BARA
Board of Airline Representatives of Australia Inc

INTERNATIONAL AVIATION POLICY SERIES

Safe and Efficient Air Navigation Services

Overview of BARA

The Board of Airline Representatives of Australia (BARA) is the industry body promoting the safe and efficient operations of international airlines serving Australia for the benefit of consumers, businesses and tourism.

BARA is a member-driven industry body that delivers value through setting key expectations and desired outcomes for Australia's aviation infrastructure and service providers. BARA's members include many of the world's largest airlines, providing 90% of all international passenger flights, and carrying most exports and imports of freight to and from Australia.

BARA's Vision and Outcomes

To guide BARA's work and clearly articulate its ideals, BARA's members have developed a *Vision and Outcomes for International Aviation in Australia*, available at www.bara.org.au.

The vision for international aviation in Australia is 'High quality, adaptive and efficient'. Underpinning this vision, BARA has identified four key outcomes to boost the competitiveness, productivity and financial performance of industry participants. These are:

Outcome 1: Timely and reasonably priced airport infrastructure

Outcome 2: Competitive supply of jet fuel

Outcome 3: Safe and efficient air navigation services

Outcome 4: Environmentally sustainable growth

During 2014 BARA published its policy papers on the need for *Timely and reasonably priced airport infrastructure* and *A competitive supply of jet fuel at Australia's major international airports*, available at BARA's website.

Safe and Efficient Air Navigation Services

Air navigation services are critical to safe and efficient airline operations across the globe. For Australia's international aviation industry, these services extend from our international airports, across the airspace of other countries and oceans, to international airports overseas.

Australia has an excellent air safety record. BARA's members have great confidence in Australia's framework and institutions for regulating and providing air navigation services. The sustained growth in domestic and international aviation is, however, generating congestion and delays at Australia's major international airports. Aircraft congestion, especially during peak times, is stretching the industry's ability to maintain and improve productivity, and will act to limit the value that Australia's international aviation industry can deliver to the Australian economy and community.

This paper articulates a series of pathways which aim to promote the ongoing development of air navigation services to allow aircraft to operate more efficiently and predictably, while maintaining safety. Central to this is ensuring investments in air navigation technologies and procedures are customer-driven. The paper also identifies opportunities to better integrate Australia's air navigation services with overseas providers, and to improve and protect airspace use around the major international airports.

Executive Summary

BARA's previous two policy papers have articulated commercial principles and reforms to make Australia's airport infrastructure and jet fuel supply more efficient. A third foundation underpinning improved industry performance is increased efficiency and predictability in safe aircraft operations.

Australia's existing air navigation system serves the international aviation industry well in supporting safe passenger and freight services. Continued growth in domestic and international aviation has, however, led to congestion and delays at the major international airports. With the potential for traffic volumes to double over the next 15 years, BARA has identified four improvement pathways for air navigation services that will provide greater aviation capacity and improved productivity while continuing to support excellent safety outcomes.

Continuous improvement in air navigation

Four improvement pathways	Benefits of continual improvement
1. Customer-driven technology and procedures	» Shorter flight times
2. Seamless airspace for international flights	» Reduced fuel burn and environmental impact
3. Airspace management improvements around Sydney Airport	» Improved on time performance
4. Outcomes-focused economic regulation of Airservices Australia	» Lower industry costs supporting airfare affordability

The improvement pathways encompass the framework for the planning and delivery of air navigation services in Australia, integration with overseas air navigation service providers, through to the management of local airspace around the major international airports. Combined, the improvement pathways offer the potential for greater industry efficiency and productivity. In turn, these productivity benefits can be shared with passengers and the economy through improved on time performance and greater airfare affordability.

BARA recognises that pursuit of the four improvement pathways and associated benefits will require the combined effort of many industry participants, including airlines, Airservices Australia (Airservices), safety regulators and the operators of the major international airports. In this regard, using existing forums that bring these participants together and encourage information sharing to drive improvements in air navigation services will be important.

BARA also sees merit in the Australian Government reviewing the potential for the industry to reduce its noise impacts on the community through improved airspace management, especially around Sydney Airport. There is also a need for state and local governments to ensure housing and commercial developments do not conflict with the airspace needs of airlines operating to and from the major international airports.

What are Air Navigation Services?

Air navigation services are integral to modern aviation. They encompass all phases of international flights, directly controlling the movement of aircraft at the airport and in the air.

At cruising speed, a jet aircraft travels at some 900 kilometres per hour and travels through five nautical miles, (or 9.3 kilometres) in approximately 40 seconds. At such speeds, pilots rely on the air navigation system to maintain safe separation distances and prevent collisions between aircraft. The air navigation system also ensures separation between aircraft as they arrive at and depart from the airport, and taxi between the terminal apron and runways.

