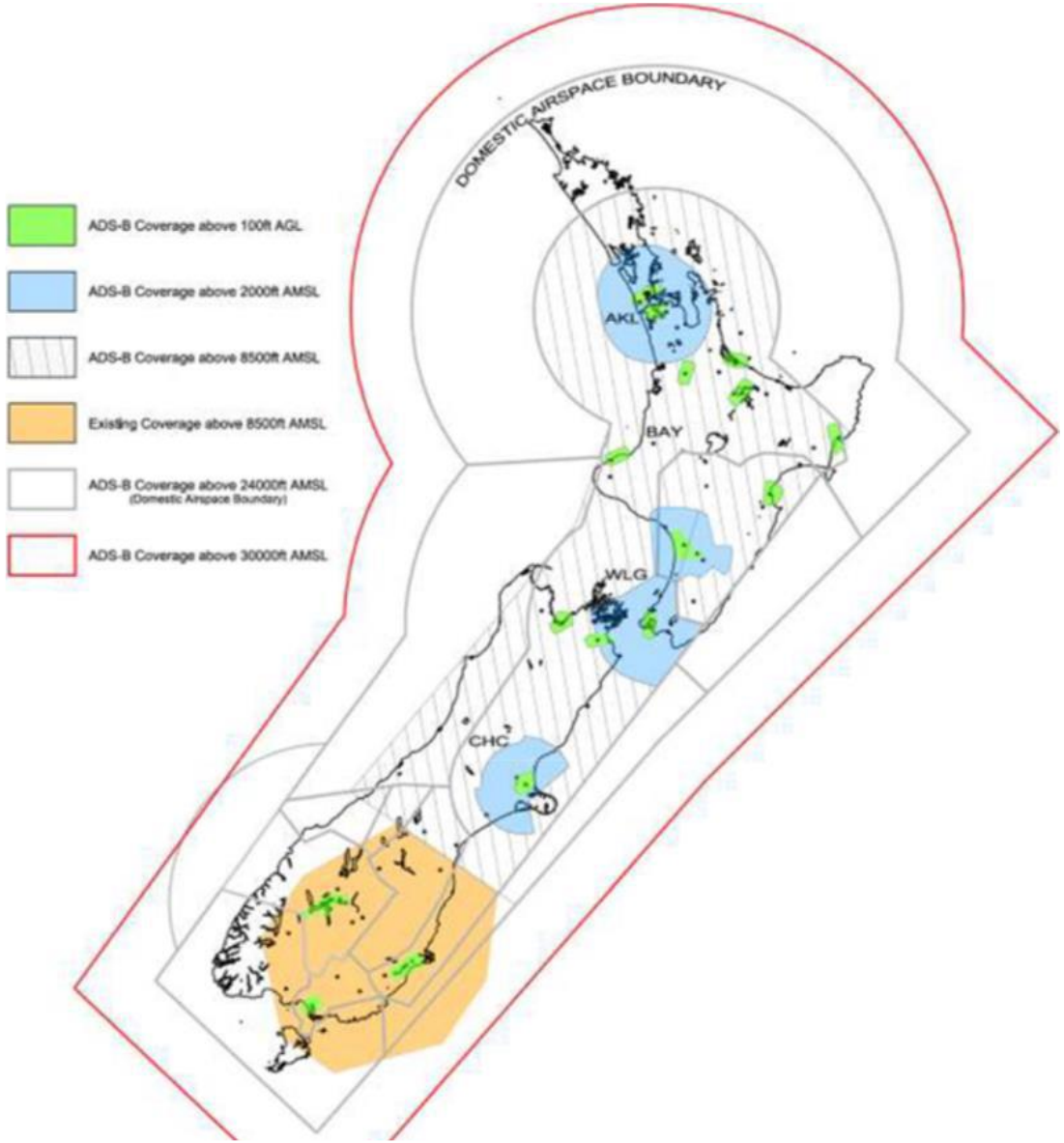
https://www.nss.govt.nz/assets/nss/resources/CAA-NSS-National-Aerospace-and-Air-Navigation-Plan-2014.pdf

NSS CONSULTATION PROCESS.

- THE NSS PROGRAMME INCORPORATED VARIOUS GROUPS AS PART OF THE DECISION-MAKING PROCESS, ENSURING EVERYONE WAS INVOLVED IN PROVIDING AN OUTCOME TO SUIT NEW ZEALAND AVIATION.
- THIS GOVERNANCE GROUP WAS CONVENED UNDER THE MINISTER OF TRANSPORT AND CHAIRED BY NZCAA. GROUPS INVOLVED INCLUDED:
- AIR NEW ZEALAND, AIRWAYS NEW ZEALAND.
- GENERAL AVIATION: INCLUDING FLYING SCHOOLS, CHARTER AIRLINES, AND PRIVATE PILOTS.
- ORGANISATIONS: INCLUDING AIRCRAFT OWNERS AND PILOT ASSOCIATION (AOPA), NEW ZEALAND AIRLINE PILOTS ASSOCIATION (NZALPA), AVIATION COMMUNITY ADVISORY GROUP(S), GLIDING NZ, THE BOARD OF AIRLINE REPRESENTATIVES NZ (BARNZ), NEW ZEALAND DEFENCE FORCE, AND THE NEW ZEALAND MET SERVICE.

AIRWAYS CONSULTATION PROCESS.

- AIRWAYS, AS THE PROVIDER OF THE SURVEILLANCE SERVICE, CARRIED OUT ITS OWN CONSULATION PROCESS, TO ENSURE THE SYSTEM PURCHASED MET THE NEEDS OF ALL ITS CUSTOMERS. THESE INCLUDED:
  - KEY AIRLINES AND THE NEW ZEALAND DEFENCE FORCE (NZDF).
  - AIRWAYS OPERATIONAL MANAGEMENT/STRATEGY TEAMS.
  - AIR TRAFFIC SERVICE PERSONNEL (ATC AND ATS).
  - AIR TRAFFIC SAFETY ELECTRONICS PERSONNEL (ATSEP).
  - AIRWAYS DOMESTIC ATMS SOFTWARE TEAM.
  - CORPORATE STRATEGIC PLAN/FINANCE TEAMS.



