



INTERNATIONAL INSTITUTE FOR AVIATION STUDIES

Thinking Beyond Today

INFORMATION FOR PROSPECTIVE DONORS

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PART A

INTRODUCTION AND EXECUTIVE SUMMARY



INTRODUCTION AND EXECUTIVE SUMMARY

The International Institute for Aviation Studies (the Institute) will be a not-for-profit aviation research centre. Its purpose is to produce, through global multidisciplinary collaboration, innovative approaches and sustainable solutions to issues and problems facing the aviation industry today.

Globalisation depends on aviation. Yet many of the issues and problems which attend globalisation, whether economic, technological or social, also attend aviation. And international air services have long been tightly regulated and protected.

Through the elimination of barriers, both physical and intellectual, our aim is to create an environment that revolutionises aviation research and the way that research is organised and undertaken. As Google's vice-president for search products and user experience notes,

... disregarding the bounds of what we know or accept gives rise to ideas that are non-obvious, unconventional, or unexplored.¹

Subject to adequate funding and other conditions, the Institute will be based in Perth at the University of Western Australia (UWA). Research under the Institute's auspices will be undertaken by individuals and by building cross-disciplinary research teams around the world. UWA is one of Australia's leading research universities, and ranked by the *Times Higher Education Supplement* in its "World University Rankings" as one of the top 100 universities in the world.² In 2005 one of its faculty - and a former graduate - won the Nobel Prize for Physiology or Medicine.

The International Institute for Aviation Studies represents a unique, innovative research concept. No such institute exists today.

Purpose of this document

Funding

We seek funding for the Institute from corporations, government and individuals. This document – at Part 3 - sets out the advantages for donors in providing such financial support. Part 8 sets out the Institute's funding requirements. Please contact David Hodgkinson, either by telephone, email or fax, to discuss support for the Institute. His contact details are provided at Part 10, page 72.

¹ Marissa Ann Mayer, "Creativity Loves Constraints," *BusinessWeek*, 13 February 2006.

² "World University Rankings," *The Times Higher Education Supplement*, 28 October 2005. UWA is ranked equal 80th, up from 96th in 2004.



Our aim is to create an international alliance of corporations and individuals which can, through financial and other support of the Institute, change aviation research and the future of aviation itself.

Information about the Institute

This document provides detailed information about the Institute, its vision and strategic goals, rationale, structure and research priorities. It outlines the Institute's research programme and work product, how research teams will be built, and how the Institute will secure the highest standard of research from industry, academia and elsewhere.

Rationale for the Institute (summary)

The aviation industry is one of the most innovative and global with unique problems and potentially fast moving changes in its basic parameters. It needs nothing less than the most innovative and forward thinking.

Recent, significant aviation trends and developments, when taken together, demonstrate the need for – indeed, demand – an international institute for aviation studies such as the one we propose. Analysis of these worldwide developments and trends and the conduct of multi- and cross-disciplinary research required to find solutions to the urgent problems they raise is one of the main purposes of the Institute. The Institute will have a global reach and a focus on the aviation industry as a whole, not simply a focus on carriers.

Part 4 of this document outlines these developments, trends and problems, together with a strong rationale for the establishment of the Institute in the Asia Pacific: With aviation growth in this region forecast to be greater than in any other region over the next 20 years, the Asia Pacific represents an aviation revolution. It is the focus for many of these aviation developments.

Research agenda and priorities (summary)

The first part of the document sets out the Institute's aviation research priorities in detail. In outline form, with some detail concerning the environmental aspects of certain of those priorities, they are as follows, arranged according to theme:

Aviation and the environment

- Regional and global aviation emissions trading schemes (markets for carbon dioxide emissions)
- Market forces and the environment: Environmental drivers in the aviation industry, and whether market forces can help cut aviation emissions



- Business management by aircraft manufacturers and airlines of their carbon exposure, specifically the way that management of that exposure in the next 5 to 10 years could, given increasing focus on global warming, create – or destroy – shareholder, or brand, value
- Developments in aviation technology and the extent to which such developments rather than emissions trading schemes will address environmental concerns
- The extent to which active take-up of environment-friendly aircraft technology provides relevant aviation industry sectors with the credibility to shape debate over emissions reductions
- Consequences of an aviation fuel tax as an alternative to emissions trading, and dynamic models of relative payoffs for each
- Strategies for airlines on climate change issues, and detailed mathematical modelling on specific options available to the airline industry

Economics of aviation

- Industry consolidation
- Aviation growth
- The economic impacts of environmental legislation
- Demand instability: Is it cyclical and, if so, are cycles endogenously or exogenously generated? What drives instabilities?
- Consequences of aviation taxes
- Consequences of rising jet fuel costs
- The viability of alternative jet fuels, and whether research energy is better deployed toward aircraft technological developments aimed at making aircraft more fuel efficient
- The impact and transformative effect of very light jets (VLJs)

Liberalisation of international air services

- The implications of liberalisation including not just air traffic rights but also airline ownership and control, “rights of establishment,” and the further reduction of trade barriers



Aviation security and the terror threat

- The effect of a changing aviation security environment following the events of 11 September 2001 and those of August 2006 at London Heathrow, and the implications in terms of security measures, airline travel and airline profitability

Aviation governance

- The effectiveness of IATA and ICAO (for example) and the need for a framework in which recent, pressing developments affecting aviation (carbon emissions, for instance) can be effectively discussed by all stakeholders in a timely manner
- The appropriate role of government (including security) in international aviation
- Possible effects and consequences of increasing focus on the aviation industry, and the effect of full liberalisation on the industry, in terms of anti-trust issues
- The Institute as a model for other industry-specific research initiatives or projects

Possible contributions of the international aviation industry

- The potential for the aviation industry worldwide to play a significant role in development aid and disaster relief
- The potential for the aviation industry to play a role in relief operations in the event of an avian flu pandemic³

Research programme, work product and unique research community (summary)

The Institute's Board will determine the Institute's aviation research priorities. The Institute will then seek leading researchers, scholars or analysts, and teams of such individuals, across disciplines, to undertake the relevant research projects.

We will identify the best people anywhere to make up research project teams. Our aim, the *challenge* we offer - to build research teams to provide better, innovative solutions to problems facing the aviation industry – will attract such people, together with the *possibility* we offer: unique, integrated, cross-disciplinary research solutions to these problems.

The relevant research project may either be conducted at the Institute, at an international location or locations, or at a combination of such places. The focus of the Institute's directed research programme is not the physical location at which the research is undertaken but the research itself. Geographic, disciplinary or intellectual boundaries will not be material.

³ Research to date has focussed, rather, on the implications of such a flu pandemic for air transport.



Research conducted as outlined above would be funded by grants from the Institute. The results of such research would be disseminated as research monographs published by the Institute.

Other aspects of the Institute - third party commissioned research; a working paper series; a scholar(s)-in-residence programme; the hosting of visiting researchers and scholars; Institute conferences, round table discussions, seminars (via webcast) and briefings; global monitoring of aviation research, developments and trends; an online store; and membership of the Institute - are set out in detail in Part 6.

Part 6 also sets out our aim to create a public, one-stop repository of aviation research - an "open-access" electronic "journal" containing research articles, updates and "posts" of research in progress. Over time we want this online journal to become the obvious place to go to for first-rate aviation research and almost "real time" information concerning the latest aviation developments and ideas.

The Institute, thus, represents a unique research community.

Structure of this document

Following the detail of the Institute's aviation research priorities (at Part 1), Part 2 sets out succinctly the Institute's vision and strategic goals. The advantages and benefits accruing to donors in providing financial support to the Institute (Part 3) are followed by a detailed part setting out the rationale for the establishment of the Institute, with a focus on recent developments in the aviation industry and their particular application in the Asia Pacific (Part 4). Part 5 explains why the Institute will be based in Perth and at the University of Western Australia, and the advantages of that location and academic institution.

Details of the Institute's research programme, work product and unique research community – essentially, how its research teams will be built, individual analysts and researchers secured, and the different forms the work product and research output of those teams and individuals will take, together with other innovative aspects of the Institute's research model - are provided at Part 6 (a summary of the Institute's research programme and work product appears above). The legal and governance structures of the Institute are outlined at Part 7.

Part 8 sets out the Institute's funding requirements and targets. Details of the Institute's proposed budget and business plan will be provided separately to potential donors upon request.

In outline, then, this document's structure is as follows:

1. Research priorities (page 13)
2. Vision and strategic goals (page 18)
3. Why provide financial support? (page 19)



4. Rationale for the establishment of the Institute (page 21)
5. Perth and the University of Western Australia (page 55)
6. Research programme, work product and unique research community (page 58)
7. Structure of the Institute (page 66)
8. Funding requirements (page 68)
9. People (page 69)
10. Contact details (page 72)

People (detailed resumes are set out at Part 9)

David Hodgkinson, 41, the Institute's proposed Chief Executive Officer, leads The Hodgkinson Group's 11-member aviation consulting practice. David was formerly Director of Legal Services at IATA, the organisation of the world's international scheduled airlines, in Montreal.

