Asia and Pacific Initiative to Reduce Emissions (ASPIRE)

Strategic Plan

Version 4.0

Mar 2011

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1 Introduction

The air transportation industry is essential for future economic growth and development, trade and commerce, cultural exchange and understanding among peoples and nations. Today it provides approximately 32 million direct and indirect jobs worldwide. Aircraft carry approximately 40% of the value of all world trade. In 2007, more travellers than ever before, nearly 2.2 billion people flew on the world's scheduled air carriers, with predictions of 9 billion passengers by 2025. In the Asia Pacific region, the rapid movement of people and materials provided by aviation will be crucial to continued economic growth and development over the next few decades.

The aviation sector has a long and distinguished record of environmental achievement. Relative to other industries that emit global green house gases (GHG), aviation's contribution represents only 3% of global greenhouse gas emissions. Technological advancement has significantly reduced aircraft fuel consumption and emissions on a per passenger basis over the last 30 years, and the industry is committed to improving on this record. But we face a real challenge in the Asia & Pacific region as air transport activity is expected to continue to grow steadily throughout the region.

In order to meet the growing regional demand for air transportation, while maintaining the industry's leadership position, it is essential for Asia and Pacific aviation partners to collaborate on environmental stewardship.

Prepared and endorsed by:

CAAS Civil Aviation Authority of Singapore

JCAB Japan Civil Aviation Bureau

AIRWAYS NEW ZEALAND

FEDERAL AVIATION ADMINISTRATION

AIRSERVICES AUSTRALIA

1.1 The ASPIRE Partnership

1.1.1 History

On February 18, 2008, a multi-lateral partnership known as the Asia and Pacific Initiative to Reduce Emissions (ASPIRE) was created in Singapore. The first air navigation service providers (ANSPs) to sign the ASPIRE joint statement were Airservices Australia, Airways New Zealand, and the Federal Aviation Administration.

Since 2008 ASPIRE has expanded to include the Japan Civil Aviation Authority (JCAB) and the Civil Aviation Authority of Singapore (CAAS) as major partners.

Aeronautical Radio of Thailand (AeroThai) has formally requested to join the ASPIRE partnership and a signing ceremony is expected in June 2011.

1.1.2 The ASPIRE Commitment

The partners under ASPIRE are committed to work closely with airlines and other stakeholders in the region in order to:

- accelerate the development and implementation of operational procedures to reduce the environmental footprint for all phases of flight on an operation by operation basis, from gate to gate;
- facilitate world-wide interoperability of environmentally friendly procedures and standards;
- capitalise on existing technology and best practices;
- develop shared performance metrics to measure improvements in the environmental performance of the air transport system;
- provide a systematic approach to ensure appropriate mitigation actions with short, medium and long-term results; and
- communicate and publicise ASPIRE environmental initiatives, goals, progress and performance to the global aviation community, the press and the general public.

1.1.3 Support of ICAO Objectives

The ASPIRE partners will ensure that ASPIRE is in support of the ICAO Strategic Objectives for 2005-2010**:**[1]

- *Strategic Objective C: Environmental Protection — Minimise the adverse effect of global civil aviation on the environment*

[1] Strategic Objectives of ICAO: Consolidated Mission and Vision Statement, 17 December, 2004

- *Strategic Objective D: Efficiency — Enhance the efficiency of aviation operations*

1.1.4 Support of the CANSO Work Program

The ASPIRE partners will work to ensure that ASPIRE is consistent with environmental planning under Civil Air Navigation Services Organisation (CANSO) Environmental Work Group which is committed to the following goals for improving aviation sustainability:

1. To develop metrics and targets for the reduction of environmental impact.
2. To define and advance best practice in environmental management for ANSPs and to promote implementation as widely as possible.
3. To influence environmental policy, regulations and legislation to balance capacity, efficiency and the environment, without compromising safety.
4. To enhance understanding of ATM's environmental impact and mitigation measures.

1.1.5 ASPIRE and the Future Air Transportation System

ASPIRE directly supports the implementation of air traffic management (ATM) modernisation programs on State, regional and global levels to support future projected air traffic levels. ASPIRE is a forward-looking collaborative effort to accelerate the transition from today's operating norms to more advanced, efficient and environmentally friendly concepts outlined in the Next Generation Air Transportation System (NextGen) in the United States, The Brisbane Green Project in Australia, and Vision 2015 in New Zealand, and Collaborative Actions for Renovation of Air Traffic Systems (CARATS) in Japan. Defined ASPIRE strategic plan activities will aim to reduce fuel burn and greenhouse gas emissions, thus reducing aviation's impact on the environment.

The initial ASPIRE partners envision continued growth of the partnership as additional ANSPs are welcomed in to the ASPIRE agreement. The intended result is a collaborative network of partners across the Asia and Pacific region dedicated to the expressed goals of ASPIRE.

1.2 The ASPIRE Strategic Plan

The ASPIRE Strategic Plan outlines recommended procedures, applications and technologies that support the stated goals of the ASPIRE partnership. This document will be updated regularly by the ASPIRE partners to reflect the most current considerations regarding Asia and Pacific emissions reductions and efficiencies, and to accommodate the expansion of ASPIRE to include additional partners under the joint statement.

The ASPIRE strategic plan activities will aim to reduce fuel burn and greenhouse gas emissions, thus reducing aviation's impact on the environment.

1.3 Document Management

1.3.1 Document Structure

The ASPIRE Strategic Plan will consist of the following parts:

Section 1	Introduction and Document Management
Section 2	ASPIRE Governance
Section 3	Recommended ANSPs Best Practices in Asia and the Pacific
Section 4	Performance and Measurement
Section 5	ASPIRE Reporting
Section 6	ASPIRE Work Program
Appendix A	Table of Acronyms
Appendix B	ASPIRE Coordinators

1.3.2 Document Management

This document is owned and maintained by the current ASPIRE partners:

- Airservices Australia
- Airways New Zealand
- The Federal Aviation Administration
- Civil Aviation Bureau, Japan (JCAB).
- Civil Aviation Authority of Singapore (CAAS)

Details of the Coordinator for each organisation can be found in Appendix B.

1.3.3 Change Management

Document change proposals shall be sent to the ASPIRE Strategic Plan editor for review and dissemination to the ASPIRE partners. Changes must be approved by all partners through the ASPIRE Coordinators. All changes to published versions will be documented in Appendix A.

Minor and routine changes to the ASPIRE Strategic Plan will be distributed as updates to the existing version (i.e. v1.1, v1.2, v1.3). Major updates and modifications to the ASPIRE Strategic Plan will result in a new version number (i.e. v2.0).