Air navigation services can be divided between:

1. Navigation infrastructure, which enables flight crews to pinpoint the position of their aircraft. It includes terrestrial navigational aids, such as Distance Measuring Equipment (DME), and space-based navigation aids such as Global Positioning System (GPS). Laser-gyro-driven Inertial Navigation Systems (INS) contained within the aircraft supplement these technologies.
2. Air traffic management, which uses aircraft position data to provide physical distance separation (air traffic control) and sequencing (air traffic flow management) of aircraft along the air routes and at airports.

The quality of the air navigation infrastructure and air traffic management services, together with the technology available in aircraft and pilot training, determine both the ability of aircraft to fly safely and the efficiency of flight as measured by metrics including flight time and fuel burn. The following sections describe the air navigation system's services and technologies that international airlines use from the aircraft's departure, throughout the flight, to safe arrival at Sydney, Melbourne, Brisbane, Adelaide and Perth airports.

Departure (terminal navigation)

Departing aircraft are initially managed by the control tower, which is responsible for separating aircraft on taxiways and runways. The control tower will apply runway separation standards between departing and arriving aircraft after it coordinates with the departures radar controller. Once airborne, aircraft fall under the jurisdiction of the departures controller and fly an assigned standard instrument departure. In normal conditions, air traffic control applies a minimum separation standard of three nautical miles between aircraft airborne within the terminal area.

Cruising (en route navigation)

When the flight is en route, aircraft fly defined single or multidirectional (ie one-way or two-way) routes, cruising at an altitude or flight level assigned by air traffic control. Flight levels are established 1,000 feet vertically apart to ensure that aircraft operating at different flight levels are vertically separated. Typically, modern high performance commercial aircraft operate between flight levels 290 (29,000 feet) and 420 (42,000 feet). Depending on the complexity of the air routes for a given area, controllers will separate aircraft using either vertical, time or distance minimum separation standards as established by the International Civil Aviation Organization (ICAO).

Accurate and real-time aircraft positional information is determined by technologies such as primary radar, secondary radar, Automatic Dependent Surveillance – Broadcast (ADS-B) and Multilateration. When using these surveillance technologies, controllers apply a minimum separation distance of five nautical miles between aircraft. Outside of electronic surveillance

coverage, flight crews use on-board systems to determine the aircraft's position. These are either verbally reported to the air navigation service provider or increasingly via automated satellite data link. This type of separation is called 'procedural separation'. It does not use continuous real-time information and therefore controllers increase the distance between aircraft to ensure there is no risk of collision.

Given the large area involved and number of aircraft operating in the en route phase, airspace is organised into air traffic sectors, with each managed by a controller. Controllers progressively hand over jurisdiction between adjacent sectors as an aircraft proceeds along a cleared route towards its destination. At somewhere near 80 nautical miles from the destination airport, the aircraft will be 'cleared' for descent.

Regulators and providers

Key Australian and global regulators and providers of air navigation services:

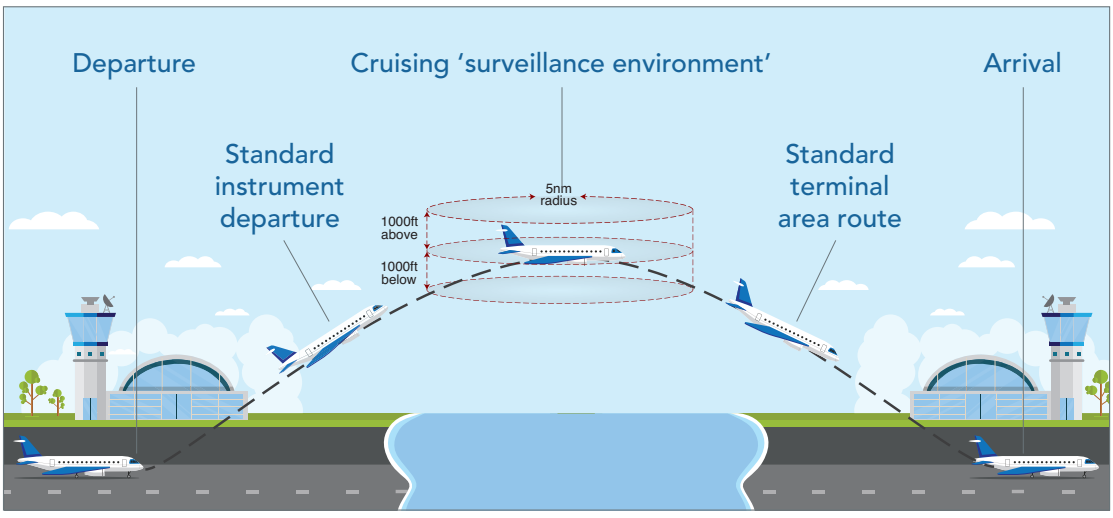
- Civil Aviation Safety Authority – Australian aviation safety regulator
- Australian Transport Safety Bureau – Australian aviation safety investigator
- Airservices Australia – Australian air navigation service provider
- Bureau of Meteorology – weather information provider
- International Civil Aviation Organization – manages international air law, and establishes global technical standards and recommended practices
- International airport operators – airport services: runways, taxiways and lighting.