He holds a Bachelor of Arts degree with First Class Honours, a Bachelor of Laws degree and a Master of Philosophy degree (with a thesis on treaty interpretation), and was a Postgraduate Fellow at Columbia University, New York.

His PhD thesis is on the regulation of aviation in federal systems.

David is the recipient of an Evans Grawemeyer Fellowship, awarded by the Australian Government for research and activities aimed at improving the global order.

Assisting in the preparation of this document, **Professor Alex Coram**, a member of The Hodgkinson Group, is Professor of Political Economy, Aberdeen Business School, Robert Gordon University, Scotland, and Professor of Political Science at the University of Western Australia. In 2006 he held the Helen Sheridan Barber Chair of Economics at the University of Massachusetts, Amherst.

The focus of Alex's current research is on strategic choice (game) theory, optimisation theory and formal modelling with reference to transportation – aviation in particular - and problems of conflict over resources and resource sharing. He also works on problems involving differential games.

Alex has held a number of academic appointments including Visiting Professor, University of Chicago, and Visiting Professor of Economics, Institute for Advanced Studies, Vienna. The author of *State Anarchy and Collective Decisions: Some Applications of Game Theory to Political Economy* (Palgrave Macmillan, 2001), Alex has published over 30 papers in international journals

Also assisting in the preparation of this document, **Brett Duthie** was formerly deputy General Counsel with Air New Zealand, Corporate Lawyer with Qantas and Legal Counsel at Airservices Australia. He has also worked as Legal Adviser to Standard Chartered Bank and as Manager of IT Contracts for Morgan Stanley & Co International Limited in London.



Brett is a solicitor of the Supreme Courts of England and Wales, New South Wales and the Australian Capital Territory. He is also a solicitor of the High Court of New Zealand.

Vision

We aim to create a global aviation research community through building teams unencumbered by geographic, disciplinary or intellectual boundaries. Together, our people will provide new information in new ways. We will provide innovative, sustainable solutions to the problems facing the aviation industry.

In this way we can make a real contribution to that industry and the world it serves.

Our unique research community has the future of aviation in plain sight.



PART B

INTERNATIONAL INSTITUTE FOR AVIATION STUDIES



1. RESEARCH PRIORITIES

Research priorities will be defined by the Institute's Board with advice from the Institute's International Advisory Council. The Institute's integrated, multi-disciplinary research priorities at this stage are set out below. It should also be noted that the Institute will undertake third party commissioned research in areas additional to those listed below, provided that such research is broadly in line with the research priorities of the Institute. Commissioned research will be transparent and approved by the Institute's Board.

Over time we plan to establish specific research programmes, or streams, each to be led by individuals based either at the Institute's Perth premises or elsewhere – that is, individual research programme leaders will be located both at the Institute and at a (physical) distance. Such a structure further adds to the Institute's global reach.

Arranged according to theme, the Institute's six research priorities are as follows:

Aviation and the environment

- Regional and global aviation emissions trading schemes (ETS) (markets for carbon dioxide emissions). In developing a market, can emissions be reduced and the environment improved? What effect can an aviation emissions market have on the global environment and aviation business? Given the nature and scope of the aviation industry, will only a global ETS, as opposed to regional schemes, work? Can aviation be incorporated into a non-aviation ETS? What lessons can be drawn from the problems which have attended the European ETS?⁴ And, as a starting point, how to choose the emissions baseline?
- Market forces and the environment: Environmental drivers in the aviation industry and whether market forces can help cut aviation emissions, together with analysis of the link between climate change and aviation business development, and the perhaps illusory barrier between environmental integrity and aviation economic performance. Can aggressive action by airlines with regard to the environment be good for aviation business?
- Business management by aircraft manufacturers and airlines of their carbon exposure, specifically the way that management of that exposure in the next 5 to

⁴ "Emissions trading: Gaming gases – Why a scheme designed to punish polluters is rewarding them," *The Economist*, 10 June 2006, p 69.



10 years could, given increasing focus on global warming, create – or destroy – shareholder, or brand,⁵ value

- Developments in aviation technology - use of composites, for example – and the extent to which such developments (which result, amongst other things, in less fuel burn) rather than emissions trading schemes can address environmental concerns
- The extent to which active take-up of environment-friendly aircraft technology provides relevant aviation industry sectors – airlines, for example – with the credibility to shape the debate over emissions reductions
- Consequences of an aviation fuel tax as an alternative to emissions trading, or to an emissions levy via route charging, and dynamic models of relative payoffs for each
- Strategies for airlines on climate change issues: Detailed mathematical modelling on some of the specific options available to the airline industry, in particular active engagement in global warming issues and steering the process of change – with possible advantages of predictability and optimality, uniformity and focus

In our view, environmental concerns regarding aircraft carbon emissions and aviation's contribution to climate change will be the most contentious issues with which the aviation industry has to deal.

Economics of aviation

- Industry consolidation through mergers and acquisitions (whether or not as a result of possible full liberalisation of air services), and the possibility of large portfolios of airlines
- Aviation growth: What are the implications and consequences for the global aviation industry and other, related industries (with a focus on the Asia-Pacific region) of forecasts for unprecedented growth in aviation markets, passengers and numbers of aircraft delivered?
- Demand instability: Is it cyclical and, if so, are cycles endogenously or exogenously generated? What drives instabilities? How can airlines sustain superior performance in an industry in which demand, business models and technology change perhaps more frequently than in other industries?

⁵ A recent study by the Carbon Trust estimated that, for airlines, up to 50% of brand value could be at risk if corporations fail to act on climate change: Carbon Trust, *Brand Value At Risk From Climate Change*, 15 November 2005 (<http://www.carbontrust.co.uk/publications>); "Companies and climate change: Can business be cool?," *The Economist*, 10 June 2006, p 62.



- Consequences of aviation taxes: Extra ticket charges, potential fuel taxes (both proposed as responses to aviation carbon emissions), a 2006 tax on tickets to fund medical aid and assistance for the developing world, and the cumulative effect of such taxes and soaring kerosene costs on airlines and travellers
- Consequences of rising jet fuel costs: The possibility of long-term higher oil prices and how, over the longer term, the aviation industry deals with ongoing high jet fuel prices. What major restructuring will take place, and how?
- Given the high price of jet fuel, which has risen faster than crude oil because of high demand and bottlenecks in refining, how viable are alternative jet fuels, such as biodiesel, hydrogen, synthetics and ethanol?⁶ Given the myriad obstacles to the production, transportation and use of such alternative jet fuels, is research energy better deployed toward aircraft technological developments aimed at making aircraft more fuel efficient (and more environmentally friendly)?

Liberalisation

- Liberalisation of international air services, in particular the conditions necessary for increasing plurilateral and multilateral liberal or expanded “open skies” air services agreements, further reducing barriers to trade in international air services. What are the implications of liberalisation including not simply traffic rights but also airline ownership and control provisions, “rights of establishment” and market access (that is, the further reduction of trade barriers)?
- Economic globalisation and the liberalisation of air services: Could - or should - aviation be more comprehensively included in the General Agreement on Trade in Services (GATS)⁷ (beyond the Doha Round, which largely ignored trade in services), with its objective of promoting trade and development through progressive liberalisation? This question could be considered in light of (a) most-favoured nation (MFN) treatment, a fundamental principle of the GATS framework which could, if applied to air transport, hold back air services liberalisation between certain States; and (b) the large number of empirical studies which suggest that “service sector liberalization has the potential to deliver larger gains than agricultural or manufactured goods. The estimates are large because protection levels are high in the service sector [including aviation], and services make up a large (and growing) share of world trade [including aviation]”⁸

⁶ See Allison Linn, “Researchers work to make alternative jet fuel affordable,” *The Philadelphia Inquirer*, 19 June 2006 (<http://www.philly.com>).

⁷ The GATS Annex on Air Transport Services includes only three relatively minor or ancillary services – aircraft repair and maintenance, selling and marketing of air transport services, and computer reservation system services – and excludes from coverage measures affecting air traffic rights and services directly related to the exercise of such rights (“traffic rights” defined in the widest possible sense).

⁸ Joseph E Stiglitz and Andrew Charlton, *Fair Trade For All: How Trade Can Promote Development* (Oxford, Oxford University Press, 2005), p 117.



Aviation security and the terror threat

- What are the consequences for the aviation industry of a changing aviation security environment, particularly changes in response to the increasing threat posed by terror attacks? To what extent is carrier profitability affected by increased security measures and to what extent do increased security measures, in turn, encourage developments which further affect the profitability of mainline carriers?