2 ASPIRE governance

2.1 ASPIRE Chair

The current chair for the ASPIRE partnership is:

Airservices Australia

Chairperson:	**Mr Doug Scott**
Address:	Locked Bag 747 Eagle Farm QLD 4009
Phone:	+61 7 3866 3366
E-mail:	doug.scott@airservicesaustralia.com

2.2 Governance Outline

The following principles are established for the governance of the ASPIRE initiative:

- ASPIRE chair will be rotated bi-annually;
- The partners will hold quarterly teleconferences to update plans and progress;
- Hosting of the ASPIRE annual meeting will be rotated among the partners;
- Chairmanship of the meeting, and the de-facto ASPIRE lead will be delegated to partner who is hosting the next annual meeting. This handover will occur after the publication of the annual report in the third quarter each calendar year;
- ASPIRE Coordinators will meet annually in the second quarter of each calendar year;
- To remain productive the annual ASPIRE meeting will be held to under 30 attendees;
- Each partner will identify 2-3 delegates to keep the meeting a manageable working size with the exception of the host, who will add administrative support, etc;
- The meetings should include key airline and industry partners where appropriate;
- The meetings should arrange for aviation environmental experts from bodies such as CANSO, IATA and ICAO to speak on relevant issues such as the state of aviation and the environment; and
- Where practicable, ASPIRE will leverage existing meetings (e.g. ISPACG and FATS) for discussion and planning among partners.

3 Recommended ANSP Best Practices in Asia and Pacific

In consultation with stakeholders, the ASPIRE partners have compiled a series of recommended procedures, practices and services that have been demonstrated or have shown the potential to provide efficiencies in fuel and emissions reduction management. These recommendations encompass all phases of flight from *gate-to-gate,* and are designed to reflect the unique nature of the Asia and Pacific region, where international flights may often exceed 7 hours in duration.

The recommendations contained below are for procedures, practices and services that are fully developed or that have reached a state of demonstrable maturity. New and conceptual applications will be added as they reach a proven state of readiness.

3.1 Surface Movement Optimisation

Surface Movement Optimisation procedures and surface and runway movement monitoring technologies have the potential to substantially improve the fuel and emissions efficiency of aircraft by reducing taxi times through improved planning of surface movements.

Surface movement optimisation procedures will be aimed at minimising the delay from start request to approval, and the time/fuel burn from start approval to take off,

The ASPIRE partners recognise the potential benefit of surface and runway movement monitoring capabilities at congested airports using surveillance via radar and/or automatic dependent surveillance – broadcast (ADS-B), often enhanced by multilateration. While these surface movement systems are principally designed to enhance safety and reduce the potential for runway incursion, they also serve as the foundation for future systems that will optimise surface and runway movement.

3.2 Departure Optimisation

Optimisation for departure profiles is a developing ANS enhancement. Procedures for the fuel and emissions optimisation of departures have yet to be defined within ASPIRE. Procedures are expected to include optimise departure to facilitate unconstrained climb to cruise level and track to route start point, and manipulate taxi and departure time to optimise oceanic entry altitude and position in the enroute sequence.

Departure optimisation procedures are expected to substantially improve the fuel and emissions efficiency of aircraft during the climb-to-cruise portion of flight by minimising low altitude vectoring and the need to level-off at interim altitudes.

3.3 Enroute and Oceanic Flight

3.3.1 User Preferred Routes (UPRs)

A User Preferred Route (UPR) during the oceanic phase of flight is defined as a lateral profile developed for each individual flight by the flight operator. These lateral profiles are customised in order to meet the specific needs of the aircraft operator for that flight, such as fuel optimisation, cost-index performance, or military mission requirements.

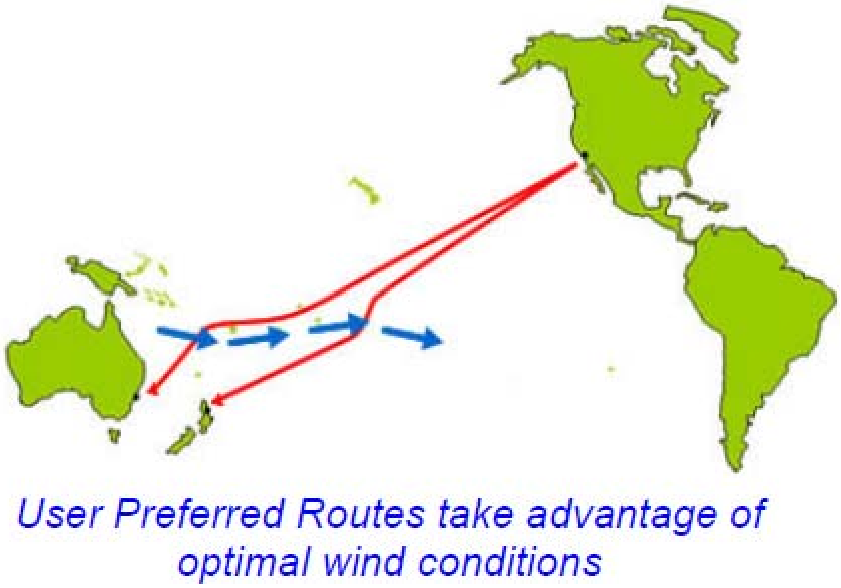

Figure 1 - User Preferred Route Example

Typically a UPR will be calculated by an aircraft operator's flight dispatch based on factors such as forecasted winds, type aircraft and aircraft performance, convective weather and scheduling requirements.

UPRs are a favoured enhancement to oceanic operations where air traffic control (ATC) limitations previously required that aircraft fly on fixed air traffic services (ATS) routes, or flexible published track systems. This enhancement is directly attributable to the implementation of ground and airborne improvements such as automated conflict prediction, conformance monitoring and automatic dependent surveillance (ADS).

When UPRs are created based on fuel optimisation considerations, the corresponding savings in greenhouse gas emissions can be substantial. For example, in 2008 Air New Zealand projected that, despite a number of operational restrictions, the implementation of UPRs between New Zealand and Japan would yield a total annual saving in fuel burn of 1,090,000 kg or, based on IATAs figures for emissions, 3,444,400 kg less CO_2 emissions.[2]

[2] ISPACG/22 IP-09 rev.2

3.3.2 Dynamic Airborne Reroute Procedures (DARP)

Dynamic Airborne Reroute Procedures (DARP) refers to an oceanic in-flight procedure whereby the lateral profile of a flight can be modified periodically in order to take advantage of updated atmospheric conditions and updated forecasts. Typically, flight operators file flight plans some hours prior to a flight's estimated time of departure. Often, revised upper wind forecasts are available after the flight plan is filed or the aircraft departs.