Arrival (terminal navigation)

Arriving aircraft normally fly one of a number of standard terminal area routes (STAR) associated with the destination airport. A STAR approach defines lateral and vertical navigation requirements and includes speed restrictions. It takes the aircraft from the airway to the instrument approach procedure, which leads onto the runway.

In some terminal areas, such as Sydney, the controller also applies a technique called 'radar vectoring' by instructing the pilot to steer the aircraft by a sequence of compass headings onto the runway while ensuring separation and sequencing with other aircraft.

At most Australian international airports, aircraft need to break free of cloud at a prescribed altitude of about 200 feet to land visually, or may use the aircraft's auto-land function to land in low visibility conditions, depending on the airport's capabilities. If no conflict exists with other traffic, the aircraft will be cleared to land.

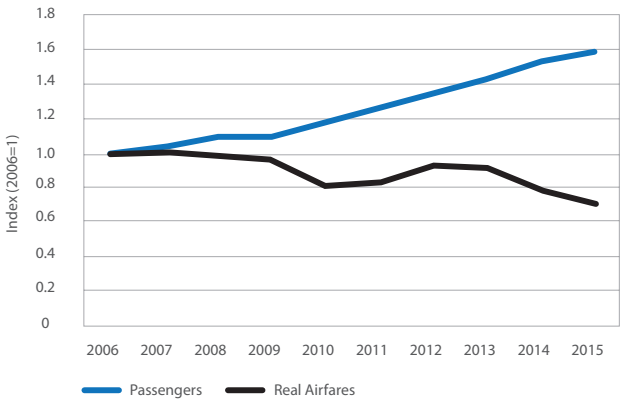


Industry Potential and Challenge

International aviation to and from Australia has grown strongly over the last decade. Passenger numbers have increased on average by 5% annually to nearly 34 million passengers in 2014–15. Freight volumes have increased by over 30% to nearly 940,000 tonnes per year. Over this same period, the number of international flights has increased on average by 4.2% annually to some 175,000 flights in 2014–15. Average international airfares to and from Australia have also fallen in real terms by approximately 30% over the last decade, making international travel increasingly affordable to Australians and for overseas visitors to Australia.

Sustained growth and congested airspace

Growth in international flights has seen the airport infrastructure and airspace around Australia's major international airports become increasingly congested, especially during peak times (7am to 10am and 4pm to 7pm at most airports). Congestion manifests either through 'airborne holding' or 'ground holding' delays, which reduce service quality to passengers and businesses and increase airline operating costs. Passenger and business impacts include late arrival, missed connecting flights and delayed freight shipments. Airline costs are increased predominantly through greater fuel burn. Congestion also increases the industry's environmental impact through greater carbon dioxide and nitrogen oxides emissions, together with increased aircraft noise.



Sources: BARA estimates derived from IATA PaxIS and ABS

Some level of ad hoc congestion is inevitable – for example, unforecast adverse weather conditions or essential runway maintenance can lead to congestion and delays. Sustained underlying increases in congestion, do, however, have the potential to significantly constrain future industry growth.

Proactive management and planning

For the industry to continue to deliver affordable airfares that make international travel more accessible to Australians and overseas visitors, ongoing improvements in productivity and performance are imperative. High quality air navigation services are critical in this regard and can play a central role in enabling Australia's international aviation industry to become more efficient. BARA's four improvement pathways outline the means to achieve these efficiencies.

Future System for Australia's International Aviation Industry

The vision of the future air navigation system supporting international aviation continues to evolve from one based on fixed rules and operating procedures to one based on operational performance, with particular emphasis on safety and efficiency. It is being enabled in part by a fundamental shift towards advanced air traffic management automation, and satellite technologies for communication, navigation and surveillance.

Satellite systems provide continuous real-time information on aircraft positions complementing the greater automation and sophistication becoming available in flight planning and execution. Flight crews will be able to depart and land at airports in almost all but the most extreme weather conditions and fly ideal flight routes and levels (trajectories) between cities. A best practice air navigation system will also allow for the adoption of innovation and technological advances to deliver continuous optimisation of the system.