Aviation governance

- How effective are the major aviation NGOs - the International Air Transport Association (IATA), for example, with regard to airlines - and State-based organisations such as the International Civil Aviation Organisation (ICAO), the specialised UN aviation agency, in addressing the challenges which the aviation industry faces in the 21st century? How can these challenges (especially environmental ones) be more effectively and more quickly addressed?
- Given the pressing global and multi-faceted problems confronting the aviation industry, the need to create an international forum in which all interests – those of governments, airlines, manufacturers, insurers, oil corporations, research organisations, passenger and specific-focus groups – can together discuss and address such problems (particularly those relating to the environment) in a way not presently provided for through existing fora or frameworks

Aviation is a unique, global industry, yet one with distinct regional and State-by-State differences, and real differences on critical issues affecting the aviation industry amongst industry stakeholders. Such differences and fractures make the resolution of industry issues - which, more than ever, require consistent, industry-wide responses - difficult

- What is the appropriate role of government in the regulation of international aviation? Should government “go further ... [and] scrap ownership rules and retreat from anything but technical [security] and safety matters”?⁹ The trans-Atlantic terror plot in August 2006 reinforces the vital role government plays in security matters; what aviation matters are properly not within its purview?
- What are the possible effects and consequences of increasing focus on the aviation industry – airlines, specifically - by anti-trust regulators and ongoing investigations in multiple jurisdictions (the United States, the United Kingdom, Australia, New Zealand, South Africa, and throughout Europe and Asia)?¹⁰

⁹ “The airline industry: A surprising boom,” *The Economist*, 12 November 2005, p 12.

¹⁰ Doug Cameron, “Airlines face passenger surcharge probe,” *The Financial Times*, 24-25 June 2006; “Clip their wings: The airline industry has been protected for far too long,” *The Financial Times*, 24-25 June 2006 (editorial); “Airline Oligopoly,” *The Australian Financial Review*, 24-25 June 2006.



Further, what are the possible effects of either full or all-but-full liberalisation on the industry in terms of anti-trust/competition issues?

- The Institute as a model for other industry-specific research initiatives or projects which, given the nature of the specific industry – and issues or problems that industry faces – require a collaborative, multidisciplinary approach

Possible contributions of the international aviation industry

- The potential for the aviation industry worldwide to play a significant role in development aid and disaster relief in terms of transport, logistics and provision of supplies, personnel and cargo (for example). How could an integrated, coordinated approach to these issues by the aviation industry (governments, airlines, airports and suppliers to aviation together) be developed and implemented, and how could such assistance possibly replace, or be more effective than, any proposed ticket tax to fund medical aid to the developing world?
- The role the aviation industry (and airlines in particular) could play in relief operations in the event of an avian flu pandemic?¹¹ Research has focussed to date on the implications of such a flu pandemic for air transport rather than how aviation could assist in dealing with it

¹¹ Ruwantissa Abeyratne, "Implications of an Avian Flu Pandemic for Air Transport," (2006) 31 *Air & Space Law* 3, pp 159-171.



2. VISION AND STRATEGIC GOALS

The Institute aims to:

- Build integrated research teams and a global aviation research community unencumbered by geographic, disciplinary or intellectual boundaries
- Revolutionise the way research solutions to aviation problems and issues are found and disseminated
- Produce better, innovative and sustainable solutions to the problems facing the aviation industry
- Promote knowledge exchange and transfer on a worldwide basis between industry, government and academia
- Become the world-leader in aviation studies and research

No other research institute is designed to ask and answer the questions we want to address. We believe that ideas and perspectives from other disciplines can help us ask and answer those questions.

We believe that talent expands possibilities.



3. WHY PROVIDE FINANCIAL SUPPORT?

An international alliance of corporations and individuals can, through financial and other support of the Institute, change aviation research and the future of aviation itself.

Such an alliance can make ideas happen.

The benefits and advantages for donors in providing financial support for the Institute, and being part of such an alliance, are as follows:

- **public recognition and evidence of the donor's commitment and contribution to research excellence**, especially in areas of vital global concern such as the environment and climate change
- involvement in building a not-for-profit organisation and a unique and innovative research institute, the work product of which could **change the way a global industry does business**
- provide **another form of participation in and exposure to the Asia Pacific**, the fastest growing aviation region in the world
- through the global reach and research of the Institute, **access to non-industry specific global opportunities**
- **access to the highest quality aviation research being produced anywhere**, and updates as that research is being undertaken
- **input** into that research in terms of focus and specific issues to be addressed
- a **different view of or perspective** on issues and problems facing the aviation industry - that is, a different view or perspective to that available in-house or, indeed, generally - thereby increasing opportunities to more effectively assist donors' existing clients
- assistance in **addressing industry-specific challenges** which the changes and developments outlined in this document represent
- **increased donor profile**: donor names would be attached to all publications (whether in hard copy or online) and conference programmes of the Institute, thereby increasing opportunities to attract new clients



- access to free-of-charge research monographs, working papers, research reports, conference papers and briefing notes
- the opportunity to **participate in Institute conferences, round table discussions and briefings** free-of-charge
- donor-only **access to the Institute's global monitoring** of aviation news, developments (including market developments) and trends - and, thus, the advantage of access to almost real-time aviation news



4. RATIONALE FOR THE ESTABLISHMENT OF THE INSTITUTE

This part outlines significant aviation developments, trends and problems which, when taken together, demonstrate the need for an international institute for aviation studies such as the one we propose.

It also outlines the strong rationale for the establishment of the Institute in the Asia Pacific.

The Institute represents a unique research concept. No such not-for-profit research institute exists today. The conclusion to this part explains why.

(a) Significant aviation developments

The following developments and trends, arranged by major themes, have global implications for all sectors of the aviation industry and for government.

Aviation and the environment

(i) Aircraft carbon emissions and aviation's growing contribution to climate change

Environmental concerns regarding aircraft carbon emissions and aviation's contribution to climate change are – and will continue to be – the most contentious issues with which the aviation industry has to deal.

The climate impacts of aviation are well known. Against a background of significant growth in air travel and aviation markets, and as a result of increasing awareness on the part of governments and the public with regard to climate change and its possible consequences,¹² pressure is being placed on the aviation industry, and airlines in particular, to reduce aviation carbon emissions.¹³

¹² See Jim Hansen, "The Threat to the Planet," *The New York Review*, 13 July 2006, pp 12-16; Elizabeth Kolbert, *Field Notes From a Catastrophe: Man, Nature, and Climate Change* (New York, Bloomsbury 2006); Eugene Linden, *The Winds of Change: Climate, Weather, and the Destruction of Civilizations* (New York, Simon and Schuster, 2006); Tim Flannery, *The Weather Makers: The History and Future Impact of Climate Change* (Melbourne, Text Publishing, 2005); "The heat is on: A survey of climate change," *The Economist*, 9 September 2006; Jared Diamond, *Collapse: How Societies Choose to Fail or Succeed* (New York, Viking, 2005).

¹³ It should be noted that, while *domestic* aviation is subject to emission targets under the Kyoto Protocol to the UN Framework Convention on Climate Change, *international* aviation is not.



The Intergovernmental Panel on Climate Change (IPCC) has concluded that, last decade, aviation contributed about 3.5% of the anthropogenic forcing¹⁴ of the climate, such percentage excluding the effect of contrail and aviation-induced cirrus.¹⁵ That effect, according to a report by a UK Royal Commission, may be three to four times that of the radiative forcing resulting from aircraft carbon emissions,¹⁶ and carbon emissions were forecast to grow significantly. It appears that radiative forcing resulting from aircraft may be twice that of land-based use of hydrocarbon fuels¹⁷ - that is, high altitude emissions may be disproportionately damaging to the environment.¹⁸ Further, as the IPCC also concludes, by 2050 up to 15% of anthropogenic forcing of climate change may be caused by aviation.¹⁹

As noted in 2006 in written evidence before a committee of the House of Lords – as a regional example - carbon emissions from the international aviation of the EU in the period 1990-2003 rose by 73%.²⁰ And a 2005 study conducted by the Tyndall Centre for Climate Change Research found that, absent any check, aviation would account for all of the EU's carbon budget by 2045.²¹

An MIT report to the US Congress on aviation and the environment stated that

There is a compelling and urgent need to address the environmental effects of air transportation ... Reducing significant aviation environmental impacts in absolute terms is a challenging goal, especially when considered in light of the projected growth in aviation traffic ... As a result of growth in air

¹⁴ Human-induced, resulting from human activities, or “[f]orcing due to human, rather than natural, factors. Such factors include increased greenhouse gas concentrations associated with fossil fuel burning, sulphate aerosols produced as an industrial by-product, human-induced changes in land surface properties among other things.” <http://www.realclimate.org/index.php?p=39>.

¹⁵ Intergovernmental Panel on Climate Change, *Special Report on Aviation and the Global Atmosphere*, eds Joyce E Penner et al (Cambridge, Cambridge University Press, 1999): <http://www.grida.no/climate/ipcc/aviation/index.htm>.

¹⁶ Royal Commission on Environmental Pollution, *The Environmental Effects of Civil Aircraft in Flight* (London, The Stationery Office, 2002): <http://www.rcep.org.uk/avreport.htm> CEP 2002 A 2006 study by the UK's Reading University's meteorology department which examines the effects of aircraft condensation trails (contrails) also suggests that aircraft flying at night can have a greater impact on the environment – in the region studied, night flights accounted for 25% of all aircraft movements but generated at least 60% of climate warming associated with contrails: Nicola Stuber et al, “The importance of the diurnal and annual cycle of air traffic for contrail radiative forcing,” *Nature*, 441, 15 June 2006, pp 864-867. and see Aimee Turner, “Night flights under green scrutiny,” *Flight International*, 20-26 June 2006, p 12.