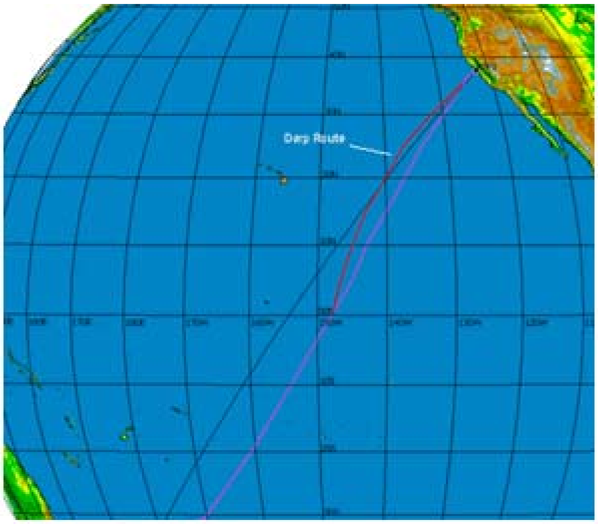

Figure 2 - Dynamic Airborne Reroute Procedure Example

DARP allows aircraft operators to calculate revised profiles from the aircraft's present position to any subsequent point in the cleared route of flight in order to realise savings in fuel or time. This updated profile is coordinated by the Airline Operations Centre (AOC) with the flight crew, and sent to ATC as a reroute request from the aircraft.

Initially demonstrated in the South Pacific in 1999, recent enhancements to conflict prediction, conformance monitoring and inter-facility coordination in Air Traffic Management automation systems have enabled the wider implementation of the DARP. Participating ANSPs can accommodate multiple in-flight reroute requests across airspace boundaries.

The DARP can provide significant savings in fuel and emissions. A recent Air New Zealand analysis concluded that 58% of all flights from Auckland to North America assessed during the analysis sample would achieve fuel savings from the DARP procedure, resulting in an average fuel burn reduction of 453kg per flight, or roughly 1431kg of CO_2 emissions.[3]

[3] ISPACG/22 IP-16

3.3.3 Flexible Track Systems

In an oceanic environment where the use of UPRs is not feasible, flexible track systems can provide an alternative vastly more efficient than fixed ATS routes. A flexible track is typically calculated so that all flights flying a specific city-pair route will utilise a single lateral profile or track. This track is calculated based on forecasted meteorological data and a representative aircraft performance model and published via NOTAM. A flexible track system is a series of flexible tracks designed to be laterally separated from one another to accommodate high traffic density.

Flexible tracks provide greater efficiencies than fixed ATS routes, because they are optimised to take advantage of favourable winds. Flexible tracks do not provide the same level of efficiencies to individual aircraft that can be achieved in a UPR system. However in circumstances where implementation of UPRs is not yet feasible a flexible track system provides a notable improvement in efficiency and reduction in emissions.

3.3.4 Oceanic Separation Minima (30/30)

Improvements in navigation capabilities have enabled reduction in the Oceanic separation minima to 50NM longitudinally and 50NM laterally. When coupled with direct controller pilot communications via data-link and automatic dependent surveillance, aircraft meeting certain navigation performance requirements can be safely separated at as little as 30NM longitudinally and 30NM laterally.

Reduced separation minima allow more aircraft access to optimum routings and altitudes; the enhanced efficiencies of optimum routes and altitudes can result in lower fuel burn and reduced emissions.

The reduced separation minima for use in the oceanic environment are published in the ICAO Procedures for Air Navigation Services – Air Traffic Management (Doc 4444) and the ICAO Annex 11 - Air Traffic Services.

RNP10 Aircraft	50nm longitudinal, 50nm lateral
RNP4 Aircraft	30nm longitudinal, 30nm lateral

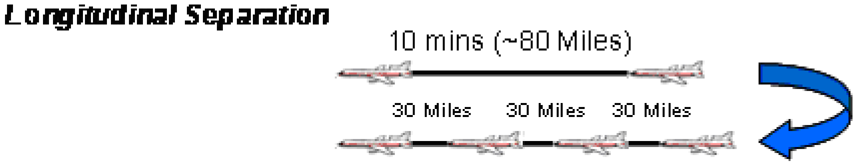

Figure 3 - Reduced Oceanic Separation Minima

Qualified aircraft navigating in airspace where these reduced separation minima have been implemented achieve significantly greater efficiencies than aircraft that cannot meet these standards. This is due to the vastly increased access to optimum flight profiles associated with the tighter spacing of the aircraft. This enhanced efficiency is reflected in lower fuel burn and reduced emissions as more aircraft can fly closer to optimal tracks and altitudes.

3.3.5 Reduced Vertical Separation Minima (RVSM)

Improvements in vertical height keeping and altimetry in the modern fleet of aircraft, coupled with new procedures and monitoring requirements has allowed a reduction of vertical separation between aircraft operating above FL290. This standard, known as Reduced Vertical Separation Minimum (RVSM), allows the vertical spacing of qualified aircraft to be reduced from 2000ft to 1000ft in airspace where the standard has been implemented.

Oceanic RVSM allows aircraft to fly closer to fuel efficient altitudes, and execute smaller step climbs, which require less fuel.

3.3.6 Time Based Arrivals Management

To reduce the environmental impact of delays caused by congestion at airports ANSPs have introduced traffic flow management procedures and automated decision support automation to reduce the need for fuel techniques such as low altitude vectoring and aircraft holding, and improve fuel and emissions efficiency by shifting delays to the enroute phase of flight.

3.4 Arrivals Optimisation

3.4.1 Overview

Arrivals Optimisation includes any one of several procedures available to aircraft operators and ANSPs to improve the fuel efficiency for aircraft during final descent phase of a flight. Qualifying arrivals optimisation procedures include continuous descent arrivals, continuous descent approaches, optimised profile descents, tailored arrivals, and are generally referred to by ICAO as Continuous Descent Operations.

3.4.2 Optimised Profile Descents

An Optimised Profile Descent (OPD) is a cockpit-based flight technique where the vertical profile of an arrival is optimised to minimise undesired level flight segments so that the aircraft can be flown with engines at idle thrust from a high altitude, potentially from cruise, until touch down on the runway. Aircraft executing an OPD realise a far more efficient fuel burn profile and reduced emissions during the descent and arrival phases of flight, as compared to a traditional arrival path. A variety of OPD applications have been analysed and developed for fuel and emission efficiency improvements.

3.4.2.1 OPD via RNAV and RNP-AR Approaches

Where conditions will allow, arrival, departure and en route traffic flows will allow, descent profiles and airspace restrictions on published Area Navigation (RNAV) and Required Navigation Performance – Authorisation Required (RNP-AR) approaches are modified to provide more optimum arrival profiles. This optimisation reduces fuel burn and carbon emissions by taking advantage of the sophisticated navigational capability of modern aircraft that can fly closer to optimal tracks and altitudes.

For example, RNP-AR approaches are conducted using idle power, continuous descent from an optimally chosen top of descent point. In Australian RNP-AR implementations, this has typically saved around 200Kg of fuel per approach. This results in a reduction of 620Kg of CO2 emission per approach. During the first 18 months of implementing RNP-AR OPD, Airservices Australia estimates that 33 B737-800 aircraft have conducted more than 10,000 RNP-AR approaches. The estimated cumulative savings in jet fuel is 345,240 kg with estimated carbon dioxide emissions reductions of 1,151,280 kg.

