

Draft Airspace and Navigation Plan Overview (13 August 2013)

	Stage 1 (by 2015)	Stage 2 (by 2018)	Stage 3 (by 2021)
Navigation Towards exclusive PBN	Mixed Mode PBN and traditional routes.	Some exclusive areas PBN – major airports and above FL 140	Exclusive PBN environment in controlled airspace.
Surveillance From Radar to ADS-B	ADS-B exclusive in airspace above FL290	ADS-B exclusive airspace – major airports and above FL 140	ADS-B exclusive in all controlled airspace. Radars decommissioned, with back-up network in place
Communications Adding Data-link	Business as usual	Development of Data-link options for domestic airspace. Transition to ATN for International Data-link solutions.	Data-link solution for New Zealand implemented in all controlled airspace congested areas
Information Digital and integrated	Going Digital	Information Management – system integration through common data standards and communications	Data systems support system wide information management (SWIM)
Air Traffic Management From controlling to enabling	Infrastructure, procedure and tool development for proactive airspace management – with a focus on trajectory based network-wide air traffic management.	Implementation of trajectory based network-wide management tools.	Trajectory based management in place supported by SWIM environment and collaborative processes
Airspace Design Fixed to dynamic	Develop policy to more clearly define airspace classification.	Review airspace design to account for new classification, PBN routes and other airspace changes	Airspace design allows for flexibility according to demand
Aerodromes Increasing capacity	Aerodrome plans to include for greater capacity and safety management, using collaborative decision making forums	Aerodrome management integrated into Air Traffic Management network	All key aerodromes have master plans in place and are integrated into Air Traffic Management network
Meteorological Services Integrate weather information			

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Draft Airspace and Navigation Plan – Stage 1 (2015)

	Performance Based Navigation <i>Mixed-mode navigation environment that allows continued use of legacy navigation applications while PBN capability is progressively implemented</i>	Surveillance <i>ADS-B monitoring available in airspace above FL290 Planning for ADS-B domestic implementation in next stages</i>	Information & Meteorology <i>Going Digital</i>	Communications <i>Planning for transition to combined data-link/radio communications environment</i>	Air Traffic Management <i>Infrastructure, procedure and tool development for proactive air traffic management</i>	Airspace Design <i>Develop policy to more clearly define airspace classification.</i>	Aerodromes <i>Increasing capacity</i>
Aircraft Equipment requirements	Mandatory compliance with AC91-21 specifications for new equipment installations. Operators wishing to take advantage of PBN routes to comply with AC 91-21 equipment specifications	Mandatory installation of ADS-B equipment for those operators wishing to take advantage of ADS-B monitoring above FL290		Oceanic: CPDLC capability Domestic: Pre-departure internationalclearances via data link (ARINC 623) from 2014.			
Infrastructure development	Future Nav-aid Strategy developed to determine contingency requirements Integration PBN into ATM system Supporting Aerodrome infrastructure is in place as PBN implemented at each airport Monitor the evolution of GLS Automatic Weather Stations (AWS) progressively installed for APV Baro-VNAV; Verify capability of the existing DME network to support DME/DME updating	Develop radar decommissioning and replacement strategy ADS-B ground infrastructure and procedures in place for FL290		On-going maintenance and upgrade of radio communications network as per radio maintenance plan	Hardware and system requirements developed for trajectory based management		Review key airport terminal and airfield design/geometry and identify constraints to reduced runway occupancy times or aircraft movement capacity. Advanced surface movement guidance and control system for key airports (A-SMGCS) providing routing, guidance and surveillance for the control of aircraft and vehicles.
Contingency and emergency systems	Future Nav-aid Strategy developed to determine contingency requirements (to be consulted and to cover at minimum international airports, their alternates, main trunk routes and provision for training)	Assess risk of GNSS system failure Contingency plan developed to ensure fail-safe surveillance system, (to be consulted and to cover at minimum international airports, their alternates and main trunk routes)		VHF and HF network maintained	Contingency plan developed for Air Traffic Management emergency situations given introduction of new management systems		Review critical infrastructure and systems to identify potential areas where further contingency measures are required
Procedures and management tools	Operator approvals for those wishing to use PBN routes to be obtained in accordance with AC 91-21 Oceanic: RNP 10 (RNAV 10) and RNP 4. Domestic: RNAV 2 for all promulgated routes above flight level 140 or 290 in domestic control terminal areas (CTAs), subject to infrastructure capability. RNAV 1 for all terminal routes with surveillance services and Basic RNP 1 for routes without surveillance services. Facilitate a mix of ground based	Operator approvals for installation and use of ADS-B equipment for those wishing to take advantage of ADS-B monitoring above FL 290 Air Traffic control procedures for ADS-B transmission monitoring	Decision Support Toolsrequired to deal with MET information and translate it into ATM-PBN constraints and impacts to provide ATM with best choice options.	Operator and Air Traffic Controller procedures in place for pre-departure internationalclearances via data link (ARINC 623) from 2014.	Development of trajectory based management and network management tools for Air Traffic Controllers Workshops with stakeholders on new systems, to identify user preferred trajectories Network-wide management principles and agreements in place	Develop policy for airspace designation to ensure consistent approach Develop Methodology for further airspace reviews: risk based, determined by triggers (traffic levels, mix of traffic, areas of concentrated flight training, weather, terrain consultation/collaboration requirements	Master plans for all key aerodromes to include steps to increase capacity and safety management. Establish a formalised airport collaborative decision making forum