¹⁷ Intergovernmental Panel on Climate Change, *supra*, note 15.

¹⁸ “Aircraft emissions: The sky's the limit,” *The Economist*, 8 June 2006. Aviation pollution is exacerbated because aircraft burn vast amounts of kerosene fuel at high altitudes.

¹⁹ Intergovernmental Panel on Climate Change, *supra*, note 15.

²⁰ House of Lords, European Union Committee, 21st Report of Session 2005-06, *Including the Aviation Sector in the European Union Emissions Trading Scheme* (London, The Stationery Office, 9 February 2006), p 15.

²¹ If the EU aims to stabilize its carbon emissions at 450 parts per million; citing the Tyndall Centre for Climate Change Research, Manchester University (<http://www.tyndall.ac.uk/index.shtml>). See also the Tyndall Centre for Climate Change Research, *Decarbonising the UK: Energy for a Climate Conscious Future* (Manchester, Tyndall Centre 2005), pp 50-53 (http://tyndall.ac.uk/media/news/tyndall_decarbonising_the_uk.pdf).



transportation, emissions of many pollutants from aviation activity are increasing against a background of reductions from many other sources.²²

Air travel, then, is a rapidly growing source of greenhouse gases.²³ The House of Lords committee concluded that, absent public policy changes, “passenger air travel and air-freight will continue to increase, and with it a significant growth in CO₂ emissions.”²⁴

With forecasts by the International Air Transport Association (IATA),²⁵ Boeing and Airbus that there will be almost unprecedented growth in airline traffic and aircraft numbers, and with reports that aviation emissions are growing faster than in any other industry,²⁶ the climate impacts of aviation and demands for reductions in aviation carbon emissions will only increase from 2006’s already high level.

(ii) Dealing with the impact of aviation on climate change, including proposals for either an aviation emissions trading scheme (ETS) or an ETS which includes aviation, has become a significant industry issue

In a July 2006 resolution on reducing the climate change impact of aviation, the European Parliament (EP) approved by a substantial majority setting up a separate – or closed – aviation-specific emissions trading system as a preliminary

²² I A Waitz et al, *Aviation and the Environment: A National Vision Statement, Framework for Goals and Recommended Actions* (Cambridge, Massachusetts Institute of Technology, 2004), pp 3, 4, 11.

²³ Environmentalists believe that “aviation is the fastest growing cause of carbon dioxide emissions and the biggest cause of climate change on the planet.” Tony Juniper, “Aviation is fastest-growing source of CO₂ emissions,” *The Independent*, 28 May 2005; Catherine Murphy, “The real cost of those lower airline fares,” *Irish Independent*, 10 June 2005.

²⁴ House of Lords, European Union Committee, *supra*, note 20, p 16.

²⁵ IATA forecasts a global average annual growth rate (AAGR) of 5.6% for international passengers and 6.3% for international freight for the period 2005-2009 (<http://www.iata.org/pressroom/pr/2005-10-31-01.htm>), revised upwards in 2006 for the Asia Pacific to 6.5% and 8.5% respectively (<http://www.iata.org/pressroom/speeches/2006-02-20-01.htm>). IATA is also concerned to dispel what it views as myths with regard to aviation and the environment – amongst others, that air transport is a major source of greenhouse gas emissions, air transport is the most polluting form of transport, air transport is getting a free ride by not paying tax on fuel, and air transport growth is not sustainable: IATA, “Aviation and the Environment – Killing Myths and Setting the Agenda,” 25 April 2006 (<http://www.iata.org/pressroom/pr/2006-04-25-02.htm>).

²⁶ As reported by the European Commission (“Airlines seek to downplay global warming impact of aviation,” <http://www.EurActiv.com>, 26 April 2006), together with its concern that such growth “risk[s] undermining progress achieved through emissions cuts in other areas of the economy.” See also Robert Wall and Douglas Barrie, “Dishing the dirt - Aviation industry’s green record: Environmental progress or reckless pollution?,” *Aviation Week & Space Technology*, 17 July 2006, pp 128-132.



step prior to possible inclusion of aviation in the EU's general ETS.²⁷ The scheme should initially cover

all flights to and from any EU airport (if possible also intercontinental flights transiting through EU air space), irrespective of the country of origin of the airline concerned.²⁸

The resolution is not legally binding but it could influence legislation being prepared by the European Commission to include airlines in the EU's ETS,²⁹ such inclusion proposed by the Commission in late 2005.³⁰ A formal legislative proposal will be tabled after July 2006 and refined by industry and EU member state experts.

The EP also voted in favour of the "immediate introduction" of a tax on jet fuel for intra-EU flights.³¹

While the international airline industry and its trade association are in general less hostile to the idea of emissions trading than to other policy options such as fuel and

²⁷ European Parliament resolution on reducing the climate change impact of aviation (2005/2249 (INI)). The resolution:

"22.Stresses that the environmental effectiveness of any emissions trading scheme will depend on it having sufficiently broad geographical scope; a rigorous cap; full auctioning of initial allocation; the technological level and early actions taken into account in the allocation; and addressing full climate impact;

23.Asks the Commission to present immediately an impact assessment on the specific parameters of its design proposals, e.g. level of cap for aviation, compliance, choice of participating entity (aircraft operators, airlines or airports), and to present proposals to ensure that the EU ETS will be applicable to airlines from outside the European Union; [and]

24.Proposes the introduction of a separate dedicated scheme for aviation emissions, recognising that, due to the lack of binding commitments for international aviation emissions under the UNFCCC and the Kyoto Protocol, the aviation sector would be unable to actually sell into the ETS ...". Texts adopted by Parliament, Tuesday 4 July 2006–Strasbourg, *Reducing the climate change impact of aviation* (<http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P6-TA-2006-0296+0+DOC+XML+V0//EN&language=EN>).

The resolution also acknowledges the difficulties of selling into the EU ETS and restrictions associated with the proposed preliminary or pilot phase.

²⁸ *Supra*, paragraph 31.

²⁹ Ben Webster, "Green tax on EU flights to double cheap fares," *The Times*, 6 July 2006; Sarah Laitner and Andrew Bounds, "Airlines come under new pressure to cut emissions," *Financial Times*, 5 July 2006.

³⁰ Perry Flint, "EC backs emissions trading for airlines instead of tax," *ATW Daily News*, 28 September 2005; "EU considers cap on air travel emissions," <http://www.EurActiv.com>, 27 September 2005; Victoria Knight, "EU Supports Inclusion of Airlines In Emissions-Trading Initiative," *The Wall Street Journal*, 28 September 2005; and see also Cathy Buyck, "EU ministers advocate emissions trading," *ATW Daily News*, 5 December 2005: <http://www.atwonline.com/news/story.html?storyID=3289>.

³¹ The European Parliament "[f]ully endorses the Commission's intention to pursue the introduction of kerosene taxes, and urges it to begin immediately by requiring a tax on all domestic and intra-EU flights (with the possibility to exempt all carriers on routes on which non-EU carriers operate); calls on the Commission to propose arrangements for their worldwide introduction." Texts adopted by Parliament, Tuesday 4 July 2006–Strasbourg, "Reducing the climate change impact of aviation," *supra*, note 27.



ticket taxes - although degrees of difference do exist between airlines³² - reaction to the EP proposal was nonetheless direct. The International Air Carrier Association (IACA) said that

[a]ny approach to aviation and the environment which calls for the simultaneous introduction of taxes on aviation fuel, VAT on airline tickets, environmental charges at airports and emissions trading scheme (ETS) totally ignores economic realities. Moreover the recommendation to set up a separate ETS scheme for aviation is totally unrealistic.³³

Lufthansa's head of environmental issues said prior to the resolution of the EP that the inclusion of air transport in the EU's ETS would have limited benefit, would represent an "unacceptable risk" for airlines and would cost the industry at least €500 million per year, if not much more.³⁴

Further, just as differences exist between airlines, disagreement on aviation emissions trading exists between States, and particularly between the EU and the US. The EU has proposed that all airlines departing EU airports, regardless of nationality, be included in any aviation-inclusive ETS.³⁵ Such proposal is opposed by the United States on principle and on international law and competition grounds. The EU and the US fundamentally disagree over emissions trading schemes and climate change in general,³⁶ and the US believes that such a regional scheme with purported application to non-regional airlines may violate the Chicago Convention, the regulatory cornerstone of civil aviation and part of a complex regulatory system.³⁷

Unlike domestic flights, carbon emissions from international flights are not included in targets established by the Kyoto Protocol to the United Nations Framework Convention on Climate Change, in part due to difficulties associated with target calculation, allocation and monitoring. Rather, responsibility for limiting or reducing

³² See "Climate change and aviation," <http://www.Euractiv.com>, 9 July 2006: <http://www.euractiv.com/en/sustainability/climate-change-aviation/article-139728>; Vicky Karantzavelou, "EU must get emissions trading right says BA's executive," *traveldailynews.com*, 11 April 2006: http://www.traveldailynews.com/new.asp?newid=28978&subcategory_id=53; and the International Air Transport Association (IATA), "Aviation and the Environment – Killing Myths and Setting the Agenda," 25 April 2006. For IATA CEO Giovanni Bisignani, "[e]missions trading may be a part of the solution. But it must be a global solution agreed through ICAO. We are in the process to achieve a result for the 2007 Assembly. There is no time to get distracted with local or regional schemes that will be less effective than a global solution:" <http://www.iata.org/pressroom/pr/2006-04-25-02.htm>.