3.4.2.2 OPD via Tailored Arrivals

Another application of OPD procedures, known as a Tailored Arrival (TA), is a procedure where trajectories are dynamically optimised for each aircraft to permit a fuel-efficient, low-noise descent profile that has imbedded compliance with arrival sequencing requirements and other airspace constraints.

Operational trials in Australia, New Zealand, and the United States have demonstrated that both types of OPD described above provide significant fuel and emissions savings. Although the successful execution of an uninterrupted OPD is greater during periods of light traffic, the ASPIRE partners are pursuing the use of OPD during congested traffic periods under the ASPIRE Work Program (See Section 6).

Estimated Actual Fuel & CO2 Savings from SFO Tailored Arrivals*

Airline	Airplane	Potential Fuel & CO_2 Savings**	Actual Fuel & CO_2 Savings	% Realized Potential
Air New Zealand	**777-200ER**	Fuel: 215,140 lbs CO_2: 669,090 lbs	Fuel: 73,530 lbs CO_2: 228,690 lbs	34%
United Airlines	**777-200ER**	Fuel: 736,610 lbs CO_2: 2,290,870 lbs	Fuel: 76,200 lbs CO_2: 237,000 lbs	10%
United Airlines	**747-400**	Fuel: 1,556,790 lbs CO_2: 4,841,620 lbs	Fuel: 112,800 lbs CO_2: 350,810 lbs	7%
Japan Airlines	**747-400**	Fuel: 64,400 lbs CO_2: 200,280 lbs	Fuel: 7240 lbs CO_2: 22,510 lbs	11%

* From December 4, 2007 to May 27, 2008
** Potential Fuel Savings based on Total number of flights recorded by ANOMS8 per Airline [4]

3.5 Performance Based Navigation (PBN) Implementation

PBN is a framework for defining navigation performance requirements that can be applied to an air traffic route, instrument procedure, or defined airspace. PBN includes

[4] Rob Mead, Boeing, "Tailored Arrivals Activities Overview" 17 October, 2008

both Area Navigation (RNAV) and Required Navigation Performance (RNP) specifications. PBN provides a basis for the numerous Air Traffic Services enhancements such as oceanic RNP separation reductions, Optimum Profile Descents, reduction of flight distance and the development of aircraft and the development of future concepts for trajectory based operations. These PBN enabled enhancements are a cornerstone of ANSP efforts to improve fuel and emission efficiencies

ANSP guidance for the implementation of PBN and associated ATS applications will be contained in the ICAO Performance Based Navigation Manual, Doc 9613.

4 Performance Measurement

Individual ANSPs, airlines and industry partners track efficiency and environmental performance to varying degrees in the course of everyday business activities. However, few arrangements are in place to accurately track the end-to-end performance and efficiency of flights in Asia and the Pacific Region. Comprehensive and comparable measurement of fuel burn and emissions performance is a key to assessing the progress of environmental initiatives and to identifying areas in need of improvement.

4.1 Baseline Performance Metrics

The ASPIRE partners recommend the development of baseline performance metrics for strategic routes and city pairs throughout the Asia and Pacific region. These baseline metrics should be designed to:

- Calculate the benefits that recent efficiency enhancements (e.g. UPR, DARP, 30NM lateral/30NM longitudinal separation) have contributed to fuel savings and emissions to date, and
- Provide the foundation for assessment of future emissions and efficiency initiatives developed within the ASPIRE partnership.

To accomplish this goal, ANSPs and airline partners must collaborate to define and collect data required to assess performance and share the appropriate data to ensure that there is consistency in the measurement, interpretation and reporting of performance.

To successfully gauge environmental and operational efficiency benefits, it is necessary that ASPIRE Partners identify historical fuel use and weight records for aircraft operations in order to establish a performance baseline. Establishment of this baseline data is vital and valuable for comparison against the effects of ATS enhancements and the determination of benefits – fuels conserved, emissions reduced, and payload fuel efficiency.

Emissions Calculation

With the determination of the fuel difference, and by application of the 1st order approximation that assumes the complete fuel combustion assumption, Carbon Dioxide (CO_2), Water (H_2O) and Sulfur Oxides (SO_x) emission reductions can be estimated from the amount of unburned fuel saved by using the emission indices as follows:

* CO_2 (kg) = 3.155 x amount of fuel conserved (kg);
* H_2O (kg) = 1.237 x amount of fuel conserved (kg); and

An online utility for the calculation of emissions is available at:

http://www.epa.gov/cleanenergy/energy-resources/calculator.html

4.2 The "Ideal Flight" Benchmark

The development and computation of a flight benchmark that reflects the "Ideal Flight" will play an essential role in the ASPIRE program. This benchmark, calculated based on the most efficient and environmentally sound gate to gate flight profile possible, demonstrates the maximum potential gain in environmental performance that can be achieved under ASPIRE.

The calculation of this benchmark is a significant challenge due to the external influences impacting each flight. The ASPIRE partners have conducted a series of ASPIRE Green Flight demonstrations for a snapshot of benefits that can be achieved by removing all controllable constraints. However the development of a comprehensive benchmark requires a combination flight demonstration data, and aircraft performance modelling. (See ASPIRE Work Program in Section 6).

5 ASPIRE Reporting

Progress, performance and program updates will be reported by the ASPIRE partners on an annual basis via the publication of the ASPIRE Annual Report. The Annual Report will be developed by the ASPIRE coordinators in the second quarter of each calendar year to provide status updates on work program initiatives and demonstrations, performance measurements and future plans for the ASPIRE partnership. The report will be distributed to appropriate members of the aviation community, including industry, media and global forums.

Periodically, the ASPIRE partners issue, individually or collectively, media releases to coincide with significant events such as demonstrations or implementations of new services that contribute to the reduction of greenhouse gasses.

All requests for information should be directed to one of the ASPIRE Coordinators listed in Appendix B.

Further public information will be published at http://www.aspire-green.com/, and general information can be requested through email: info@aspire-green.com.

6 ASPIRE Work Program

The work program consists of a series of initiatives which, as they're completed, will allow the ASPIRE partnership to progress towards their goal of improving the efficiency and sustainability of aviation.

Work Program A was initiated in June 2008 by the initial ASPIRE partners to focus on Pacific efforts. Additional work programs may be created to correspond with the expansion of the ASPIRE partnership to other parts of the Asia Pacific region.

For each initiative one ASPIRE partner is identified as the lead. It is the leads responsibility to track the progress of the initiative and coordinate and facilitate the other stakeholders to encourage success of the initiative.