	<p>approaches, RNP APCH (RNAV GNSS) including Baro-VNAV enabled Approach with Vertical Guidance, where possible, and RNP AR APCH.</p> <p>No change to existing procedures; will be implemented as required.</p>						
Transitioning people	<p>Guidance developed for private and commercial operators on procedural changes</p> <p>Training standards developed and included in flight training curriculum</p> <p>Pilot and operator education programme</p> <p>Pilots wishing to use PBN routes to be trained in accordance with AC 91-21</p>	<p>Operator procedure guidelines developed</p> <p>Education programme for operators, pilots and air traffic controllers on ADS-B installation, and operational requirements.</p> <p>Training requirements included in training curriculum</p>	<p>Education programme on future information systems</p>	<p>Data-link education and training programmes for operators, pilots and air traffic controllers using data-link systems.</p> <p>General education on data-link systems for operators not equipped for data-link (to begin building knowledge of alternate communications system)</p>	<p>Education programme on upcoming changes to air traffic management</p> <p>Human factors assessment to ensure transition to time based trajectory management and full network management complexities are fully assessed</p>		
Data (integration, maintenance, collection, management and quality)	<p>Navigation database integrity and control systems in place</p> <p>GNSS/RAIM prediction requirements, including GNSS status monitoring, reporting and recording, and prediction of availability for a particular operation and aircraft;</p> <p>Operator approvals to include database update procedures.</p>	<p>ADS-B data integrated into Air Traffic Management surveillance system.</p>	<p>P-14 — Obstacles</p> <p>P-15 — Aerodrome mapping</p> <p>P-08 — Aeronautical information exchange conceptual model (AIXM) + WXXM The models should include conceptual and exchange representations of weather data and information types.</p> <p>P-12 — Aeronautical information briefing.</p> <p>P-10 — Communication networks</p> <p>Delivery channels developed for tablet devices and smart phones</p>	<p>Data-link protocols to match Asia Pacific requirements</p>	<p>Integrated data systems (see AIM)</p>	<p>Data collection on demand and pressure on airspace to feed into airspace management</p>	<p>Forecast report to identify industry capacity demands for all aerodromes</p> <p>Critical airports: Provide and maintain appropriate electronic obstacle and terrain data to assist with the future provision of PBN flight paths and use of cockpit technology such as enhanced flight vision systems.</p>
Regulator	<p>Revision of CAR Part 19 to allow GNSS operations</p> <p>Ensure adequate capacity to assess and issue approvals for aircraft, operators and pilots</p> <p>PBN Capability register</p>	<p>Rule development – ADS-B equipage and operator requirements for aircraft wishing to take advantage of ADS-B surveillance above FL 290</p> <p>Ensure adequate capacity to assess and issue approvals for aircraft, operators and pilots</p> <p>ADS-B Capability register</p>		<p>Assess safety risks associated with potential introduction of Data-link equipment and procedures into the domestic environment</p>			<p>Consider need for review of aerodrome master plans</p>