COVERAGE REQUIREMENTS AFTER CONSULTATION PROCESS

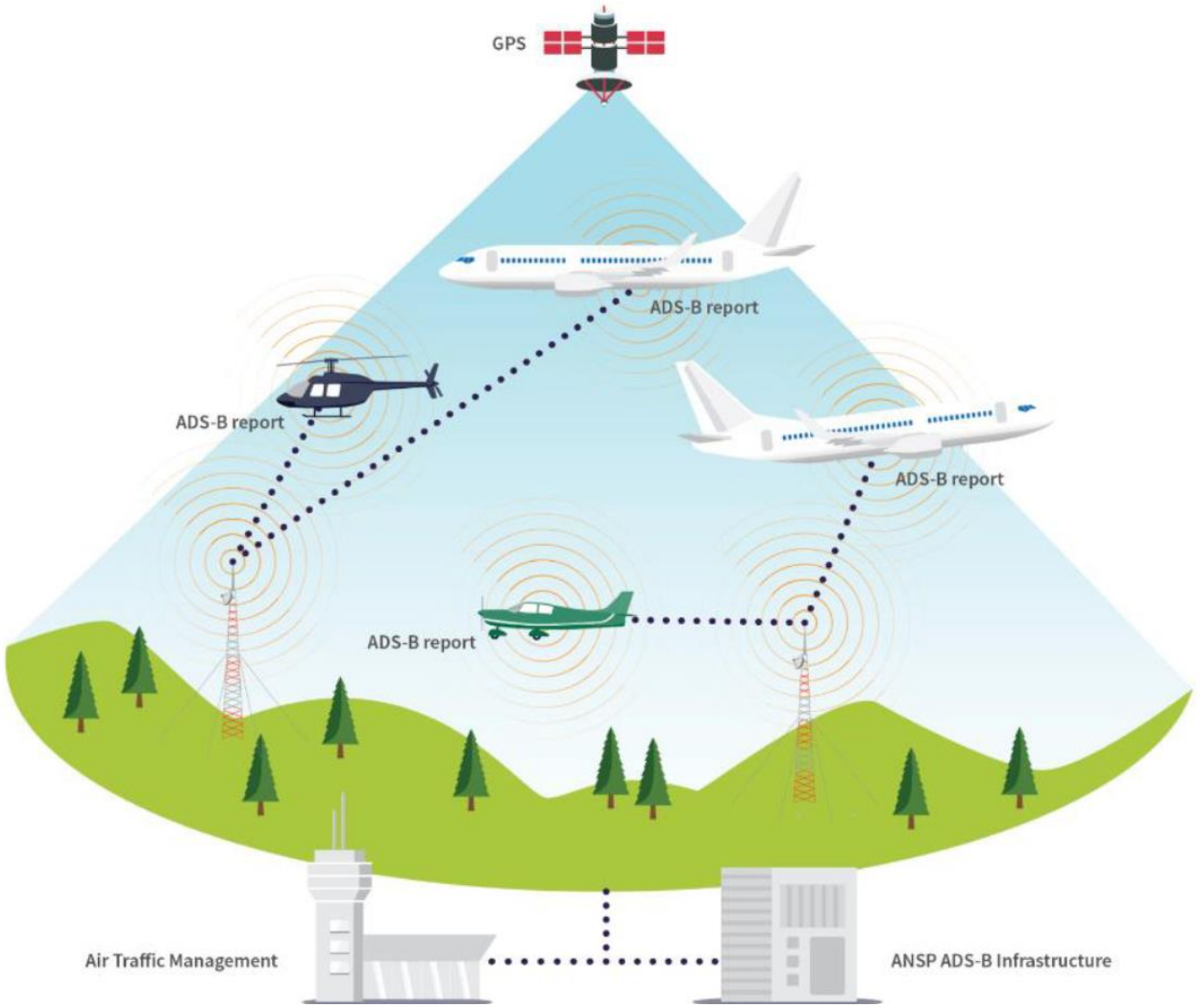
IN ALL CASES BETTER THAN EXISITING COVERAGE AND, AS A MINIMUM, COVERING ALL CONTROLLED AIRSPACE

- GREEN — ADSB ≥ 500FT AGL
- BLUE — ADSB ≥ 2000FT AMSL
- STRIPE — ADSB ≥ 8500FT AMSL
- ORANGE — MLAT ≥ 8500FT AMSL
- WHITE — ADSB ≥ 24000FT AMSL
- RED — ADSB ≥ 30000FT AMSL

2

CHAPTER 2

DEVELOPMENT / ACQUISITION PHASE



ICAO

DEVELOPMENT PHASE / ACQUISITION PHASE.

DEVELOPMENT PHASE.

- REQUIREMENTS OF THE NSS PLAN AND AIRWAYS OPERATIONAL CONCEPT NEEDED TO BE CONSIDERED.
- INVOLVED A LOT OF PRE-PROJECT PLANNING BETWEEN SURVEILLANCE ENGINEERING AND ANS REQUIREMENTS AS THE LEAD SME'S.
- DELIVERY HAD TO FIT WITHIN THE REGULATORY AND AIRWAYS TIMEFRAMES, INCLUDING A 2-STAGE DELIVERY MODEL TO MEET THE REGULATORY MANDATES.
- AS PART OF THE PROPOSED RFI PROCESS IT WAS DETERMINED THAT AN ADS-B TRIAL WAS REQUIRED. THIS WOULD HELP TO PROVIDE INSIGHT INTO THE CAPABILITY OF THE TECHNOLOGY AND SUPPLIERS.

RFI AND RFP PROCUREMENT PROCESS.

- STEP 1 - WAS AN RFI OUTLINING NEW ZEALAND'S REQUIREMENTS.
  - INCLUDED IN THE RFI WAS A REQUIREMENT FOR ALL VENDORS REPLYING TO THE RFI TO PREFORM A 2 WEEK DEMONSTRATION OF THEIR EQUIPMENT IN NEW ZEALAND.
    - OF THE 5 RESPONSES TO THE RFI, 4 AGREED TO THE TRIAL, AND PROVIDED EQUIPMENT WHICH WAS TESTED IN CHRISTCHURCH NEW ZEALAND.
      - THE TRIAL TOOK PLACE FROM THE SAME SITE AND THE SAME TIME FOR ALL THOSE INVOLVED.
    - FEEDBACK TO THOSE VENDORS TESTED WAS PROVIDED AS PART OF THE TRIAL PROCESS.
- STEP 2 - BASED ON FEEDBACK FROM THE RFI RESPONSES, AND THE ADSB TRIAL IN CHRISTCHURCH, AN RFP WAS PREPARED.
  - MANY OF THE ICAO, EUROCAE AND RTCA DOCUMENTS DISCUSSED EARLIER ARE REFERENCED IN THE RFP PROCESS AS REQUIREMENTS THE VENDORS NEEDED TO MEET.

ACQUISITION PROCESS.