6.1 Develop the "Ideal Flight" Benchmark Metric

<table>
<tr><th colspan="3">Initiative Summary</th></tr>
<tr><td colspan="3">Develop benchmark metrics for the "Ideal Flight" assuming unconstrained flight conditions.</td></tr>
<tr><th colspan="3">Initiative Lead</th></tr>
<tr><td colspan="3">FAA</td></tr>
<tr><th colspan="3">Contributing Stakeholders</th></tr>
<tr><th>ASPIRE Partners</th><th>Airlines</th><th>Supporting Agencies</th></tr>
<tr><td>Airservices Australia</td><td></td><td></td></tr>
<tr><td>Airways NZ</td><td></td><td></td></tr>
<tr><td>FAA</td><td></td><td></td></tr>
<tr><th colspan="3">Affected Flight Information Regions</th></tr>
<tr><td></td><td>NA</td><td></td></tr>
<tr><th colspan="3">Strategic Goals</th></tr>
<tr><td colspan="3">1. Develop a performance metric for Australasia to North America flights demonstrating the best case fuel and emissions scenario using today's fleet of aircraft.
2. Use the "Ideal Flight" benchmark for the creation of goal targets for improvement on each phase of flight on a gate-to-gate basis</td></tr>
<tr><th colspan="3">Benefits</th></tr>
<tr><td colspan="3">Provide the foundation for assessment of future emissions and efficiency initiatives developed within the ASPIRE partnership.</td></tr>
</table>

Responsibilities		
Activity	**Responsible Group**	**Activity Status**
Develop the data requirements and begin compilation of data.	FAA	**In progress** Reviewing data received from Airservices Australia, collecting and parsing data from Air New Zealand (sent feedback), and sent responses to questions from Adacel in support of Fijian data sharing. Continuing the ASPIRE baseline work with Airways New Zealand data, beginning to incorporate Australia and Air New Zealand.

6.2 Develop the South Pacific Baseline Flight Metric

Initiative Summary		
Using ANSP and air carrier flight and fuel data, the ASPIRE partners will develop a continually updated performance metric based on actual fuel burn between North America and Australasia.		
Initiative Lead		
FAA		
Contributing Stakeholders		
ASPIRE Partners	**Airlines**	**Supporting Agencies**
Airservices Australia	Air New Zealand	
Airways NZ	Qantas	
FAA	United	
Affected Flight Information Regions		
	NA	
Strategic Goals		
1. Develop a baseline performance metric for the current South Pacific environment using the best available flight and fuel data. • Start up to take-off • Take-off to top of climb • Cruise • Top of descent to landing • Landing to gate		
Benefits		
Contribute to the foundation for performance assessment of future emissions and efficiency initiatives developed within the ASPIRE partnership		

Responsibilities		
Activity	**Responsible Group**	**Activity Status**
Compile the flight and fuel data for initial baseline calculation and reporting in the 2010 ASPIRE Annual Report.	FAA	In Progress

6.3 Develop an Oceanic Emissions Baseline for US to Asia City-Pairs

Initiative Summary		
The FAA and JCAB have developed a shared fuel baseline for the oceanic segment of flight on selected city-pairs between the US and Asia. As the fuel data baseline is refined, ASPIRE will develop emissions baseline data.		
Initiative Lead		
FAA		
Contributing Stakeholders		
ASPIRE Partners	**Airlines**	**Supporting Agencies**
FAA		
JCAB		
Affected Flight Information Regions		
	NA	
Strategic Goals		
1. Utilise the existing shared oceanic fuel metric program to provide baseline data for emissions in the North and Central Pacific for analysis and reporting.		
Benefits		
Contribute to the foundation for performance assessment of future emissions and efficiency initiatives developed within the ASPIRE partnership		

Responsibilities		
Activity	**Responsible Group**	**Activity Status**
Develop a plan for emissions calculation based on refined FAA-JCAB fuel data.	IPACG	Under development

6.4 ASPIRE Daily City Pair Route Rating System

Initiative Summary		
Develop a program for daily city-pair flights, beginning in the SoPac based on the principles of ASPIRE Best Practices. City-pair routes will be assigned a classification (e.g. ASPIRE-4 Star) based on the availability of Best Practice procedures.		
Initiative Lead		
FAA		
Contributing Stakeholders		
ASPIRE Partners	**Airlines**	**Supporting Agencies**
Airservices Australia		IATA
Airways New Zealand	Air New Zealand	
CAAS		
FAA		
JCAB		
Affected Flight Information Regions		
	NA	
Strategic Goals		
1. Develop the concept for ASPIRE-Daily city-pair routes with the initial airline partner and begin ASPIRE-Daily flights in 2010. 2. Expand city-pairs and airline partners 3. Track and report progress of ASPIRE-Daily.		
Benefits		
ASPIRE-Daily will increase awareness and utilisation of best practices on a daily basis in the Asia-Pacific region.		

Responsibilities		
Activity	**Responsible Group**	**Activity Status**
Concept proposal on ASPIRE-Daily	FAA	**Completed** ✓
Identify initial airline partner and city pair	ASPIRE Coordinators	**Completed** ✓

Responsibilities		
Kickoff ASPIRE-Daily flights	ASPIRE Coordinators	**Completed** ✓

6.5 Dynamic Airborne Reroute Program (DARP) Enhancement

Initiative Summary		
Identify limitations and constraints to the existing Pacific Dynamic Airborne Reroute Program (DARP). Where possible, remove constraints via procedural, cultural and automation changes.		
Initiative Lead		
Each Partner in their Area of Responsibility		
Contributing Stakeholders		
ASPIRE Partners	**Airlines**	**Supporting Agencies**
Airservices Australia		
Airways NZ		
FAA		
JCAB		
Affected Flight Information Regions		
Oakland Oceanic	Auckland Oceanic	Melbourne
Brisbane	Fukuoka	
Strategic Goals		
1. Identify the constraints limiting the use of DARP across the Pacific. • Institutional • Procedural • Ground technology • Airborne technology • Restricted Areas 2. ASPIRE partners remove constraints within their jurisdictions and make available Dynamic Airborne Reroute wherever practicable		
Benefits		
DARP allows aircraft operators to calculate revised profiles from the aircraft's present position to any subsequent point in the cleared route of flight in order to realise savings in fuel or time.		