Airspace Plan – Stage 2 (by 2018)

	Performance Based Navigation <i>Some exclusive areas PBN – major airports and above FL 140</i>	Surveillance <i>ADS-B exclusive airspace above FL140 on major routes and in CTA of major international airports</i>	Information & Meteorology <i>Information Management and weather information – system integration</i>	Communications <i>Transition to ATN for International Data-link solutions. Development of Data-link options for domestic airspace</i>	Air Traffic Management <i>Implementation of trajectory based management tools supported by education programmes</i>	Airspace Design <i>Systems and tools developed to support demand-based airspace design</i>	Aerodromes <i>Integrated into Air Transport Management network management</i>
Aircraft Equipment requirements	Voluntary equipage for operations in non-exclusive airspace. Mandatory equipage for aircraft operating in PBN exclusive airspace Equipment requirements as set out in draft Advisory Circular	ADS-B transponders all aircraft entering Class A and C airspace 1090 MHz Mode S “extended squitter Review option to replace or enhance ACAS with ADS-B In		CPDLC Oceanic – transition to ATN protocol Review demand for CPDLC in domestic environment RPAs: Communications in non-segregated airspace must operate within the AM(R)S or AMS(R)S OR CPDLC implemented for RPAS			ADS-B equipment for ground based movement monitoring?
Infrastructure development	Decommissioning of some terrestrial navigation systems as per Nav-aid strategy	ADS-B ground receivers and infrastructure in place for FL140 and CTA of international airports		VHF and HF network maintained. Consider move to 8.33 kHz channels if radio congestion becomes an issue. Infrastructure supports CPDLC network Transition from AFTN to AMHS completed	Implement hardware and systems for trajectory based management Virtual towers in place		Supporting Aerodrome infrastructure is in place as PBN implemented at each airport Consider implementation of appropriate procedures and further enhancement of visual aids to provide routing, guidance and surveillance for the control of aircraft and vehicles ADS-B systems in place for ground movement at airports where it has been implemented
Contingency and emergency systems	Implementation of Nav-aid contingency strategy	Contingency plan implemented		VHF and HF network maintained	Implement contingency plan Air Traffic Management emergency situations		Implement findings of review of critical infrastructure and systems
Procedures and Management tools	Operator approvals for those wishing to use PBN routes to be obtained in accordance with AC 91-21 Oceanic: No change Domestic: RNAV 2 exclusive in airspace above FL140 RNP APCH (RNAV GNSS) with APV where possible, and RNP AR APCH. Terminal CTA: RNAV 1 and Basic RNP 1 (exclusive airspace). (Helicopters now as per fixed wing) Maintenance procedures developed for equipment	Operator Air Traffic Management procedures in place for ADS-B signal monitoring Approvals for equipment Maintenance procedures developed for equipment		Procedures developed to support transition to ATN in Oceanic	Implement trajectory based management tools Network-wide management processes in place	ATM network management includes aerodrome management so aircraft can be managed from departure	CDM partnerships in place and providing solutions for optimised airport operations Implementation of Master Plans
Transitioning people	IFR training curriculum in place Pilot and operator education programme	Training requirements for use of ADS-B equipment included in training curriculum	P-16 – Training	Training for pilots on transition to ATN protocol in Oceanic Airspace	Education and training for operators and air traffic controllers on transition to time based trajectory management and network management	Education programme on reclassification and airspace changes	