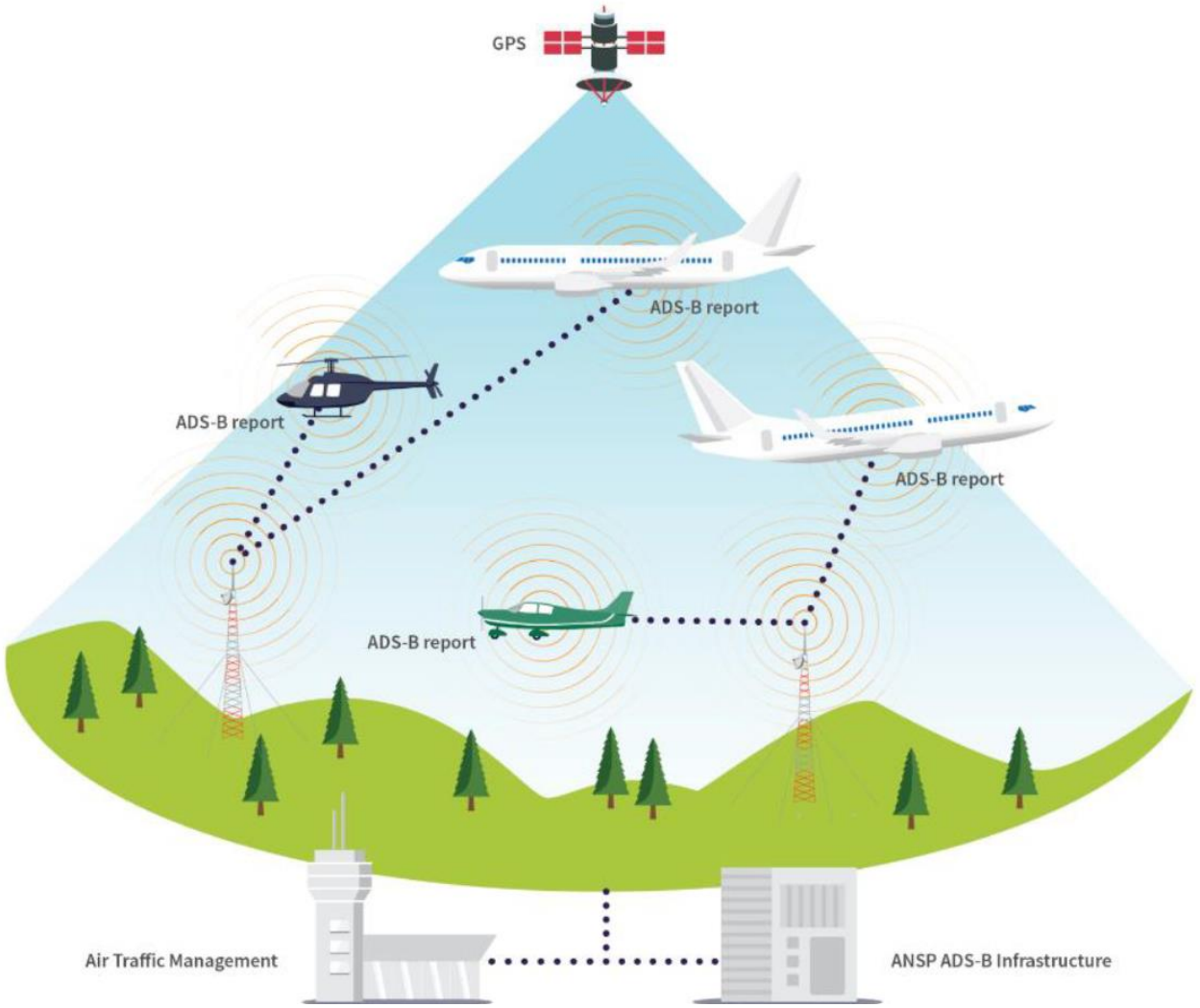
- AN ADS-B ACQUISITION STRATEGY WAS AGREED TO AND SIGNED OFF WITH THE PROCUREMENT MANAGER AND THE PROJECT CONTROL GROUP.
- THE KEY ELEMENTS WERE:
  - THE PROPOSED RFP WAS ACCEPTED AND SENT TO THE PREFERRED SUPPLIERS WHO TOOK PART IN THE CHRISTCHURCH TRIAL.
  - RESPONSES TO THE RFP PROCESS FROM VENDORS WERE EVAULATED BY THE PROJECT GROUP AND A FINAL SUPPLIER WAS SHORT-LISTED.
  - A CONTRACT WAS NEGOTIATED WITH THE PREFERRED SUPPLIER – IN THIS CASE THALES GERMANY.

- THE RFP OUTLINED THE REQUIRED TWO STAGED DELIVERY MODEL:
  - PHASE 1 (MAIN TRUNK): INSTALLATION AND ACCEPTANCE OF 10 SITES TO PROVIDE ENROUTE ADS-B COVERAGE 10,000FT AMSL AND ABOVE. THIS WAS TO COVER THE EXPECTED ADS-B MANDATE OF “ADS-B MANDATORY AIRSAPCE ABOVE FL245 WITHIN THE NZZC FIR” (DEC 31, 2018). COVERAGE WAS EXPECTED TO COVER THE FIR BOUNDARY BETWEEN THE NZZO AND NZZC FIR’S
    - NOTE THIS STAGE WAS COMPLETED AND WENT OPERATIONAL IN THE FIRST HALF OF 2017 – WELL BEFORE THE REQUIRED MANDATE.
  - PHASE 2 (REGIONAL AIRPORTS): INSTALLATION AND ACCEPTANCE OF THE REMAINING 15 SITES TO PROVIDE ADS-B COVERAGE OVER ALL CONTROLLED AIRSPACE TO SURFACE LEVEL WITHIN THE NZZC FIR. THIS WAS TO COVER THE 2ND ADS-B MANDATE EXPECTED ON DEC 31, 2021”.
    - DUE TO COVID THIS WAS DELAYED TO DEC 31, 2022.
    - NOTE THIS STAGE WAS COMPLETED AND WENT OPERATIONAL IN LATE 2018 – AGAIN WELL BEFORE THE MANDATE.

3

CHAPTER 3

PRODUCTION PHASE



ICAO

DESIGN PHASE.

COMPLETION OF THE RFP PHASE LED INTO THE DESIGN PHASE.

- THE DESIGN WAS FINALISED BY SURVEILLANCE ENGINEERING, BUILT ON THE “PRELIMINARY DESIGN AND CUSTOMER REQUIREMENTS” AND INCLUDES:
  - SYSTEM ARCHITECTURE.
  - ENGINEERING SYSTEM REQUIREMENTS.
  - NETWORK REQUIREMENTS.
  - EQUIPMENT INSTALLATION.
  - RISK MANAGEMENT.
  - MAINTENANCE AND TECHNICAL TRAINING SOLUTIONS.
  - OPERATIONAL AND CUSTOMER SOLUTIONS.