³³ "EU Parliament backs CO2 cap on air traffic," <http://www.EurActiv.com>, 5 July 2006: <http://www.wbcsd.org/plugins/DocSearch/details.asp?type=DocDet&ObjectId=MTk1OTA>.

³⁴ Helen Massey-Beresford, "Lufthansa warns of "little benefit" of aviation emissions trading," *Flight International*, 26 May 2006.

³⁵ Knight, *supra*, note 30.

³⁶ Douglas Barrie and Robert Wall, "Charged Environment," *Aviation Week & Space Technology*, 7 November 2005, p 90.

³⁷ Robert Wall, "Airing Grievances," *Aviation Week & Space Technology*, 5 December 2005, p 50; Justin Wastnage, "USA warns over EU emission plan," *Flight International*, 8-14 November 2005, p 13.



greenhouse gases is left within the purview of States, working through the International Civil Aviation Organisation (ICAO), the specialised UN aviation agency.³⁸ For the US, then, and for other States,³⁹ ICAO is the appropriate forum in which to examine the issue of an aviation emissions trading scheme. While ICAO previously decided against a global, uniform scheme, it will revisit the issue of emissions trading and “present ideas on possible implementation” in 2007.⁴⁰ For the EU and others, this process is moving too slowly and causes “frustration and tension.”⁴¹ Moreover, there appears to be a risk that the ICAO general assembly meeting in 2007 “could fail to produce the “efficient and effective” policy on emissions charges the industry needs.”⁴²

Other options in addition to emissions trading schemes exist for dealing with the impact of aviation on climate change and, like such schemes, each is attended by difficulties. *Airline carbon offset schemes*, whereby passengers volunteer to offset the carbon emissions created by their flight by making a donation for specific projects that assist in reducing emissions elsewhere,⁴³ for example, while useful, do not represent a long-term or comprehensive solution to sufficiently reducing aviation carbon emissions. *Environmental taxes on air travel* may not materially affect the public’s desire to fly, and they face problems in terms of wide geographic application and legal certainty. *Improvements in air transport technology and infrastructure, and more efficient operational practices*, are clearly useful but whether they represent a comprehensive solution to dealing with the impact of aviation on climate change is questionable. This applies also to *more efficient air traffic control practices and reforms*, notwithstanding the reduction in fuel consumption and aircraft emissions that such practices and reforms may represent. The use of *route charging systems to levy emissions charges* is also being examined⁴⁴ but, again, difficulties also attend such a charging regime.

³⁸ Article 2.2 of the Kyoto Protocol to the United Nations Framework Convention on Climate Change.
³⁹ Japan and Canada, for example, and the developing world: Robert Wall, “Time to Talk,” *Aviation Week & Space Technology*, 1 May 2006, p 40.
⁴⁰ Wall, *supra*, note 37.
⁴¹ Barrie and Wall, *supra*, note 36.
⁴² Wall, *supra*, note 37.
⁴³ See, for example, “British Airways launch carbon offset scheme,” <http://www.embren.net/British-Airways-launch-Carbon-Offset-Scheme>, 13 September 2005.
⁴⁴ By Eurocontrol; its central route charges office states that “As there appears to be strong resistance by various aviation and non aviation parties against this intention [emissions trading], the application of alternative market-based measures, including environmental revenue-neutral or revenue-generating charges cannot be discarded.” Julian Moxon, “Eurocontrol eyes green tax options,” *Flight International*, 29 August - 4 September 2006, p 5



And, with regard to a *tax on aviation fuel* (see (v) below), under the multilateral Chicago Convention international air services are exempt from fuel taxes. The difficulties associated with the implementation of any fuel tax, including the necessity of renegotiating government-to-government bilateral air services agreements, the length of time required to implement such tax and resistance on the part of some States to a fuel tax may not make such a tax feasible.

The International Energy Agency has stated that emissions trading “will remain at the core of any future international agreement to combat climate change.”⁴⁵ Given the above-mentioned developments, together with the conclusions of a number of recent studies,⁴⁶ it seems clear that the focus is on emissions trading schemes as a means by which to deal with the climate change impact of aviation carbon emissions. Whether such schemes are regional or global, or aviation inclusive or exclusive, a myriad of problems – those of politics, economics, law, geography and engineering, for example – attend them. For example, any EU inclusion of international aviation in its ETS would exceed the parameters of the Kyoto Protocol; carbon emissions from international flights are not included in targets established by that Protocol. Design issues include, in addition to interplay with the Kyoto Protocol, coverage of climate impacts, geographic scope, allocation rules, trading entities,⁴⁷ allowance allocation method, and monitoring method.

(iii) Increased focus on the aviation industry’s management of its carbon exposure, and business strategies for managing that exposure

It was said earlier that there is growing awareness on the part of governments and the public with regard to climate change and its possible consequences. As a result, demands are now being placed on corporations that obviously generate greenhouse gases such as carbon dioxide, or those, such as airlines, that use products – aircraft – which generate carbon dioxide, to address their liability for carbon emissions. Pressure is also being brought by shareholders, concerned - as McKinsey notes - “that over the next 5 to 15 years the way a company manages its

⁴⁵ International Energy Agency, *Act Locally, Trade Globally: Emissions Trading for Climate Policy*, 2006: <http://www.iea.org/bookshop/add.aspx?id=206>.

⁴⁶ For example, ICF Consulting, *Including Aviation into the EU ETS: Impact on EU allowance prices* (London, ICF Consulting, 2006), study commissioned by the UK DEFRA and DfT; CE Delft, *Giving wings to emissions trading: Inclusion of aviation under the European Emission Trading System (ETS) – Design and impacts*, eds Ron Wit et al (Delft, 2005), study commissioned by the European Commission, which concluded that “emissions trading is a policy option worthy of consideration alongside other instruments for tackling aviation climate impacts ... The system can be designed to encompass non-European carriers too, thereby minimizing economic distortions among carriers. Introducing emissions trading for the aviation sector does not appear to pose many challenges beyond those already encountered in the context of the current EU ETS;” Centre for European Policy Studies (CEPS), *Reviewing the EU Emissions Trading Scheme (Part II)*(Brussels, CEPS, 2006); Wuppertal Institute for Climate, Environment and Energy, *Linking Schemes: Potential Impacts of Linking the European Union Emissions Trading System with Emerging Carbon Markets in other Countries*, Conference Papers (Brussels, Wuppertal Institute, 2006); House of Lords, European Union Committee, *supra*, note 20; and International Energy Agency, *supra*.

⁴⁷ Aircraft operators, airports, fuel suppliers, air traffic management providers, aircraft manufacturers.



carbon exposure could create or destroy shareholder value.⁴⁸ Airlines, aircraft manufacturers and lessors are obvious targets for such demands.⁴⁹

Moreover, management by corporations of environmental risks and issues such as carbon emissions now increasingly forms a part of investor and business analysis of those corporations. Goldman Sachs notes that

companies' management of environmental ... risks and opportunities may affect corporate performance. We further believe that the management of risks and opportunities arising from climate change and its regulation will be particularly significant and will garner increasing attention from capital market participants.⁵⁰

Methodologies are also being developed for analysing shareholder value at risk from climate change.⁵¹ Bankers, insurers and institutional investors "are now demanding that companies in which they hold stakes (or insure) add up risks related to climate change and alter their business plans accordingly."⁵² And the brand value of industries such as aviation – 50%, according to one study⁵³ – may be at risk if action on climate change is not taken.⁵⁴

Ceres⁵⁵ and the World Resources Institute have concluded that "[c]ompanies that take positive and proactive measures to mitigate climate risk may create a competitive advantage for themselves relative to the rest of their sector," such measures including corporate strategy to respond to regulatory action.⁵⁶ Indeed, more corporations are developing strategies and policies "to improve their competitive positioning on the climate change issue."⁵⁷

As the carbon emissions issue or problem for the aviation industry is, on one view, the most contentious matter with which the industry has to deal, one immediate issue is whether the industry, and airlines in particular, can gain competitive advantage by addressing various regulatory proposals such as

⁴⁸ Christoph Grobbel et al, "Preparing for a low-carbon future," *The McKinsey Quarterly*, No 4, 2004.