The future system will support greater efficiency and predictability in safe aircraft operations, underpinned by an outcomes-focused regulatory framework. Recognising this, ICAO established a performance framework for air navigation services in 2005, defining 11 key performance areas across the industry, namely safety, capacity, efficiency, flexibility, global interoperability, environment, cost effectiveness, predictability, security, participation and access/equity.

The box below shows the key performance outcomes and corresponding solutions. Each of the technological solutions will require sound cost-benefit analysis and business case assessment before implementation, to ensure they are capable of delivering net value to airlines and the broader industry.

Performance outcomes at the airport:

- All weather operations, subject to aircraft capabilities, with no reduction in capacity
- Constant runway acceptance rates in all wind conditions
- Matching the movement of aircraft with available airport infrastructure

Technological solutions

- Ground-based augmentation systems for precision GPS approaches
- Advanced Surface Movement Guidance and Control System
- Arrivals Management (AMAN) and Departures Management (DMAN)
- Airport Collaborative Decision Making (A-CDM) between the airlines, airports and Airservices

Performance outcomes in the air:

- 'On the day' optimised flight trajectories
- Safely reduced aircraft separation distances to increase airspace capacity
- Greater sharing of defence and civilian airspace

Technological solutions

- Sole-means GPS navigation and performance-based navigation
- A single flight information region established for all Australian airspace
- Flexible airspace architecture

Benefits of Continuous Improvement

Continuous improvement in Australia's air navigation services brings with it substantial benefits, directly supporting the expectations of airlines and the travelling public in relation to aircraft safety and flight reliability. The potential benefits for airlines, passengers and the community are substantial, including a more cost effective air traffic management system, better on time performance, decreased fuel burn and reduced noise emissions. There is also scope for the resilience of the air traffic system in recovering from disruptions to be enhanced.

Reduced flight times

The quality of air navigation services directly influences flight times between cities. Reducing flight times translates directly into reduced fuel burn and maintenance costs.

During flight, it can cost between $7,000 to $10,000 an hour to operate a long-haul international aircraft, depending on prevailing fuel prices and aircraft type. Reducing international flight times by an average of just one minute per flight could reduce annual fuel use by over 20 million litres and generate some $25 million in operating efficiencies for Australia's international airlines. These savings can be expected to double in line with forecast traffic growth over the next 15 years.

Flight times are reduced when aircraft can fly flight paths which are optimised to suit the wind conditions on the day of operation. As an example, using flight paths based on actual wind, or air miles, rather than the ground distance, or ground miles, has reduced flight times between Sydney and Dubai by approximately 12 minutes. This reduces the fuel burn of an Airbus 380 by some 2,000 litres, or over 30 average family car fuel tanks. The annual savings for a daily flight are some 750,000 litres, or nearly 11,000 family car fuel tanks.

Reduced airborne, ground delays and aircraft diversions

Aircraft holding, diversions and flight cancellations provide for a poor passenger experience and are very costly for airlines. For example, a single diversion can cost an international airline more than $100,000. Such operational disruptions can also affect flights at other airports and cause delays in the domestic aviation network.

An efficient air navigation system can respond to and minimise delays through increasing airspace capacity, ensuring the efficiency of existing airport infrastructure is maximised and reacting quickly to disruptions as a result of inclement weather or events on the airfield. Both airspace and runway capacity, as well as the quality of the airport infrastructure, affect the air traffic system's ability to minimise delays.

Improvement Pathways

BARA's role is to foster an environment in which airlines, service providers and regulators collaborate to improve performance to allow the economy and community to derive the greatest benefits from Australia's international aviation industry.

BARA recognises that air navigation services in Australia support a diverse aviation community, ranging from general aviation through to long-haul international aviation. The services provided at the airport and in the air differ depending on the number and mix of aircraft and local terrain conditions. BARA supports establishing technologies and services that provide demonstrable net benefits for the broader industry.

Four improvement pathways

BARA has identified four improvement pathways to drive ongoing advances in air navigation services with a view to establishing a best practice air navigation system for international aviation:

Improvement pathway 1: Customer-driven technology and procedures

Improvement pathway 2: Seamless airspace for international flights

Improvement pathway 3: Airspace management improvements around Sydney Airport

Improvement pathway 4: Outcomes-focused economic regulation of Airservices Australia

These improvement pathways focus on meeting present and future industry needs. They can underpin the cost effective delivery of the best possible future air navigation framework, capable of delivering the greatest benefits for Australia's aviation industry.