KEY ARCHITECTURE DECISIONS.

THESE WERE DRIVEN BY:

- THE PROPOSED LOCATION OF THE 29 OPERATIONAL GROUND STATIONS TO PROVIDE EXTENSIVE OVERLAPPING COVERAGE.
- A NEED TO CONNECT ALL RECEIVERS TO TWO DIFFERENT ATC CENTRES (AUCKLAND AND CHRISTCHURCH).
- A NEED TO ACHIEVE A SYSTEM RELIABILITY AND AVAILABILITY OF 99.95%.
- EACH GROUND STATION RECEIVER HAVING 2 INDEPENDENT DATA CHANNELS (I.E. LINES OF COMMUNICATION).
- REMOTE GROUND STATION SITES WITH LONG REPAIR TIMES PREDICTED (E.G., MOUNTAIN TOPS WERE FITTED WITH DUAL RECEIVERS FOR REDUNDANCY).
- NO CENTRAL PROCESSING SYSTEM, THE ATMS WILL DO ALL THE PROCESSING.
- TWO NON-OPERATIONAL GROUNDSTATIONS TO BE LOCATED IN AIRWAYSATMS TEST LAB).

SYSTEM REQUIREMENTS DECISIONS.

THESE TRANSFORM THE DESIRED CAPABILITIES INTO A SOLUTION MEETING OPERATIONAL NEEDS:

- THE ADS-B SYSTEM RECEIVES AND PROCESSES ICAO STANDARD DF 17, 18 AND 19 (MILITARY) SIGNALS.
- THE SYSTEM WAS CAPABLE OF PROCESSING THE LATEST DO-260B MOPS STANDARD AND WAS BACKWARDS COMPATIBLE. – NOW DO260C
- A CENTRAL PROCESSING SYSTEM WAS NOT REQUIRED – ONLY THE RECEIVING AND MONITORING (CPMS, RCMS AND LCMS) SYSTEMS WERE PURCHASED.
- EACH GROUND STATION IS A STAND-ALONE UNIT OUTPUTTING ASTERIX CAT 21, 23 AND 247 DATA (VERSION 2.1). RAW DATA IS ALSO OUTPUT.
- THE SYSTEM DESIGN WAS AGREED TO WITH THE VENDOR AS PART OF THE CONTRACT.
- ALL ADS-B TRACK PROCESSING WILL BE HANDLED WITHIN THE ATMS BY THE SURVEILLANCE DATA PROCESSOR.

DESIGN ASPECT DECISIONS.

TOWER BYPASS REQUIREMENTS (RESILIENCE).

- PROVIDING TOWERS, ESPECIALLY REGIONAL TOWERS WITH CONTINUING SURVEILLANDE DATA IN THE EVENT OF A SURVEILLANCE DATA PROCESSOR (SDP) FAILURE ON THE MAIN ATMS WAS ESSENTIAL.
    - TO ACHIEVE THIS GROUND STATIONS BASED ON THE REGIONAL TOWERS, OR AT ADJACENT HIGH SITES, PROVIDE A DIRECT FEED INTO THE TOWER EMERGENCY BYPASS SYSTEM LOCATED ON THE TOWER CONTROLLER WORK POSITION COMPUTERS.

OTHER REQUIREMENTS INCLUDE:

- THE OVERALL DESIGN WAS DRIVEN BY THE SOLUTION CONTRACTED IN THE AQUISTION PHASE, THE WIDER COMMUNICATIONS NETWORK AND SECURITY POLICIES.
- AN OPERATIONAL PROCESSING REQUIREMENT FOR 1 SECOND UPDATES – IMPACTS LATENCY.
- OVERALL SYSTEM AVAILABILITY TO BE BETTER THAN 99.95% - ACHIEVED VIA OVERLAPPING COVERAGE AND/OR EQUIPMENT REDUNDANCY INCLUDING POWER AND NETWORK ELEMENTS.

INSTALLATION.

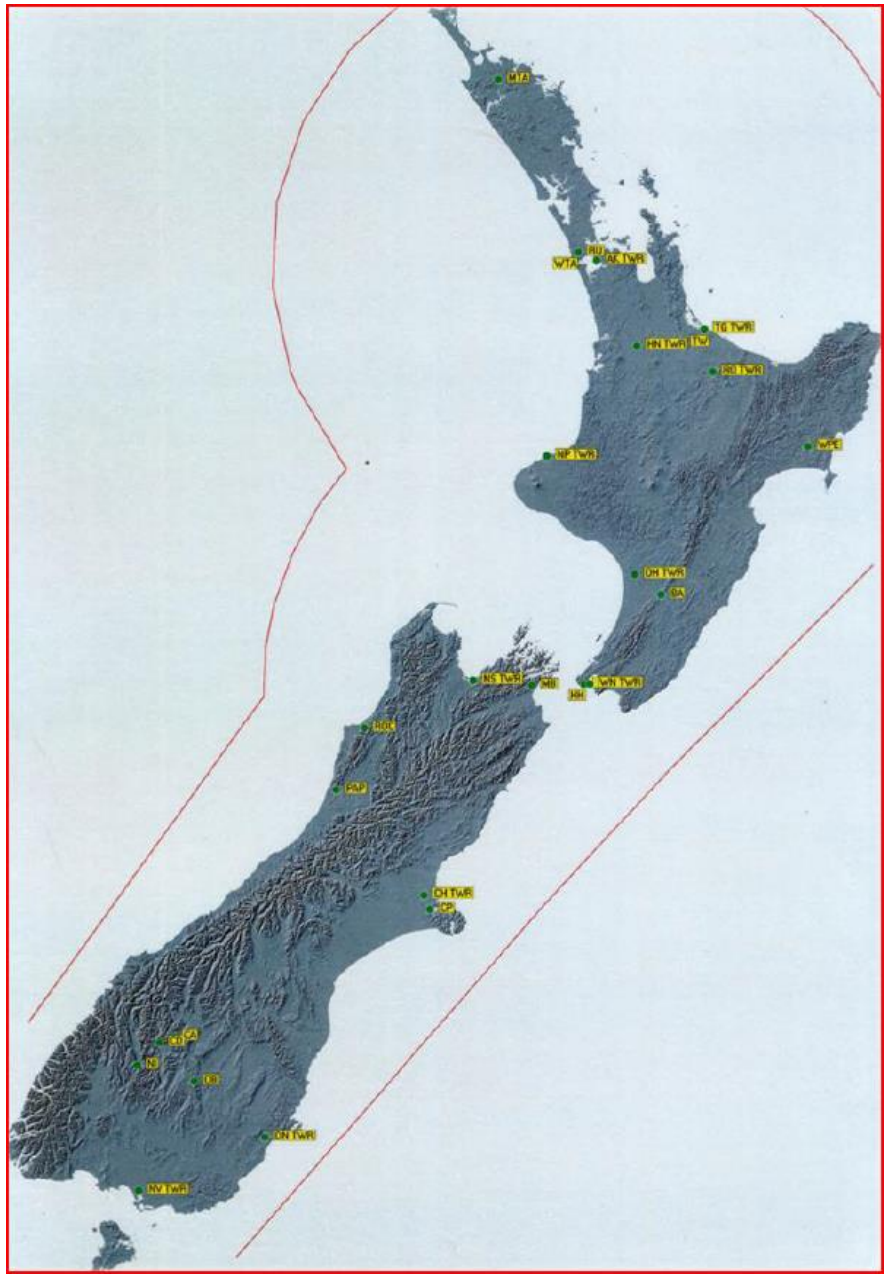
- THE INSTALLATION AND ENGINEERING TEAMS COMPLETED WORK ON FIRMING UP THE SITES (BOTH AIRWAYS AND NON-AIRWAYS) AND COMMENCING THE INSTALLATION OF THE ADS-B SYSTEM.
  - INSTALLATION AT AIRWAYS SITES WAS MANAGED BY AIRWAYS TECHNICAL STAFF.
  - INSTALLATION AT NON-AIRWAYS SITES (E.G., KORDIA) WAS MANAGED BY THE SITE OWNERS STAFF, WITH THEIR PROCESSES OVERSEEN BY AIRWAYS STAFF.
- THE SELECTED SITES INCLUDE HILL-TOP COMMUNICATIONS TOWERS, AND AIR TRAFFIC CONTROL TOWERS.
- AFTER INSTALLATION, AND AS PART OF THE PRE-SAT PROCESS, THE ON-SITE THALES ENGINEER CHECKED THE INSTALLATIONS OF EACH SITE TO CONFIRM THEY MET THE REQUIREMENTS LAID DOWN IN THE CONTRACT.
- THE COMPLETION OF PHASE I ALLOWED AIRWAYS TO MAKE A DESIGN CHANGE, MOVING SOME OF THE EQUIPMENT PROGRAMMED FOR 3 REGIONAL AIRPORTS TO DIFFERENT SITES, PROVIDING GREATER REDUNDANCY AND BETTER OVERALL COVERAGE.