Data (integration, maintenance: collection, management and quality)			P-18 — Agreements with data originators P-09 — Aeronautical data exchange (AIX) P-20 — Electronic aeronautical charts P-21 — Digital NOTAM All data accessible in real time via internet Development of air traffic management information reference model (AIRM) P-19 — Interoperability with meteorological products WXXM Data can be downloaded on all gadgets... (maps, AIP, Preflight etc...)		See AIM – ensure adequate real-time and integrated data and systems available to support trajectory based management and network management		Establish on site procedures to ensure the appropriate provision of data input into the national A CDM system. Regional airports: Consider the provision of appropriate electronic obstacle and terrain data to assist with future development of PBN flight paths
Regulator	Ongoing equipment, operator and training approvals	Review of technologies around self-surveillance and recommendations to Government. Ongoing equipment, operator and training approvals	Contract for supply of aeronautical services supports future data management requirements	Review regulatory requirements around data-link systems as part of review of data-link implementation in domestic airspace.	Develop charging policy for airspace time- slots to further manage pressure at peak times and congested airspace.	Review of Airspace design Review transponder mandatory airspace	Encourage use of RMA processes to ensure the protection and support of future flight paths to and from the airport

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Airspace Plan – Stage 3 (by 2021)

	Performance Based Navigation <i>Exclusive PBN environment in controlled airspace. Back up network in place</i>	Surveillance <i>ADS-B exclusive in all controlled airspace. Radars decommissioned, with back-up network in place</i>	Information & Meteorology <i>Full interoperability, migration to system wide information management (SWIM) model complete</i>	Communications <i>Data-link solution for New Zealand implemented in all controlled airspace congested areas</i>	Air Traffic Management <i>Trajectory based management in place supported by SWIM environment and collaborative processes</i>	Airspace Design <i>Airspace design is flexible according to demand – allowing 4D trajectory management</i>	Aerodromes <i>All key aerodromes reviewed to ensure fully integrated and maximised capacity</i>
Aircraft Equipment requirements	All IFR aircraft to be equipped with approved GNSS receivers in accordance with draft advisory circular AC 91-21 Likely transition from single GPS to multi-constellation GNSS equipment.	ADS-B transponders required in all controlled airspace 1090 MHz Mode S “extended squitter” transponder Replacement or enhancement of ACAS with ADSB-In Implementation of self-surveillance review recommendations	Weather and aeronautical information accessible real-time both on the ground and on board aircraft	CPDLC implemented in congested domestic airspace in accordance with review			ADS-B required for international airport ground operations
Procedures and management tools	All IFR operators approved for PBN navigation Oceanic: no change Domestic: RNAV 1 / RNP 1 exclusive in airspace above FL145. RNAV 2 in all other controlled airspace? Terminal CTA – RNP 1 exclusive airspace (Advanced RNP 1 limited to locations with specific operational requirements). The standard approach procedure will be GNSS based - RNP APCH (RNAV GNSS) with APV where possible, and RNP AR APCH	Operator approvals complete			Trajectory based management in place supported by SWIM environment and collaborative processes	Flexible and responsive airspace design	Aerodrome management fully integrated with airspace management Review master plans
Infrastructure development		National ADS-B ground surveillance and infrastructure II controlled airspace (NB uncontrolled airspace, no requirement)		Voice radio communications remain primary communications medium, except in congested airspace Infrastructure expands to support CPDLC network in congested airspace Oceanic: SATVOICE superceed HF as primary voice system		Data systems support direct information transfer on airspace into aircraft so pilot has up to date information	Infrastructure changes from first master plan in place or underway
Contingency and emergency systems	Retain a minimum contingency infrastructure using terrestrial navigation systems (VOR/DME). Retain ILS at major international airports and those ground based	Legacy radar remains at strategic points in accordance with contingency plan		VHF and HF network maintained SATVOICE		Ability to manage	Contingency systems in place for all aerodromes

	<p>approaches considered essential for contingency purposes.</p> <p>Supporting Aerodrome infrastructure is in place at all airports with a GNSS approach</p>						
Transitioning people	All IFR operators approved for PBN navigation	ADS-B business as usual for all users	All users are familiar with the interface, human factors issues mitigated			Culture and training supports flexible airspace management	
Data (integration, maintenance: collection, management and quality)			<p>Data collection and quality control protocols in place</p> <p>All aeronautical data is available in digital form</p> <p>SWIM in place: System Wide Information Management</p> <p>Integration of AIXM, WXXM, FIXM?</p>				<p>Ongoing data collection on aircraft movements</p> <p>Aerodromes incorporated into SWIM model</p>
Regulator							

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