BARA recognises that there are already a number of established forums in Australia, and globally, that are tasked with developing improved air navigation services. BARA's improvement pathways highlight particular issues for international aviation in Australia and opportunities to improve performance within existing institutional and regulatory arrangements.

Industry is well-positioned to lead the implementation of many of the improvement pathways, especially in relation to the promotion of customer-driven technology and procedures. It will, however, be necessary to secure the support of all three levels of government in order to improve airspace management around the major international airports. BARA will continue to engage in good faith with all key stakeholders, to ensure that the foundations being laid today will meet the requirements of the industry in years to come.

IMPROVEMENT PATHWAY 1

Customer-driven technology and procedures

The contribution that Australia's aviation industry can make to the Australian economy and its people depends on its ability to meet the needs of passengers and freight forwarders. As a critical input into the aviation industry, the air navigation system must meet these same customer needs.

Delivering the future air traffic management system – OneSky

The Australian Government is replacing and merging the civil and defence air traffic management systems through the OneSky project. Airservices is the main agency responsible for delivering OneSky, which will effectively determine much of the performance of Australia's air navigation system over the next 20 years.

Consistent with ICAO requirements, OneSky must be an 'outcomes-driven' project that delivers the improved performance capabilities airlines most value. As performance standards and technologies evolve, OneSky must be adaptable to future opportunities.

Under OneSky, there is scope to extend optimal flight paths to all Australian airspace outside the high-density routes between Brisbane, Sydney and Melbourne. Even modest reductions in average flight times under OneSky have the potential to save international airlines over $100 million each year in reduced fuel burn and other aircraft operating costs. This will require investment in technologies by Airservices and CASA's approval. BARA and its members would like to see this improved flight path extension adopted as a central outcome of the OneSky project.

Other key outcomes of OneSky must include:

- increased sharing of defence and civilian airspace
- a single Australian flight information region across Australian airspace
- flexible and adaptive airspace management
- supporting the '4D' trajectory concept in air traffic management whereby ground and airborne computer systems exchange and share accurate flight data.

BARA, alongside Australia's domestic and regional airlines, will continue to engage proactively with Airservices in planning and monitoring outcomes under the OneSky project.

Maximising the efficiency of east coast parallel runway operations

Sydney Airport has three runways, including two parallel, while third runways are planned for both Brisbane and Melbourne airports. The new Western Sydney Airport will further increase runway capacity and will share airspace with Sydney, Bankstown and Camden airports and the RAAF Base at Richmond.

Additional runways are expensive major investments, ultimately funded by airlines and passengers, with capital costs potentially exceeding $1 billion. A runway is just not a strip of concrete but rather a 'technology platform' which allows high volumes of aircraft to operate in adverse weather. Each runway includes considerable amounts of ground lighting and sophisticated air navigation equipment.

The operational performance of Sydney Airport's parallel runways has been historically limited by a number of physical factors, including the narrow distance between runways, the short length of the third runway, and inefficient crossovers and terminal paths.

Brisbane and Melbourne's widely-spaced parallel runways will offer the opportunity for long-term improvements to airline operations by increasing capacity, reducing the need for sequencing restrictions and allowing an aircraft to fly an arrival trajectory closer to its optimal performance. To achieve this, it will be necessary to redesign the terminal airspace architecture to allow aircraft to utilise more efficient arrival and departure flight paths, accommodating all wind conditions and runway direction applications.

With three sets of parallel runways and Western Sydney Airport, the airspace design for aircraft flight paths along the east coast of Australia will need to be rationalised. This will require design work that integrates performance outcomes for the entire east coast, rather than considering each airport and its set of runways in isolation.

An updated service delivery baseline

To provide industry with the certainty it requires, BARA believes it is necessary for Airservices to develop and publish an updated service delivery baseline. This should include committed and accountable delivery targets and milestones to ensure that all industry stakeholders are working towards consistent outcomes. Defined future outcomes will also facilitate timely investments in technology by all industry participants.

BARA acknowledges and supports the initial efforts by Airservices to specify meaningful deliverables under OneSky. The updated baseline should incorporate these deliverables, including projected completion dates for when new services will be ready and available for use by airlines, together with all other services to be provided over the next five to 10 years.

Airport Collaborative Decision Making

The objective of Airport Collaborative Decision Making (A-CDM) is to achieve the best operational performance from airport infrastructure and generate efficiencies in the aircraft turnaround process. Up to date and accurate information is shared between Airservices, the operators of the major international airports and airlines to enable improved real-time decision making. A-CDM, underpinned by an efficient communications system, requires joint procedures and practices rather than Airservices and the airport operators independently managing their area of operations.