NON-AIRWAYS SITE

AIRWAYS SITE

ADS-B GROUND STATIONS IN NZ

- 25 OPERATIONAL SITES
- 22 SINGLE STATIONS
- 7 DUAL STATIONS



VERIFICATION PROCESS.

AS INDICATED IN PREVIOUS AIRWAYS PRESENTATION AT THIS WORKSHOP, MANY INTERNATIONAL DESIGN STANDARDS AND REGULATIONS ARE USED BY AIRWAYS. THE DOCUMENTS ALLOW US TO COMPARE THE DATA FROM THE SURVEILLANCE SITE TO THE CONTROLLER SCREEN AND ENSURE IT MEETS THE REQUIRED STANDARDS, INCLUDE:

- ED-126 SAFETY AND PERFORMANCE AND INTEROPERATABILITY REQUIREMENTS DOCUMENT FOR ADS-B NRA APPLICATION.
- ED-161 SAFETY AND PERFORMANCE AND INTEROPERABILITY REQUIREMENTS DOCUMENT FOR ADS-B RAD APPLICATION.
- ED-163 SAFETY AND PERFORMANCE AND INTEROPERABILITY REQUIREMENTS DOCUMENT FOR ADS-B AIRPORT SURFACE SURVEILLANCE APPLICATION.
- NZCAA REGULATIONS USED INCLUDE: PART 171 AERONAUTICAL TELECOMMUNICATIONS, PART 139 AERODRDOMES, PART 172 AIR TRAFFIC SERVICE ORGANIZATIONS AND AC91.24.
- EUROCONTROL SPECIFICATION FOR ATM SURVEILLANCE SYSTEM PERFORMANCE (VOL 1 AND 2) EDITION 1.1 (NOW 1.3). – THIS DOCUMENT FORMS THE BASIS FOR THE AIRWAYS REPORT “MEASURING THE PERFORMANCE OF THE ATM SURVEILLANCE SYSTEM” AND IS PROVIDED BY AIRWAYS TO NZCAA AS ASSURANCE THE ADSB SYSTEM IS FIT FOR PURPOSE AND MEETS THE REQUIREMENTS TO PROVIDE 3 AND 5 NM SURVEILLANCE SEPARATION..

ICAO

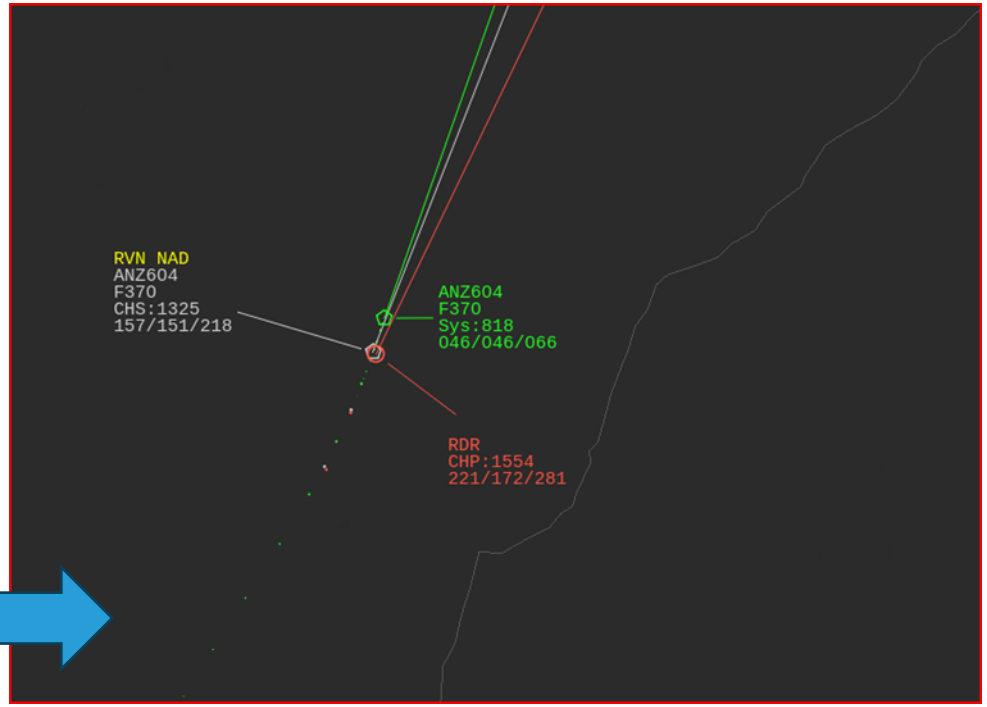
SYSTEM VERIFICATION PROCESS.