Responsibilities		
Activity	**Responsible Group**	**Activity Status**
Identify constraints to DARP implementation	ISPACG	Completed DARP testing with Nadi and Tahiti Control Centres on 2/15/11. Nadi are evaluating to see if they can improve their support of the DARP Procedures.
Recommend action plans to remove constraints	ISPACG	The only real constraints on DARPs at this time are at what level DARPs can be supported within the different FIRs. Waiting to see if Nadi and Tahiti can expand their support.
Remove constraints within their jurisdictions	ASPIRE partners	
Confirms regions of DARP capability	ASPIRE partners	Working with JCAB to begin a limited Westbound DARP trial in the Spring of 2011.
Oceanic Conflict Advisory Trial (OCAT) - Tactical trajectory feedback tool lab testing		2011
OCAT - Tactical trajectory feedback tool operational trial		2012

6.6 User Preferred Route (UPR) Expansion

Initiative Summary		
Identify constraints limiting the availability of User Preferred Routing. Expand the availability of User Preferred Routes.		
Initiative Lead		
Each Partner in their Area of Responsibility		
Contributing Stakeholders		
ASPIRE Partners	**Airlines**	**Supporting Agencies**
Airservices Australia	Qantas	[TBD]
Airways NZ		
FAA		
JCAB		
CAAS		
Affected Flight Information Regions		
Oakland Oceanic	Auckland Oceanic	Melbourne
Brisbane	Fukuoka	

Strategic Goals

ASIA

1. Study the possibility of UPRs between Japan and Singapore through Manila FIR, with the aim of identify the constraints limiting the availability of UPRs between Japan and Singapore;
   - Institutional
   - Procedural
   - Ground technology
   - Airborne technology
   - Restricted Areas

Strategic Goals		
Pacific 1. Identify the constraints limiting the use of UPR across the Pacific example • Institutional • Procedural • Ground technology • Airborne technology 2. ASPIRE partners remove constraints within their jurisdictions		
Benefits		
When UPRs are created based on fuel optimisation considerations, the corresponding savings in greenhouse gas emissions can be substantial		
Responsibilities		
Activity	**Responsible Group**	**Activity Status**
Identify constraints to UPR service provision	ISPACG & IPACG	The ISPACG Planning Team is working to develop a list of the constraints on flight planning UPRs between North America and the South Pacific.
Recommend action plans to remove constraints	ISPACG & IPACG	Review the UPR constraints at every IPACG meeting to see which might be removed. There are very few restrictions on UPRs in the South Pacific.
Remove constraints within their jurisdictions	ASPIRE partners	
Confirm regions of UPR availability	ASPIRE partners	

6.7 Oceanic ADS-C Climb-Descent Procedures

Initiative Summary		
Collaborate on the standards development and the execution of operational trials for Oceanic ADS-C Climb-Descent Procedures (CDP).		
Initiative Lead		
FAA		
Contributing Stakeholders		
ASPIRE Partners	**Airlines**	**Supporting Agencies**
Airservices Australia	[TBD]	MITRE
Airways NZ		
FAA		
Affected Flight Information Regions		
Oakland Oceanic	Auckland Oceanic	Melbourne
Brisbane		
Strategic Goal		
Implementation of ADS-C CDP in the South Pacific using existing FANS equipment and ground infrastructure		
Benefits		
The availability of ADS-C Climb-Descent Procedures will enable easier access to preferred flight levels in Oceanic areas.		

Responsibilities		
Activity	**Responsible Group**	**Activity Status**
Approvals for ADS-C ITP Pacific Operational Trials	ISPACG / FAA	**Completed** ✓

Responsibilities		
Activity	**Responsible Group**	**Activity Status**
ADS-C ITP Pacific Operational Trials	ISPACG / FAA	**In progress** Operational trial start date 15 Feb 2011 for initial 90-day trial. Data collection and analysis will be ongoing to support approval for continuation of trial for period of 1 year.
ADS-C ITP Pacific Implementation	ISPACG / FAA	

6.8 Automatic Dependent Surveillance – Broadcast (ADS-B) Oceanic and Remote In-Trail Procedures (ITP) for Reduced Separation

Initiative Summary		
Collaborate on operational trials to harmonise procedures and collect data to support implementation of ADS-B ITP in South Pacific airspace.		
Initiative Lead		
FAA		
Contributing Stakeholders		
ASPIRE Partners	**Airlines**	**Supporting Agencies**
Airservices Australia	[TBD]	
Airways NZ	[TBD]	
FAA	United Airlines	Honeywell / Teledyne
Affected Flight Information Regions		
Oakland Oceanic	Auckland Oceanic	Melbourne
Brisbane		
Strategic Goals		
1. Implementation of ADS-B ITP in the South Pacific 2. Expand capability into other regions		
Benefits		
The availability of ADS-B Oceanic and Remote In-Trail Procedures will enable easier access to preferred flight levels in Oceanic areas.		

Responsibilities		
Activity	**Responsible Group**	**Activity Status**
Outreach to pilot unions and other airlines	ISPACG, APANPIRG,	
South Pacific routes (SOPAC) business case developed – March 2008		

Responsibilities		
Activity	**Responsible Group**	**Activity Status**
Avionics Standards and Safety case (DO-312) – June 2008		
Separation and Airspace Safety Panel approval – November 2008	**FAA**	**Completed** ✓
Program plan (ITP strategy and joint responsibilities) – May 2009		
Approved Aircraft Certification and OpSpec - 2010		
Airspace approvals – 2010		
Begin SOPAC Operational Trials – 2010		**In progress** 4th SRM Panel meeting conducted 8 Feb 2011. Hazard analysis continues. Appropriate Collision Risk Model agreed-upon with WJHTC. WJHTC will validate the model for use with ADS-B ITP.
Complete SOPAC Operational Trials – 2011		
Draft report - 2011		
Final report - 2011		

6.9 Implementation of ADS-B with VHF communications

Initiative Summary		
Progress ADS-B implementation in the South China Sea area with Viet Nam and Indonesia		
Initiative Lead		
CAAS		
Contributing Stakeholders		
ASPIRE Partners	**Airlines**	**Supporting Agencies**
CAAS	[TBD]	DGCA Indonesia
		VANSCorp
Affected Flight Information Regions		
Singapore	Jakarta	Ho Chi Minh
Strategic Goals		
1. Improve surveillance coverage in the South China Sea		
Benefits		
1. Enhance safety with better surveillance coverage 2. Increase capacity and efficiency by providing radar-like separation with VHF communications outside radar coverage through sharing of ADS-B data		

Responsibilities		
Activity	**Responsible Group**	**Activity Status**
Implementation of ADS-B	ADS-B TF and SEA ADS-B WG	**In progress** Agreement for ADS-B Data Sharing with VHF Communication between CAAS and DGCA Indonesia has been signed.
Implementation Plan of ADS-B		**Completed** ✓
Actions taken to progress implementation		Operational trial is planned for 4th quarter of 2011
Discussion with Viet Nam and Indonesia –		In progress

6.10 Oceanic Separation below 30/30

Initiative Summary		
Collaborate on the safety and cost/benefits analysis of separation reductions in level flight, below the current minimum oceanic standards of 30nm longitudinal and 30nm lateral.		
Initiative Lead		
Airways NZ		
Contributing Stakeholders		
ASPIRE Partners	**Airlines**	**Supporting Agencies**
Airservices Australia	[TBD]	[TBD]
Airways NZ		
FAA		
JCAB		
Affected Flight Information Regions		
Oakland Oceanic	Auckland Oceanic	Melbourne
Brisbane	Fukuoka	
Strategic Goals		
1. Determine if separation standards below the current 30:30 add sufficient value (defined as additional capacity on optimal routes) to airlines that justify the cost of development and implementation of such separation standards		
Benefits		
Reduced separation minima allow more aircraft access to optimum routings and altitudes; the enhanced efficiencies of optimum routes and altitudes can result in lower fuel burn and reduced emissions.		