A-CDM offers synchronicity

IMPROVEMENT PATHWAY 2

Seamless airspace for international flights

En route services are allocated across countries based on flight information regions (FIRs). The quality of air navigation services within these FIRs is not uniform and there are important safety and efficiency considerations as aircraft pass through the controlled airspace of different countries. Australia's immediate FIR neighbours are New Zealand, Fiji, Solomon Islands, Papua New Guinea, Indonesia, Sri Lanka, the Maldives, Mauritius and South Africa.

Improving the flight path of an international flight requires coordinated and consistent services across FIRs. Achieving this outcome is complicated by the fact that countries are often at different stages in their service delivery and adoption of technology. Australia's excellent safety record is underpinned by its current air traffic management technology.

ICAO has proposed a global spread of new technologies and practices in planned blocks with five-year increments. In its initial phase at Block 0 (2013–2019), which the Australian system already meets, these initiatives are important for safety and efficiency, while providing investment certainty for airlines.

'Radar like' coverage across vast oceans

The majority of the airspace across the oceans is subject to procedural separation, requiring large separation distances between aircraft. Access to preferred flight levels and reduced separation distances require expanding surveillance applications in oceanic airspace.

Automatic Dependent Surveillance – Broadcast (ADS-B) provides aircraft positional information close to or better than that of conventional radar.

It is currently used across continental Australia and is being progressively introduced in many other countries. In the medium to long term, ADS-B, using satellites rather than terrestrial receivers to relay positional information to air traffic control, has the potential to provide enhanced air navigation services across the world's oceans – subject to a satisfactory cost-benefit and safety analysis.

Seamless exchange of data between providers

Seamless airspace for international aircraft requires the seamless exchange of flight information data between air navigation service providers. Air traffic sector Interfacility Data Communication is necessary across all FIRs in order to share information between all air navigation service providers.

BARA supports Airservices' work with overseas air navigation service providers in improving the safety and efficiency of global airspace. International aviation also requires Airservices to focus on achieving a seamless exchange of data with neighbouring air navigation service providers.

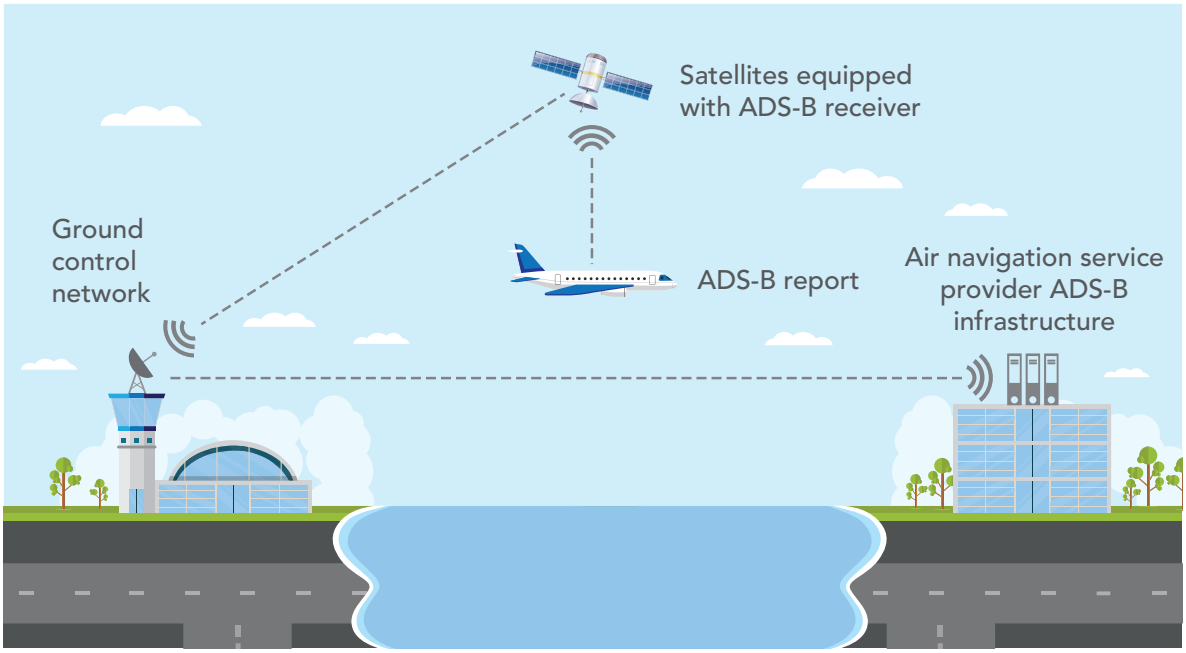
Automation of services

There is increasing scope to automate and assist controllers to provide en route air navigation services. This includes the use of short and long term conflict probes to alert controllers of potential conflicting aircraft flight paths, automated airways clearance conformance monitoring and controlled flight into terrain warnings.