THE ATMS TESTING IS A COMPLEMENTARY BUT SEPARATE TEST TO THE SAT PROCESS CARRIED OUT BY SURVEILLANCE ENGINERRING.

ATMS TESTING CONSISTED OF THE FOLLOWING:

- COMPARING THE PERFORMANCE OF THE ADSB AGANST MLAT AND/OR MSSR USING TOOLS WITHIN THE ATMS (E.G., POPCORN – AN INTERNAL TEST TOOL WHICH ALLOWS THE TESTER TO VIEW THE SYSTEM TRACK AGAINST ANY OTHER SENSOR WHICH HAS BEEN SELECTD.

VIEW OF POPCORN.



ICAO

- RECORDING THE CAT 21 AND CAT 23 DATA AND COMPARING THE AIRWAYS ATMS DECODE VERSUS AN INDEPENDENT SURVEILLANCE TOOL (RAPS 3) TO ENSURE THE ATMS DECODE WAS CORRECT.
  - THIS ALLOWED AIRWAYS TO IDENTIFY ANY ISSUES WITH THE CAT 21 DATA BEING SENT FROM THE GROUND STATIONS AND HAVE THE ISSUE RECTIFIED BEFORE GO-LIVE.

- USING TARGETS OF OPPORTUNITY TO CONFIRM GROUND STATIONS RANGE.
  - INVOLVED USE OF ATAC PLOTTING TOOL.

- USING TARGETS OF OPPORTUNITY TO PROVIDE THE DATA FOR THE ATM SURVEILLANCE SYSTEM REPORT.
  - MEASURING THE PERFORMANCE OF THE ATM SURVEILLANCE SYSTEM.

- PROVIDING A TEST LAB FACILITY WHICH PROVIDES FULL ACCESS TO BOTH LIVE FLIGHT PLAN AND SURVEILLANCE DATA TO ALLOW SUBJECT MATTER EXPERTS AND OPERATIONAL CONTROLLERS TO PERFORM LIVE TESTING OF THE DATA. ALSO PROVIDES DATA FOR REPORT ABOVE.

VALIDATION.

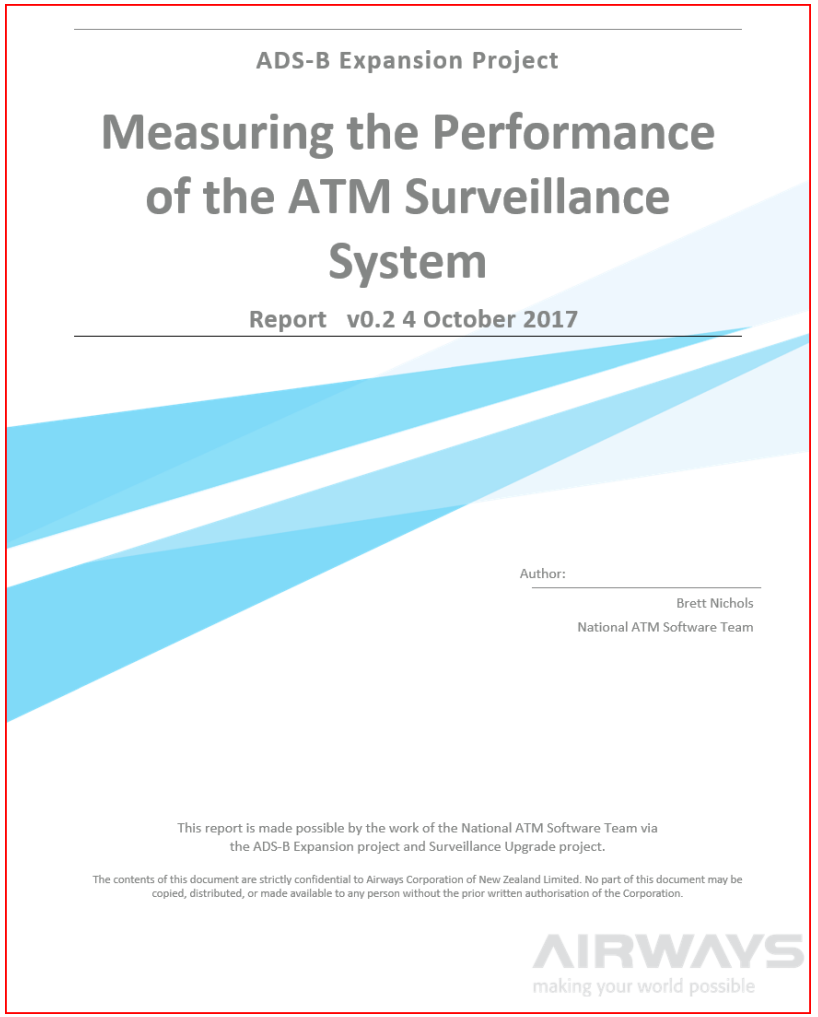
- THE VALIDATION PROCESS ALLOWS THE SYSTEM TO MOVE INTO A TRANSITION PHASE WHERE THE FINAL STEPS BEFORE GO-LIVE OCCUR.

- IN AIRWAYS THE VALIDATION PHASE INVOLVES USING ALL THE TOOLS USED DURING VERIFICATION TO PROVIDE INPUT INTO THE SYSTEM REPORT, REQUIRED BY VARIOUS TEAMS WITHIN AIRWAYS AND THE NZCAA TO PROVIDE FINAL SIGN OFF FOR OPERATIONAL USE.

- THE VALIDATION PROCESS ALSO INCLUDED PROVIDING FEEDBACK TO NZCAA OF IDENTIFIED AIRCRAFT WITH NON-COMPLIANCE ISSUES
    - I.E,. AIRCRAFT WHICH DID NOT MEET THE QUALITY VALUES REQUIRED BY NZCAA FOR THE TRANSMISSION OF ADS-B. THESE VALUES ARE - FOR DO260 $\geq$ NCUP 4, - FOR DO260A $\geq$ NACP 5, NIC 5 AND SIL 2, AND - FOR DO260B $\geq$ NACP 5, NIC 5 AND SIL 3.