⁴⁹ See Wall and Barrie, *supra*, note 26.

⁵⁰ Goldman Sachs, "Our Business and the Environment," 2006: http://www.gs.com/our_firm/our_culture/social_responsibility/environmental_policy_framework/articles/environmental_policy_framework_051116102823.html; and see Cheryl Dahle, "The Greening of Goldman," *Fast Company*, June 2006, p 40.

⁵¹ For example, Carbon Trust and Cairneagle Associates, *Climate change and shareholder value* (London, The Carbon Trust, 2006).

⁵² Adam Aston et al, "The Race Against Climate Change," *BusinessWeek*, 12 December 2005.

⁵³ Carbon Trust and Lippincott Mercer, *Brand value at risk from climate change* (London, The Carbon Trust, 2005).

⁵⁴ "Companies and climate change: Can business be cool?," *The Economist*, 10 June 2006, pp 61-62.

⁵⁵ A coalition of investment funds, environmental funds, environmental organisations and public interest groups.

⁵⁶ Ceres and World Resources Institute, *Questions and Answers for Investors on Climate Change*, Fred Wellington et al (Washington, DC, Ceres and World Resources Institute, December 2004).

⁵⁷ World Resources Institute, "New WRI, Ceres report highlights investor tools for assessing climate risk," News release, 2 June 2005: <http://capitalmarkets.wri.org>.



emissions trading schemes and various forms of taxes before possibly being required by government to participate in such schemes or collect such taxes - the “value of anticipation.” Corporations “with a head start ... will have the credibility to participate in, or even shape, the debate over how to further reduce emissions.”⁵⁸

More particularly, taking action before being required to do so may provide airlines with some control over any process of ETS inclusion, and may enable airlines to have input into relevant decision-making – design of any ETS, for example. It would, as a result, produce certainty, and

[u]ncertainty about future regulations is the biggest risk in the carbon equation: executives need long-term assurances on credits and emission levels to factor them into plans for expensive capital investments.⁵⁹

(iv) Aircraft technological developments

Environmental concerns (specifically aircraft emissions), significant and possibly long-term increases in the price of crude oil, and disproportionate rises in jet fuel prices as against crude oil prices, are driving revolutionary aircraft technological developments and research.

Airbus’ A380 is the largest passenger airplane built to date, and will carry more passengers further than any airplane before it. It will have “around 13% lower fuel burn than its closest competitor”⁶⁰ and “is the first long-haul aircraft to consume less than three liters of fuel per passenger over 100km, a rate comparable to that of a fuel-efficient car.”⁶¹ Airbus states that the A380 is “the sole aircraft employing [composites] in the centre wing box and rear fuselage ... with increased use of carbon fibre reinforced plastic, and the first application of glass fibre-aluminium laminate on a civil airliner.”⁶²

Boeing’s 787, designed from scratch,⁶³ is the first large commercial jetliner with a composite fuselage; almost the entire airframe is made of composites – carbon-

⁵⁸ Todd S Thompson, “Green is Good for Business,” *BusinessWeek*, 8 May 2006, p 124.

⁵⁹ Grobbel et al, *supra*, note 48.

⁶⁰ Statistics at the Institute of Environmental Management and Assessment’s website (“Airbus’s A380-Environmentally Better?.” <http://www.iema.net/news/envnews?cat=223&aid=4975>).

⁶¹ James Keighley, “Products and Profits: Airbus A380,” *The Wall Street Journal*, 1 June 2005.

⁶² <http://www.airbus.com/en/corporate/innovation/>. Note, however, Boeing’s claim in its July 2006 *Market Overview* (Current Market Outlook Presentation), Farnborough Air Show, that “[t]he technology breakthroughs of the 787 now make it possible for the smaller airplanes to have lower fuel consumption per seat than today’s significantly larger airplanes. For example, the 787-9 consumes about 267 liters per seat while the much larger A380 consumes over 31 percent more at 351 liters per seat.” http://www.boeing.com/nosearch/exec_pres/cmo.pdf.

⁶³ J Lynn Lusford and Daniel Michaels, “After Four Years in the Rear, Boeing Is Set to Jet Past Airbus,” *The Wall Street Journal*, 10 June 2005. The 787 is a mid-size aircraft with a big jet range



fibre reinforced plastic⁶⁴ - and, as composites “weigh half as much as aluminium, but are stronger so that wings and other parts can be made slimmer and more aerodynamic,”⁶⁵ its “radical” lightweight design⁶⁶ makes it far more fuel efficient than other jets.⁶⁷ Indeed, the 787 “promises to burn 20% less fuel than conventional planes.”⁶⁸

The production process and supply chain for the 787 may be as innovative as the aircraft itself. Boeing has involved important suppliers and manufacturers,⁶⁹ located around the world, in the 787’s design, build and support process.⁷⁰ Such parties, often competitors of Boeing, will provide large completed structures to be assembled in Washington State “using a single nose-to-tail pulse production line.”⁷¹ In the context of the 787 this has led to Boeing being termed an “essential elements company,” dealing itself with design and integration tasks and relying on outside companies for everything else.⁷² Such an approach enables Boeing to access the best talent and hold down production costs.

It has been argued, however, that such “extreme” outsourcing leaves Boeing

highly dependent on a far-flung supply chain that includes 43 “top-tier” suppliers on three continents. It is the first time Boeing has ever outsourced the most critical areas of the plane, the wing and the fuselage ... The [787] Dreamliner’s mounting challenges call into question whether such a radical business model can succeed, and whether the advantages of

and, therefore, like the A380, attractive to a number of international Asia Pacific carriers. Although not a direct competitor of the A380 in terms of capacity, it represents Boeing’s vision of international air travel as one in which passengers prefer to fly “point-to-point” rather than having to change planes at busy hub airports (Agence France-Presse, “Paris Air Show points to flight paths for aviation’s future,” *USA Today*, 20 June 2005). Boeing believes that demand for point-to-point service will increase and traffic on major international routes will diminish as more routes are introduced.

⁶⁴ A composite is formed when two or more materials with very different properties are combined together. Demand for composites, and carbon-fibre in particular, is anticipated to increase by 50% over the next 5 to 10 years; composites “have gained ground in aerospace because of their light weight, high strength, fatigue resistance and the ability to use manufacturing processes that can produce integrated structures with reduced parts count and assembly time:” Rob Coppinger, “Making Light,” *Flight International*, 20-26 June 2006.

⁶⁵ Carol Matlock, “Airbus has a bad case of jet lag,” *BusinessWeek*, 29 May 2006, p 40.

⁶⁶ Stanley Holmes, “The 787 encounters turbulence,” *BusinessWeek*, 19 June 2006, p 38.

⁶⁷ See James Wallace, “New 787 plants a boon for economy,” *Seattle Post-Intelligencer*, 29 June 2006.

⁶⁸ Matlock, *supra*, note 65.

⁶⁹ About 40 to date: Michael Mecham, “The Flat-Earth Airplane,” *Aviation Week & Space Technology*, 3 July 2006, p 45.

⁷⁰ Michael Mecham, “Heady days: By choosing the 787-9, Singapore Airlines puts more pressure on Boeing’s supply chain,” *Aviation Week & Space Technology*, 19 June 2006, p 25, and see, generally, Guy Norris, “Dreamliner takes shape,” *Flight International*, 11-17 July 2006, pp 70-78.

⁷¹ *Supra*.

⁷² Mecham, *supra*, note 69.



collaboration on such a scale are outweighed by the loss of logistical and design control.⁷³

The 787 is Boeing's "flat-Earth" aircraft, reflecting the world as "one giant global supply chain."⁷⁴

Research being prioritised by Boeing in 2006 also focuses on low-cost aircraft and aircraft that use less fuel and are environmentally friendly (for example, an aircraft with main wings swept forward, not back, and miniature wings on the front), with work already commenced with engine companies on propulsion options.⁷⁵ Further, in terms of reducing aircraft emissions, Boeing is working on replacing auxiliary power units with fuel cells, although commercial aircraft application is more than a decade away.⁷⁶ Airbus also plans to begin flight testing fuel cell technology in 2007, and reports suggest that Boeing and Airbus may cooperate on this and other technological and environmentally-friendly initiatives.⁷⁷

Nonetheless, in terms of "greener" flying, and while

Boeing and Airbus have technology development efforts underway to address greening demands ... they are not headline-making initiatives that either is particularly eager to discuss. With billions invested in current aircraft technology design, there's little appetite to trumpet early research into unorthodox approaches that often are radically different from current configurations.⁷⁸

In terms of reducing aircraft emissions other aircraft technological research includes flying wing designs, lightweight materials, water injection in engines and hybrid laminar flow control.⁷⁹ Research by engine manufacturers also focuses on technology that reduces nitrogen oxides emissions, including emissions

⁷³ Holmes, *supra*, note 66, p 39. For Boeing, though, "the idea of sticking to our core competencies – design, engineering, systems integration – and finding partners to help with the higher-level components is a model we like" ("Only the paranoid survive," interview with W James McNerney, Jr," *Aviation Week & Space Technology*, 26 June 2006, p 48.