With pilots and controllers coming from many countries, ICAO has established minimum English language proficiency standards that both controllers and pilots must meet. An opportunity to further automate information transfers exists through the deployment of Controller Pilot Data Link (CPDLC), which provides instructions and responses in English language text. CPDLC eliminates any ambiguity and uses standardised and preformatted messages between controllers and pilots in all FIRs. Voice can still be used as a backup or for urgent communications.

Oceanic ADS-B

Oceanic ADS-B uses satellites to record aircraft position information, which is transmitted directly to the controller display. Unlike land-based ADS-B, it does not require ground receivers. It can harness the potential of existing aircraft avionics, avoiding the need to retrofit aircraft with new technology, and when introduced will transform air traffic management and navigation services across the oceans.



IMPROVEMENT PATHWAY 3

Airspace management improvements around Sydney Airport

Sydney Airport is Australia's largest international gateway, serving about 13 million passengers each year. The efficiency of operations into Sydney Airport will become increasingly challenged as passenger and aircraft volumes grow. There is the potential to reduce airline costs and environmental impacts through improvements to airspace management around Sydney Airport, benefiting the industry, passengers and communities alike.

The Australian Government regulates airline operations into Sydney Airport to reduce and share aircraft noise across the community. These regulations include various flight path 'modes', movement caps, a night-time curfew and restrictions on the aircraft that are permitted to operate on the parallel or 'third' runway. Combined with its less than ideal airfield configuration, airline operations into Sydney Airport are complex.

A review of noise management arrangements

BARA supports the recommendations of the *Joint Study on Aviation Capacity in the Sydney Region*, including the proposal to review the current operational restrictions at Sydney Airport, with the aim of determining new, more effective measures of aircraft noise impacts and respite than the current runway end movement numbers. A public inquiry by the Productivity Commission would be one way to proceed.

BARA considers that any new arrangements should offer greater operational flexibility for 'new generation', quieter aircraft, consistent with encouraging the operation of such aircraft at Sydney Airport.

Improved environmental performance within existing arrangements

The air navigation system has untapped potential to deliver improved environmental performance for the residents of Sydney. Initiatives include airspace redesign, flexible or variable geometry approach and departure flight paths, greater reliance on satellite-based landing systems with ground augmentation for accuracy and safety, and the wider application of required navigation performance (RNP). All these initiatives could streamline operations into the airport and reduce community and environmental impacts.

It is in the interests of the community and airlines to explore opportunities that can deliver both increased efficiencies in aircraft operations and reduced environmental impacts within the existing institutional and regulatory arrangements. Proposals could be carefully evaluated through consultation, including within the Sydney Airport Community Forum (SACF), of which BARA is a member.

BARA recommends that its member airlines and Airservices develop a list of potential improvement options for consideration by the Australian Government and SACF. Options could then be trialled and evaluated, with those that deliver net value to airlines, the travelling public and surrounding communities adopted as standard practice.

Protection of airspace around our major international airports

Safety, in part, relies on defining and protecting the operational airspace around airports. 'Prescribed airspace' protects aircraft from obstacles that could be a threat to safety and ensures that communications, navigation and surveillance equipment can operate free from interference.

The National Airports Safeguarding Framework provides advice for land use planners and decision makers in assessing proposed developments within and around an airport's prescribed airspace. In applying the framework, BARA endorses the Australian Strategic Air Traffic Management Group's *Statement of principles, protecting airspace around Australia's airports*, urging state, territory and local governments, as decision makers, to ensure land use planning and development proposals are approved if they do not conflict with the prescribed airspace of airports.

Required navigation performance

Required navigation performance (RNP) technology in the terminal area would allow 'throttled-back' approaches along a variable 'glide slope'. Under existing practice, maintaining a constant glide path in strong headwinds requires an increase in engine thrust, making more noise and burning more fuel. RNP allows the pilot to adjust the glide path to the best glide angle, reducing the need for engine thrust on approach.

IMPROVEMENT PATHWAY 4

Outcomes-focused economic regulation of Airservices Australia

Airservices is a commercial entity that recovers about $1 billion in costs annually directly from airlines through terminal navigation and en route prices. On average, international airlines pay about $14 per passenger.

Airservices' prices are subject to economic regulation by the Australian Competition and Consumer Commission (ACCC). Prices are generally set for five years. Broadly, prices are calculated by dividing the estimated cost of providing services each year (using forecasts of operating costs, planned investments plus existing infrastructure) by forecast pricing units (landed tonnes and distance flown). This is generally referred to as 'cost-based' price regulation.