REPORT MADE AVAILABLE TO:

- **NZCAA,**
- **AIRWAYS POLICY and STANDARDS,**
- **AIRWAYS OPERATIONAL MANAGEMENT, and**
- **AIRWAYS SAFETY TEAM.**



ADS-B Expansion Project

Measuring the Performance of the ATM Surveillance System

Report v0.2 4 October 2017

Author:
Brett Nichols
National ATM Software Team

This report is made possible by the work of the National ATM Software Team via the ADS-B Expansion project and Surveillance Upgrade project.

AIRWAYS
making your world possible

TRANSITION PROCESS.

THE TRANSITION PROCESS MOVES THE SYSTEM INTO AN OPERATIONAL STATUS ENSURING THE SYSTEM IS OPERABLE, AND COMPATIBLE WITH OTHER OPERATIONAL SYSTEMS – VERIFIED BY THE PREVIOUS REPORT.

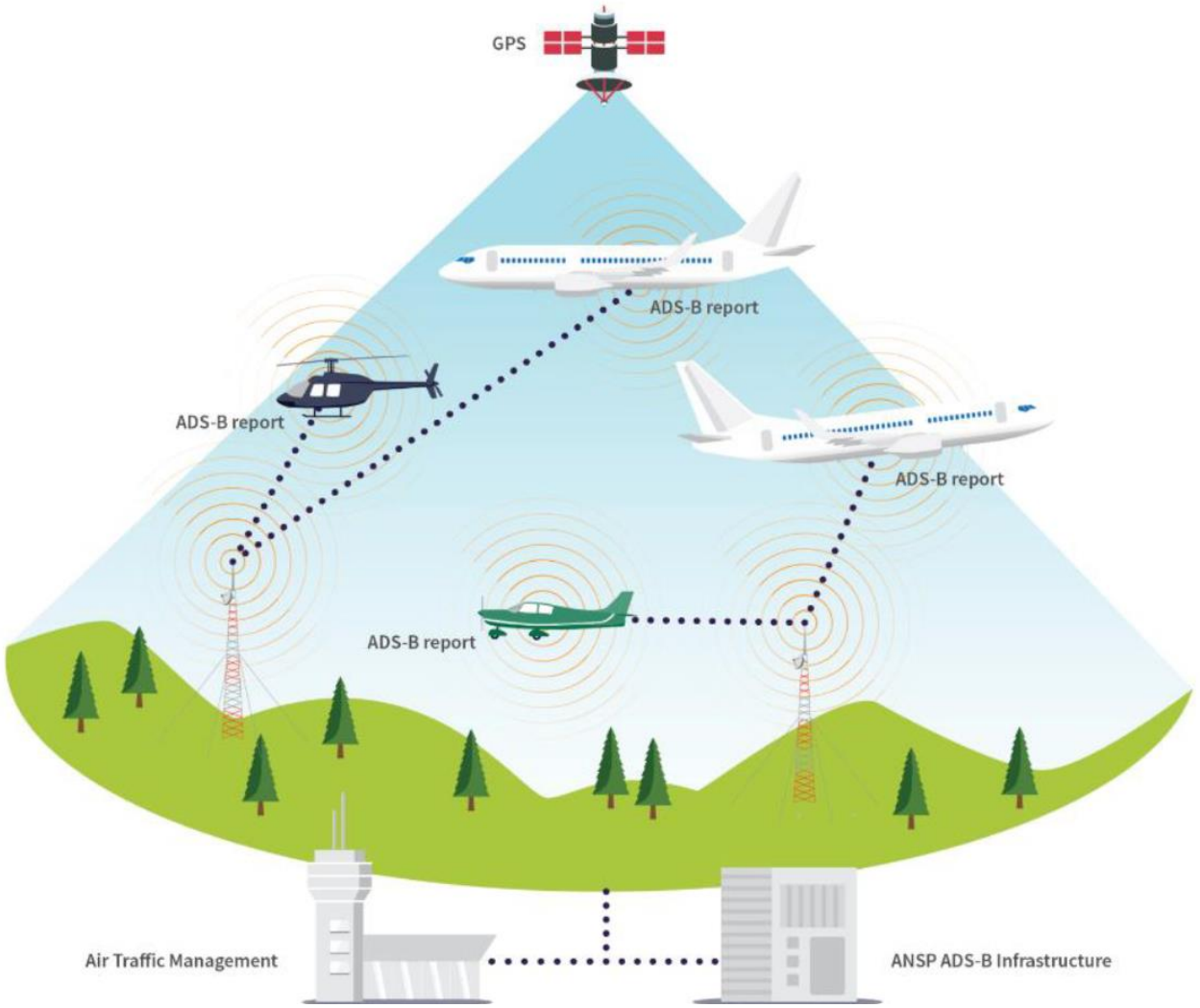
INCLUDED IN THIS PROCESS ARE:

- THE TRANSITION STRATEGY WAS A TWO-PHASE STRATEGY TO MEET EACH OF THE ADS-B MANDATE GO-LIVE DATES.
- ENSURING THE NETWORK WAS IN PLACE AND OPERATIONAL FOR EACH RELEASE.
- SURVEILLANCE ENGINEERING FINAL SIGN OFF OF SYSTEM COMPLIANCE FOR EACH RELEASE.
- TRAINING AND ANY UPDATE TRAINING COMPLETE FOR ATSEP(S).
- ANY UPDATE TRAINING COMPLETE FOR ATS STAFF.
- APPROVAL SIGN-OFF FROM NZCAA AND AIRWAYS PROCESSES, INCLUDING QUALITY ASSURANCE .