⁷⁴ Mecham, *supra*, note 69. On "flat-Earth" issues see Thomas L Friedman, *The World is Flat: A Brief History of the Twenty-First Century* (New York, Farrar, Straus and Giroux, 2005).

⁷⁵ Dominic Gates, "Clean engines, wings that fold: Boeing dreams of futuristic jets," *The Seattle Times*, 5 May 2006.

⁷⁶ Douglas Barrie, "Cell Development," *Aviation Week & Space Technology*, 1 May 2006, p 44.

⁷⁷ Robert Wall, "Partners on Power? Airbus and Boeing mull cooperation on fuel cells for future aircraft," *Aviation Week & Space Technology*, 1 May 2006, p 41.

⁷⁸ Robert Wall, "Cleaner from Cradle to Grave," *Aviation Week & Space Technology*, 17 July 2006, p 134.

⁷⁹ See "New ideas to reduce emissions," *Flight International*, 8-14 November 2006, p 25; and Greener by Design, *Mitigating the Environmental Impact of Aviation: Opportunities and Priorities* (London, Royal Aeronautical Society, July 2005; <http://www.greenerbydesign.org.uk/>).



combustor technology, the commercial application of which may likely be seen in the next generation of narrow body Airbus and Boeing passenger aircraft.⁸⁰

(v) New forms of taxation #1: Fuel taxes

Dealing with the impact of aviation on climate change is perhaps the most significant aviation industry issue. In addition to proposals for an aviation-specific emissions trading system (ETS), or for the inclusion of aviation in a general regional or global ETS, the industry also faces proposals for the introduction of an aviation fuel tax.

In the July 2006 resolution on reducing the climate change impact of aviation referred to earlier, the European Parliament (EP), in addition to approving the setting up a separate – or closed - aviation-specific emissions trading system as a preliminary step prior to possible inclusion of aviation in the EU's general ETS, approved by a substantial majority the “immediate introduction” of a tax on jet fuel for intra-EU flights. The EP

[f]ully endorses the Commission's intention to pursue the introduction of kerosene taxes, and urges it to begin immediately by requiring a tax on all domestic and intra-EU flights (with the possibility to exempt all carriers on routes on which non-EU carriers operate) [and] calls on the Commission to propose arrangements for their worldwide introduction.⁸¹

In terms of the efficacy of an aviation fuel tax, however, the EP is at odds with the European Union Committee of the House of Lords, IATA and others. The House of Lords stated in its February 2006 report that it is

common for Member States to exempt fuel used for international air services from energy and similar taxes [this is done under the Chicago Convention]. The [European] Commission concludes that the extension by Member States of energy taxation to aviation could provide side-benefits in terms of greenhouse gas reductions ... but only to a limited extent. This option is not considered sufficiently robust to be the basis for a strategy for achieving the Commission's policy objectives in this area.⁸²

Under the multilateral Chicago Convention international air services are exempt from fuel taxes. The difficulties associated with the implementation of a fuel tax, including the necessity of renegotiating government-to-government bilateral air services agreements, the length of time required to implement such tax and resistance on the part of some States to a fuel tax, may not make such a tax feasible.

⁸⁰ Douglas Barrie and Robert Wall, “Burning Issues,” *Aviation Week and Space Technology*, 17 July 2006, pp 140-142.

⁸¹ European Parliament resolution on reducing the climate change impact of aviation, *supra*, note 27.

⁸² House of Lords, European Union Committee, *supra*, note 20.



Opening the Second Aviation and the Environment Summit in April 2006, IATA's Director General and CEO, Giovanni Bisignani, stated that one of the myths about international aviation's approach to the environment was that it gets "a free ride by not paying tax on fuel." He stated that

[a]ir transport pays entirely for its own infrastructure ... Airlines pay when they land, when they fly and when they park. This is completely different from both road and rail. On top of that air transport is a cash cow for many governments.⁸³

While the arguments against the introduction of aviation fuel taxes on feasibility and practicality grounds clearly have some force, the July 2006 resolution of the EP approving the introduction of a tax on jet fuel for intra-EU flights, and other calls for the introduction of such taxes, ensure that aviation fuel taxes as a way of dealing with the impact of aviation on climate change will continue to be a significant aviation industry issue.

Economics of aviation

(vi) Industry consolidation

Airline industry losses between 2001 and 2004 exceeded USD 36 billion.⁸⁴ Globally in 2005 airlines lost USD 6 billion.⁸⁵ IATA's current 2006 forecast is for airline losses of USD 3 billion,⁸⁶ with US carrier losses "narrowing" to USD 2 billion.⁸⁷ The current financial state of the airline industry, at least in the US, Latin and South America and Africa, but excluding Asia (where carriers reported USD 1.5 billion profit for 2005⁸⁸), suggests that the airline industry will consolidate through (a) mergers and acquisitions as a result of eventual full liberalisation of air services agreements, particularly in Europe and the US, and the possibility of large portfolios of airlines; (b) in the interim, global airline alliances as proxies for such mergers and acquisitions; (c) privatisations; and/or (d) bankruptcy filings.

The former Chief Executive of British Airways, Sir Rod Eddington, notes that:

⁸³ IATA, *supra*, note 32.

⁸⁴ IATA, "State of the Air Transport Industry," Address by Giovanni Bisignani, Director General and CEO, 61st IATA Annual General Meeting and World Air Transport Summit, Tokyo, 30 May 2005: <http://www.iata.org/pressroom/speeches/2005/2005-05-30-01.htm>.

⁸⁵ IATA, "Asia Pacific Summit, Singapore: Remarks by Giovanni Bisignani, Director General and CEO, International Air Transport Association (IATA)," 20 February 2006: <http://www.iata.org/pressroom/speeches/2006-02-20-01.htm>. European carriers made about USD1.3 billion.

⁸⁶ <http://www.iata.org/pressroom/speeches/2006-06-05-01.htm>; See Jens Flottau and Robert Wall, "Reasons to worry: Good news on revenues could mask the next crisis for airlines," *Aviation Week & Space Technology*, 12 June 2006, p 39.

⁸⁷ Evan Perez and Melanie Trotman, "Major Airlines Fuel a Recovery By Grounding Unprofitable Flights," *The Wall Street Journal*, 5 June 2006.

⁸⁸ IATA, *supra*, note 86.



One of the reasons why global aviation has such an appalling economic record, why it destroys shareholder value, is because it is too fragmented. There are simply far too many airlines. And until it consolidates, it will continue ... to perform poorly as an economic entity. It will stagger from crisis to crisis.⁸⁹

In Europe, with airlines saddled with massive debt, a reduction in passenger numbers, rising oil prices (along with the rest of the industry) and facing challenges from LCCs, such consolidation also seems likely. Airline consolidation will raise regulatory, antitrust/competition, liberalisation and operational issues, the issue of further reform of the aviation industry, and a host of other, related issues.

In China, consolidation of the airline industry – and alliance building - has already taken place. Air China is one of three airlines around which three major airline groups have been built.⁹⁰ Such consolidation is part of a process aimed at strengthening the aviation industry in China and supporting the forecast growth in air travel within, to and from it.

Under a June 2006 Cathay Pacific-Dragonair-Air China deal, Cathay Pacific took the outstanding shares of Dragonair (it became a wholly-owned subsidiary of Dragonair) and doubled its stake in Air China to 20%; Air China took a 17.5% share of Cathay Pacific.⁹¹ As a result of Cathay Pacific's takeover of Dragonair and, more particularly, through its cross shareholdings with Air China, it became possible for it to obtain access to mainland China, where outbound traffic is expected to increase 20% for the next 5 years, reaching 100 million by 2019.⁹²

Soon after the above developments, then, China and Hong Kong concluded a new, liberal air services agreement under which Hong Kong carriers can fly to additional cities in China. Cathay Pacific thus becomes an important "gateway" carrier into Mainland China. It has applied to the Hong Kong government for additional services to Beijing⁹³ and new cargo services, and to operate services to Shanghai, from as early as October 2006;⁹⁴ Shanghai accounts for 35% of the

⁸⁹ Cathy Buyck, "Interview: British Airways Chief Executive Rod Eddington," *Air Transport World*, August 2005, p 25.

⁹⁰ The other two are China Southern and China Eastern Airlines: See "CAAC Pushes Airline Consolidation," *People's Daily* (English edition), 22 July 2000 (http://english.people.com.cn/english/200007/22/eng20000722_46179.html).

⁹¹ Jens Flottau and Neelam Mathews, "Big Deal? Some competitors equate Cathay deal with a monopoly of mainland China services," *Aviation Week & Space Technology*, 19 June 2006, p 41. *Supra*.

⁹² Cathay presently serves only Beijing and Xiamen; Dragonair flies to 23 Mainland China destinations (Alman Loong, "Dragonair premium has Cathay reaching for skies," *HKG Standard*, 7 July 2006).