Responsibilities		
Activity	**Responsible Group**	**Activity Status**
Conduct feasibility analysis, and begin business case development. Coordinate via ISPACG /IPACG	ISPACG/IPACG	
Business case agree - TBD • Benefits agreed • Cost of development agreed • Cost of implementation agreed		
Recommendation made to ASPIRE partners - TBD		

6.11 Implementation of Reduced Horizontal Separation

Initiative Summary		
Progress the implementation of RNP10 and RNP4 operations in the South China Sea and Bay of Bengal areas.		
Initiative Lead		
CAAS		
Contributing Stakeholders		
ASPIRE Partners	**Airlines**	**Supporting Agencies**
CAAS	[TBD]	CSSI
Affected Flight Information Regions		
Singapore	Jakarta	Ho Chi Minh
Strategic Goals		
1. Implement RNP10 and RNP4 in the South China Sea and Bay of Bengal areas.		
Benefits		
1. Increase capacity and improve efficiency in both the South China Sea and Bay of Bengal areas.		

Responsibilities		
Activity	**Responsible Group**	**Activity Status**
Routes identified		**Completed** ✓
Set up of En-route Monitoring Agency		**Completed** ✓
Recommended action plans to implement RNP10 and RNP4 operations		In progress
Implement RNP10 and RNP4 operations in the South China Sea areas	SEA-RR/TF	

Responsibilities		
Activity	**Responsible Group**	**Activity Status**
Implement RNP10 and RNP4 operations in the Bay of Bengal areas.	BOB RHS/TF	4 Routes have been identified for Phase 1 implementation of RNP10 operations in April 2011.
Remove constraints within their jurisdictions	ASPIRE partners	In progress

6.12 Arrivals Optimisation (Continuous Descent Operation, Tailored Arrivals)

Initiative Summary		
Collaborate on development of common procedures and standards for arrivals optimisation via the principles of a Continuous Descent Operation (CDO). This includes the development of Optimised Descent Profile (OPD) procedures, and the continued development of Tailored Arrivals programs.		
Initiative Lead		
Each ASPIRE Partner in their Area of Responsibility		
Contributing Stakeholders		
ASPIRE Partners	**Airlines**	**Supporting Agencies**
Airservices Australia	Qantas	[TBD]
Airways NZ	SIA	
CAAS		
FAA		
JCAB		
Affected Flight Information Regions		
Oakland Oceanic	Auckland Oceanic	Melbourne
Brisbane	Fukuoka	
Strategic Goal		
Minimise fuel burn for the arrival segment by enabling each jet to fly the optimum track to Top of Descent TOD and OPD from TOD to a touchdown on the landing runway		
Benefit		
Emissions will be reduced during the Arrivals phase for all eligible flights		

Milestone Targets
1. Provide optimum track to STAR start points 2. Identify constraints to the introduction of CDOs or TAs as the 'normal' means of operating rather than the exception. 3. Provide for Constant Descent Operations or Tailored Arrival from TOD at selected airports 4. Manage the arrival demand in order to realise the benefits of CDO or TA for **each** arriving flight.

Responsibilities

Activity	Responsible Group	Activity Status
1 Airservices		
Central Traffic Management System (CTMS) was implemented into Sydney Airport operations in 2004.	Airservices Australia	**Completed** ✓
RNP Brisbane Green trial completed 2007	Airservices Australia	**Completed** ✓
RNP expansion program trial – completed 2009	Airservices Australia	**Completed** ✓
RNP national rollout – commenced 2010	Airservices Australia	In progress
Implementation of National ATFM – commenced,2009 Completion 2010	Airservices Australia	In progress
CDA arrival trial – commenced in Melbourne 2009	Airservices Australia	In progress
2 Airways		
CDA trials	Airways NZ	**Completed** ✓ - Auckland 2007

Responsibilities		
Activity	**Responsible Group**	**Activity Status**
RNAV STARS rolled out at International airports; complete Nov 08	Airways NZ	**Completed** ✓
RNP AR implemented at one international ports Procedures will be linked to STARs and enable TAs for suitably equipped aircraft	Airways NZ	Rotorua 2011 QN,AA, WN(dep) 2012 WN (App) 2013 CH
Collaborative arrival Manager (CAM) implemented is major Airports	Airways NZ	AA - **Completed** ✓ WN - **Completed** ✓ CH – 2011 QN - 2011
Integrate advanced Arrivals manager in to CAM and deliver services to major Airports	Airways NZ	Project underway for implementation into AA
3 CAAS		
Development of OPD procedures	CAAS	
Study the implementation of TA	CAAS	
Conduct OPD operational trials with other airlines operating into Changi Airport	CAAS	
4 FAA		
Tailored Arrivals trials	FAA	**In progress** trials are underway at daily at SFO and MIA, trials at LAX TBD
Develop Safety Case	FAA	Safety Case developed

Responsibilities		
Activity	**Responsible Group**	**Activity Status**
Implementation of TA	FAA	**In progress** Activities in progress to implement TAs at SFO, MIA and LAX. This includes the documentation of cost-benefit analysis, safety risk management, profile development criteria, changes to supporting FAA directives and orders, and other related reports which support the implementation.
Expansion to additional airports	FAA	**Under Development** Coordinating with DoD Commercial Aircraft Division for oceanic optimization for KC-135s and C17 including development of a TA at Travis AFB. Other military installations that will be considered are Elmendorf and Hickam AFBs.
2010 Plans for Optimised Profile Descent (OPD) Standard Terminal Arrival Routes (STARs) utilised by appropriately equipped oceanic arrivals:	FAA	Anchorage: One OPD STAR published and implemented **Completed** ✓ Honolulu: 3 OPD STARs (GPS required) published and implemented **Completed** ✓ Seattle: Under Development
Develop requirements for ground automation support tools for enhanced OPD	FAA	Under development
5 JCAB		
Continuous Descent Arrivals (CDA) trials	JCAB	started at Kansai Airport 2009

Responsibilities		
Activity	**Responsible Group**	**Activity Status**
Expansion to additional airports	JCAB	under development
Identify constraints to conduct full CDA	JCAB	
Identify required ATC support tool for sequencing and metering	JCAB	
Requirements for ground automation support tools are being developed	JCAB	
RNP-AR trial at Haneda Airport	JCAB	Will be implemented Haneda Airport in 2012