4

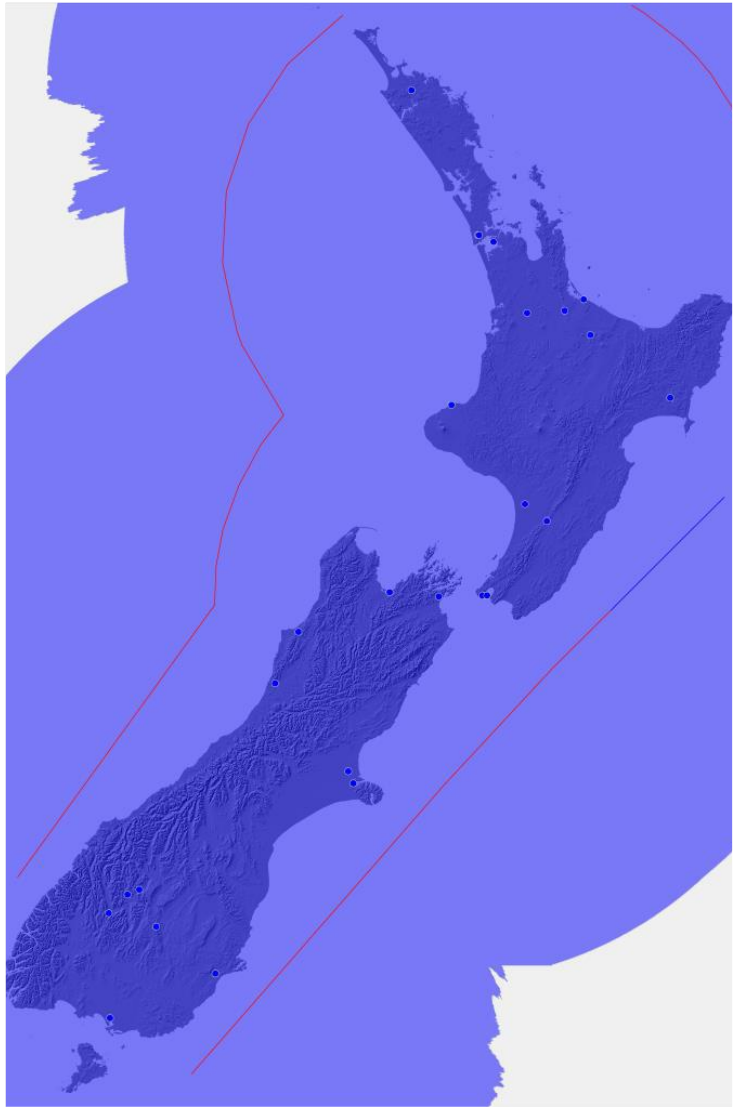
CHAPTER 4

UTILISATION PHASE



ICAO

UTILISATION PHASE



ADS-B COVERAGE AT FL300 – WELL OUTSIDE OF THE NZZC FIR WITH SOME COASTAL SITES ON THE WEST COAST PROVIDING UP TO 300 NM COVERAGE VERSUS A PREDICTED COVERAGE OF 250NM MAXIMUM

UTILISATION PHASE

THE SYSTEM IS AVAILABLE TO BE OPERATED IN ITS INTENDED ENVIRONMENT TO DELIVER ITS INTENDED SERVICE.

- PHASE 1 REQUIRED AN ENROUTE COVERAGE WITHIN THE NZZC FIR ABOVE A100 FOR THE FIRST ADSB MANDATE ON DEC 31, 2018, COVERING ALL CONTROLLED AIRSPACE FL245 AND ABOVE.
    - THIS WAS ACHIEVED WELL BEFORE THE MANDATE, AND PROVIDED ADDITIONAL COVER INTO THE NZZO FIR, WHERE ALTHOUGH ADS-B IS NOT MANDATED MOST IF NOT ALL AIRCRAFT ARE EQUIPPED.

- PHASE 2 REQUIRED ALL CONTROLLED AIRSPACE WITHIN THE NZZC FIR FOR THE SECOND ADS-B MANDATE ON DEC 31, 2021 (INITALLY) BUT FINALLY DEC 31, 2022, - DUE TO COVID.
    - LIKE PHASE 1, THIS WAS ACHIEVED WELL BEFORE THE MANDATE, AGAIN PROVIDING BETTER THAN EXPECTED COVERAGE WITH SOME SITES PROVIDING 300NM COVERAGE RANGE.

ISSUES DETECTED FROM THE ATMS SINCE GO-LIVE

- DUE TO COVID NZCAA ALLOWED AN ADDITIONAL YEAR AFTER THE MANDATE FOR AIRCRAFT TO EQUIP WITH ADS-B. THIS MEANT AIRWAYS INTENDED SOFTWARE UPDATES, TO IDENTIFY NON-COMPLIANT OR NON-ADSB TRAFFIC TO CONTROLLERS, HAD TO BE DELAYED UNTIL THE 2ND QUARTER OF 2024.

  - NO ADS-B ALERT

  - DEGRADED ADS-B ALERT

- SOME MINOR ISSUES WITH THE THALES ADS-B SYSTEM WERE IDENTIFIED AND RESOLVED BY THE VENDOR. THESE REQUIRED TESTING IN AIRWAYS LAB CONFIGURATION BEFORE AN OPERATIONAL RELEASE. THEY INCLUDE:
  - DIFFERENT SOFTWARE/FIRMWARE PROGRAMS ON SYSTEM MODULES REQUIRED TWO SOFTWARE CHANGES
    1. AIRWAYS FOUND AND ERROR RESULTING IN INCORRECT INFORMATION IN ASTERIX DATA STREAM. THIS WAS FOUND BY THALES TO BE A GLOBAL ISSUE AND RESULTED IN NEW SOFTWARE.
    2. TRACK NUMBERS FROM THALES SYSTEM WERE STARTING WITH ZERO WHICH WAS NON-COMPLIANT WITH THE ATMS SYSTEM. FIXED WITH NEW SOFTWARE.
  - SOME ENGINEERING ISSUES HAVE BEEN FOUND AND HAVE BEEN RESOLVED OR HAVE BEEN FIXED BUT ARE AWAITING RESOLUTION BY AIRWAYS.

FEEDBACK FROM STAFF:

- OPERATIONAL STAFF ARE EXTREMELY HAPPY WITH THE SYSTEM, PARTICULARLY THE ABILITY TO PROVIDE A 1 SECOND UPDATE TO THE CONTROLLER SCREEN WHICH MAKES VECTORING FAR EASIER THAN THE 5 SECOND UPDATES FROM RADAR.
- THE ADDITIONAL COVERAGE INTO THE NZZO FIR HAS ALLOWED FOR IMPROVEMENTS IN ALLOWING OUTBOUND INTERNATIONAL TRAFFIC TO REACH DESIRED ALTITUDES PRIOR TO INBOUND INTERNATIONAL TRAFFIC ENTERING ADS-B COVERAGE.
- LOW LEVEL COVERAGE HAS IMPROVED EVERYWHRE MAKING IT EASIER TO FIND AND HELP AIRCRAFT IN DIFFICULTIES. AIRWAYS IS NOW CONSIDERING ADDITIONAL SITES TO FURTHER IMPROVDE THIS COVERAGE.
- COOPERATION BETWEEN OPERATORS, AIRLINES, CAA AND AIRWAYS IN RESOLVING ISSUES WITH NON-COMPLIANT AIRCRAFT IS WORKING WELL. CURRENTLY 2 AIRCRAFT ARE LISTED ON OUR ADS-B SUPPRESSION LIST FOR NON-COMPLIANT DATA OUT OF 3151 NEW ZEALAND REGISTERED AIRCRAFT EQUIPPED WITH ADS-B.

Thank You

ICAO