These pricing arrangements have evolved and provided industry with a reasonable degree of stability and predictability. To support the arrangements, Airservices and industry have formed a Project Consultative Committee to monitor overall performance outcomes and the ongoing implementation of Airservices' investment program.

To support the move to a performance-based air navigation system and provide airlines with greater investment certainty, Airservices' commercial and pricing arrangements with airlines also need to evolve. This will require a new set of arrangements, more closely aligned with a services delivery agreement rather than funding a given set of forecast operating and investment parameters.

Linking prices to the delivery of services and outcomes

BARA supports the development of more outcomes-focused arrangements with Airservices that establish a clear link between the prices paid, services delivered and outcomes achieved. This will require that the prices charged must be linked to the updated service delivery baseline, which can detail current service outcomes and when new capabilities will be ready and available for airlines to use.

New services delivered each year generally represent a small proportion of the overall services offered. Accordingly, most of a long-term pricing agreement, often five years in duration, would

encompass the ongoing delivery of high quality 'business as usual' air navigation and air traffic management services. The cost of providing new services can be individually identified and incorporated into prices when available.

The outcomes sought here are consistent with BARA's commercial principles for the major international airports, as detailed in the policy document, *Timely and reasonably priced airport infrastructure*. Establishing similar arrangements with Airservices will encourage the organisation to pursue continual improvement and ongoing efficiencies.

Demonstrated cost efficiency

As a monopoly service provider, it is important that Airservices demonstrates its efforts to operate reasonably efficiently, as airlines should only be expected to fund those costs which are incurred on a reasonable basis. Airservices' ability to operate profitably and pay dividends to the Australian Government should be dependent on its ability to innovate and continuously improve, delivering enhanced outcomes for its airline customers.

BARA welcomes Airservices' initiative to undertake an independent review of its operating and capital cost efficiency. It is expected that Airservices will use this review to develop a program of efficiency improvements for incorporation in the next and future pricing agreements. These agreements should incorporate formal reporting mechanisms for each improvement initiative, to highlight which have been successful, supporting ongoing transparency of Airservices' operating and capital expenses.

Economic regulation and service outcomes

Economic regulation uses a wide range of methods to set the prices charged by monopoly providers of infrastructure services, such as water and electricity.

Economic regulation generally involves some specification of services by the monopoly provider, often across many millions of individual households and thousands of businesses. The infrastructure provider or economic regulator cannot seek the views of all customers, or even a modest proportion of them, in developing the service level offering.

Air navigation services for high capacity aircraft differ, as Airservices has the ability to negotiate the service requirements directly with its customers - domestic and international airlines. Regulatory arrangements must therefore encourage a high level of engagement between Airservices and airlines, in order to establish future outcomes and enabling technologies and procedures.

Industry and Government in Partnership

The international aviation industry in Australia, including airlines, Airservices, airport operators, and regulators, supported by the Australian Government, are all equally important in the ongoing drive to ensure aircraft fly safely and with greater efficiency.

The policy initiatives advocated in this paper are focused on improvements to service levels and airspace management that have the potential to facilitate the continued growth of Australia's international aviation industry. These initiatives are consistent with the Australian Government's ongoing work to ensure Australia remains a leader in aviation safety, including implementation of the reforms identified during the Aviation Safety Regulation Review.

Effective engagement and accountability

BARA's improvement pathways will require engagement between key industry participants and a willingness by all stakeholders to take accountability for their area of responsibility.

BARA will continue to work with all industry participants, including the Australian Government, in supporting the development of a first-class air navigation system for Australia's international aviation industry.

Lead stakeholders on the four pathways

Customer-driven technologies and improvements

- Domestic and international airlines must establish clear priority outcomes, which should be reflected in Airservices' service delivery baseline

Seamless airspace for international flights

- Airservices should work with overseas air navigation service providers in improving data transfers and achieving ICAO block upgrades

Airspace management improvements around Sydney Airport

- The Productivity Commission be tasked with reviewing existing noise management arrangements
- International airlines and Airservices should propose improvement options for the Australian Government and SACF to consider and trial

Outcomes-focused economic regulation of Airservices Australia

- Airlines and Airservices should negotiate a new commercial pricing and service delivery agreement for consideration by the ACCC

BARA's Members

AIRCALIN
AIR CANADA
AIR INDIA
AIR MAURITIUS
AIR NEW ZEALAND
AIR VANUATU
ALL NIPPON AIRWAYS
ASIANA AIRLINES
CATHAY PACIFIC AIRWAYS
CHINA EASTERN AIRLINES
CHINA SOUTHERN AIRLINES
DELTA AIR LINES
EMIRATES
ETIHAD AIRWAYS
EVA AIR
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