6.13 Departure Optimisation

<table>
<tr><th colspan="3">Initiative Summary</th></tr>
<tr><td colspan="3">Collaborate on the development of standards and procedures for the efficient management of departures.</td></tr>
<tr><th colspan="3">Initiative Lead</th></tr>
<tr><td colspan="3">Each ASPIRE Partner in their Area of Responsibility</td></tr>
<tr><th colspan="3">Contributing Stakeholders</th></tr>
<tr><th>ASPIRE Partners</th><th>Airlines</th><th>Supporting Agencies</th></tr>
<tr><td>Airservices Australia</td><td>[TBD]</td><td>[TBD]</td></tr>
<tr><td>Airways NZ</td><td></td><td></td></tr>
<tr><td>FAA</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><th colspan="3">Affected Flight Information Regions</th></tr>
<tr><td></td><td>NA</td><td></td></tr>
<tr><th colspan="3">Strategic Goals</th></tr>
<tr><td colspan="3">1. Minimise delay from start request to approval
2. Minimise the time/fuel burn from start approval to take off
3. Minimise time/length of taxi for departures
4. Maintain surface and runway capacities in all weather conditions
5. Provide precise surface guidance to a runway in all conditions
6. Optimise departure to facilitate unconstrained climb to cruise level and track to route start point
7. Manipulate taxi and departure time to optimise oceanic entry altitude and oceanic trajectory based on predictive analysis of traffic</td></tr>
<tr><th colspan="3">Benefit</th></tr>
<tr><td colspan="3">Emissions will be reduced during the Arrivals phase for all eligible flights</td></tr>
</table>

Milestone Targets
1. Just in time' engine start approval implemented 2. The holding time at the runway holding point, awaiting take –off clearance, is minimised. Metrics (ideal times) for each airport to be developed 1. Provide for the most efficient route from the departure runway to the outbound route / UPR.

Responsibilities		
Activity	**Responsible Group**	**Activity Status**
1. Airservices		
Auto release procedures	Airservices Australia	implemented ML, SY and BN ✓
Auto release expansion	Airservices Australia	commenced
Departure Extraction routes	Airservices Australia	will be implemented in line with the RNP rollout
2. Airways		
	Airways NZ	**Current situation:** • Optimising departure trajectories on an aircraft by aircraft basis to facilitate un-interrupted climb for jets. • Auto release procedures in place at major airports. • RNAV SIDs in place at major International airports. • No hold downs on RNAV SIDs for Jets – unrestricted climb provided for.

Responsibilities		
Activity	**Responsible Group**	**Activity Status**
3. FAA		
OTM-4D Pre-Departure Concept of Operations	FAA	**Completed** ✓
OTM-4D Pre-Departure Benefits case and Requirements development	FAA	**Completed** ✓
Pre-departure planner algorithm data collection and analysis	FAA	2011
Pre-departure planner lab demonstration	FAA	2013
Pre-departure planner operational trial	FAA	2014
4. JCAB		
Departure Optimisation Program	JCAB	Program being developed

6.14 ASPIRE - Flight Demonstration Program

Initiative Summary		
Conduct a series of flight demonstrations exercising concepts and technologies in flight efficiency and emissions reductions in all phases of flight.		
Initiative Lead		
Each ASPIRE partner		
Contributing Stakeholders		
ASPIRE Partners	**Airlines**	**Supporting Agencies**
Airservices	Qantas	Boeing
Airways NZ	Air New Zealand	
CAAS	SIA	
FAA		
JCAB	JAL	
Affected Flight Information Regions		
Oakland Oceanic	Auckland Oceanic	Melbourne
Brisbane	Fukuoka	

Strategic Goals

1. Conduct gate-to-gate demonstration flights showcasing existing services and technologies while removing controllable constraints for the best current achievable fuel and emission results:
   - Maximum use of FANS 1/A data link and updated wind information
   - Start-up arranged to achieve "no-delay" for taxi and takeoff.
   - Departure: subject to Regulatory rules, most efficient intercept of UPR, with unrestricted climb to optimum cruise level
   - Cruise: Unrestricted cruise level change allocation and DARP/s
   - Arrival: Unrestricted TA/CDA to landing
   - Taxi in: No delay taxi to gate
2. Publicise fuel and emission reduction gains achieved by current technology and procedures
3. Provide data indicating fuel savings and a data point for fuel and emission metrics

Benefits		
Establish the best case fuel and emissions scenario as a target reference for future ASPIRE initiatives		
Responsibilities		
Activity	**Responsible Group**	**Activity Status**
JCAB / FAA and JAL conduct demonstration Flight 4 - HNL-KIX 10th of October 2009	JCAB	**Completed** ✓
CAAS / FAA and SIA conduct demonstration Flight 5 - LAX-NRT-SIN 2nd of February 2010	SIA	**Completed** ✓
Aerothai and Thai Airways to conduct demonstration Flight 6 - TBA	AeroThai	Planning in progress

Appendix A Table of Acronyms

Acronym	Explanation
ADS	automatic dependent surveillance
ADS-B	automatic dependent surveillance - broadcast
ADS-C	automatic dependent surveillance - contract
ANSP	air navigation service provider
AOC	airline operations centre
ASPIRE	The Asia and South Pacific Initiative to Reduce Emissions
ATC	air traffic control
ATM	air traffic management
ATS	air traffic services
CANSO	The Civil Air Navigation Services Organisation
CDO	continuous descent operation
CNS/ATM	communications, navigation, surveillance / air traffic management
CTMS	Central Traffic Management System
DARP	dynamic airborne reroute procedures
GHG	global greenhouse gas
IATA	The International Air Transport Association
ICAO	The International Civil Aviation Organisation
ISPACG	Informal South Pacific ATS Coordinating Group
IPACG	Informal Pacific ATC Coordinating Group
MAESTRO	Means to Aid Expedition and Sequencing of Traffic with Research of Optimisation

Acronym	**Explanation**
NOTAM	Notice to Airmen
OPD	optimised profile descent
OTM-4D	Oceanic Trajectory Management – 4D
PBN	performance based navigation
RNAV	area navigation
RNP	required navigation performance
RNP-AR	required navigation performance – authorisation required
RVSM	reduced vertical separation minima
SOPAC	South Pacific
STAR	standard terminal arrival
TA	tailored arrival
TBD	to be determined
TMA	Traffic Management Advisor
TOD	top of descent
UPR	user preferred routes

Appendix B ASPIRE Coordinators

Partner	ASPIRE Coordinator	Address	Phone	Email
Airservices Australia	David Webb	P.O. BOX 1093, Tullamarine, VIC 3043, Australia	+61 408 004 213	david.webb@airservicesaustralia.com
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Civil Aviation Authority of Singapore (CAAS)	Edmund Heng Cher Sian	Singapore Changi Airport, PO BOX 1, Singapore 918141	+65 65412430	edmund_heng@caas.gov.sg
Civil Aviation Bureau, Japan (JCAB)	Ms Tomoko NAKAGAWA	2-1-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8918, Japan	+81 3 5253 8740	nakagawa-t07au@mlit.go.jp
The Federal Aviation Administration	Kevin Chamness	800 Independence Ave, Washington DC, 20591 USA	+1 202 3858964	kevin.chamness@faa.gov