⁹⁴ See "HK Cathay To Keep China Flights After Dragonair Buyout," *The Wall Street Journal*, 4 July 2006 (http://online.wsj.com/article_print/BT-CO-20060704-702407.html) and Bruce Stanley, "Cathay Sights Shanghai," *The Wall Street Journal*, 4 July 2006 (http://online.wsj.com/article_print/SB115192295766796938.html).



passenger market between Hong Kong and China and is one of the most lucrative routes in Asia.⁹⁵ Cathay's Dragonair acquisition gives it immediate access to Mainland China markets, together with necessary infrastructure. These developments, especially the liberalised China-Hong Kong air services agreement, have implications for liberalisation throughout Asia.

Finally, Cathay Pacific's 20% Air China shareholding paves the way for, and clearly puts pressure on, China Southern and China Eastern to also seek investment (and expertise) from, and strategic alliances with, non-Chinese airline partners - and, thus, further consolidation. Indeed, in late July 2006, China Eastern was in talks with Singapore Airlines, reportedly with the aim of selling a 20% strategic stake in the airline⁹⁶ and giving China Eastern access to a significant global network. Other potential strategic investors have also been targeted by the airline. Further, China Southern is in talks with Korean Air to establish an air cargo joint venture and is also talking to other carriers including Air France KLM.⁹⁷ Korean Air is a member of SkyTeam; China Southern aims to join that alliance in 2007.

If Singapore Airlines does invest in China Eastern, implications follow for each of the oneworld and Star alliances. Singapore Airlines is a member of the Star Alliance, and a China Eastern rival, Shanghai Airlines, is likely to join Star in 2007. Further, the Air China-Cathay Pacific cross-equity agreement is an agreement between airlines from, respectively, Star and oneworld.

(vii) Growth in aviation markets, number of passengers and number of aircraft

"[T]he airline industry is poised for an almost unprecedented boom, as a new generation of planes is combining with better business models and huge volume growth in new markets."⁹⁸

As 2005 and 2006 forecasts by Airbus, Boeing, IATA and the Airports Council International (ACI) demonstrate, there will be almost unprecedented growth in aviation markets and passenger and aircraft numbers in the period 2005-2009 (IATA) and over the next 20 years (Boeing and Airbus). JP Morgan states that "one could argue that the global [airline] industry – ex the US – has entered a phase of sustained growth, evidenced by the resilience of global passenger volumes despite the implementation of fuel charges."⁹⁹

⁹⁵ Justine Lau, "Cathay to resume Shanghai flights," *The Australian*, 5 July 2006.

⁹⁶ Reuters, "Singapore Air Confirms Talks With China Eastern," 20 July 2006; Reuters, "China Eastern Seeks Foreign Partners," 22 July 2006.

⁹⁷ Reuters, "China Southern, Korean Air In Cargo JV Talks," 22 July 2006.

⁹⁸ "Lining up for profits," *The Economist*, 12 November 2005, p 73.

⁹⁹ JP Morgan Chase & Co, "Arabian Gulf Aviation: Impact on Asia-Pacific Aviation," *Asia Pacific Equity Research*, 21 October 2005, p 20.



Airbus' most recent assessment is that global air passenger traffic will average growth of 5.3% per year over the period 2004-2023.¹⁰⁰ Boeing's July 2006 forecast for 2006-2025 is for an annualised global passenger traffic growth rate of 4.9% and cargo growth rate of 6.1% against worldwide average economic growth of 3.1%.¹⁰¹ For ACI, more than 7.4 billion passengers will be travelling by air in 2020, with a global per annum passenger growth rate of 4.1% over the next 15 years.¹⁰²

Boeing believes that just over 27,000 new aircraft will be delivered over the next 20 years (more than doubling the current worldwide fleet of aircraft) for a total value of USD 2.6 trillion.¹⁰³ Airbus agrees that the size of the worldwide passenger fleet will double over that 20 year period; for Airbus, the number of aircraft delivered in that period will be just over 17,000.

IATA, for the period 2005-2009, forecast a global average annual growth rate (AAGR) of 5.6% for international passengers and 6.3% for international freight,¹⁰⁴ revised upwards in 2006 for the Asia Pacific to 6.5% and 8.5% respectively.¹⁰⁵ And its 2006 Airline Business Confidence Index shows that, of chief financial officers surveyed, 69.5% expect continued improvement in airline profitability in the 12 month period from February 2006.¹⁰⁶ International traffic data for May 2006 released by IATA on 30 June 2006 shows 7% growth in passenger demand and 5.1% growth for freight over the same period in 2005. Load factors for May achieved an average of 73.6%. For IATA, the 7% growth

represents a pick-up in the underlying growth rate, helping to boost growth in the year to date to an above average 6.8%. Airlines are also benefiting from improved capacity utilisation.¹⁰⁷

Finally, while operating margins remained low, the Association of European Airlines released data in late June 2006 which showed that its member airlines

¹⁰⁰ Airbus, *Global Market Forecast 2004-2023*, p 10:

http://www.airbus.com/store/mm_repository/pdf/att00003033/media_object_GMF2004_full_issue.pdf.

¹⁰¹ Boeing, 2006 *Current Market Outlook*: <http://boeing.com/commercial/cmo/highlights.html>.

¹⁰² "2020 vision: Global air traffic to hit 7.4bn," <http://travelbiz.com.au>, 25 August 2005.

¹⁰³ Boeing, *supra*, note 101; the world airline fleet, according to Boeing, will grow from 17,330 to 35,970 aircraft. See also Boeing, *New Airplanes*: <http://boeing.com/commercial/cmo/new.html>.

¹⁰⁴ <http://www.iata.org/pressroom/pr/2005-10-31-01.htm>.

¹⁰⁵ <http://www.iata.org/pressroom/speeches/2006-02-20-01.htm>.

¹⁰⁶ <http://www.iata.org/pressroom/speeches/2006-03-22-02.htm>.

¹⁰⁷ <http://www.iata.org/pressroom/pr/2006-30-06-02.htm>. IATA's Director General and CEO said that "strong economies are supporting strong demand growth for both freight and passenger traffic. This positive demand environment is helping the global airline industry to offset some of the sharp increase in jet fuel prices. And it is helping airlines boost revenues by an average of 10% over the past three years."



together posted a 2005 provisional operating profit of USD 755 million, up 82.8% from 2004.¹⁰⁸

Aviation growth will be most significant in the Asia Pacific region and, in particular, routes in, to and from India and China. Part 4(b) below outlines and explains this growth.

Notwithstanding forecast growth in aviation markets and passenger and aircraft numbers, and 2006 revenues, a weakening global economy could affect strong aviation industry performance. Potential aircraft overcapacity – record aircraft orders – could also be problematic,¹⁰⁹ as could the rising price of oil. Airlines' fuel costs in 2006 are forecast to exceed USD 112 billion, USD 21 billion more than in 2005. Fuel is forecast to comprise 26% of airlines' average costs in 2006 as against 22% in 2005,¹¹⁰ with the price of oil averaging USD 66 per barrel.¹¹¹

(viii) New forms of taxation #2: Airline ticket taxes to fund medical aid and assistance in the developing world

In addition to fuel and carbon taxes (as outlined earlier), governments have implemented and are contemplating the implementation of ongoing taxes on airline tickets to fund medical aid and other forms of assistance in the developing world.

With support from the UN secretary general,¹¹² momentum for such taxes came from the 2005 G8 summit in Gleneagles where the G8 leaders agreed that, with regard to development aid for Africa, “[a] group of G8 and other countries will ... take forward innovative financing mechanisms including ... an air-ticket solidarity levy” with the aim of doubling aid for Africa by 2010.¹¹³ Subsequently, French President Jacques Chirac wrote to 140 world leaders, urging the imposition of a levy on airline tickets to finance aid for Africa. “I offer you to associate yourselves with the establishment of an international solidarity contribution on plane tickets, aimed, particularly, at financing the fight against AIDS, tuberculosis and malaria [in Africa],” President Chirac said.¹¹⁴

Despite opposition from the aviation industry, the French government approved a tax on airline tickets issued locally to fund development aid for poor countries

¹⁰⁸ Cathy Buyck, “AEA airlines’ operating surplus nearly doubles, margins remain low,” *ATW Daily News*, 30 June 2006 (<http://www.atwonline.com/news/story.html?storyID=5567&print=Y>).

¹⁰⁹ See Flottau and Wall, *supra*, note 86. 2005 set a new record for mainline airliner orders, exceeding the 1989 record of 1,631 aircraft: Max Kingsley-Jones, “Airframers,” *Flight International*, 3-9 January 2006, p 25.

¹¹⁰ Reuters, “IATA Airlines Loss Forecast Now USD\$3 Bln,” 6 June 2006.

¹¹¹ Perry Flint, “IATA tempers 2006 outlook in face of higher fuel prices,” *ATW Daily News*, 6 June 2006.

¹¹² David White, John Thornhill and Bertrand Benoit, “Annan pushes for levy on airline tickets,” *Financial Times*, 6 July 2005.

¹¹³ G8 Gleneagles 2005, *Summit Documents*, “Chair’s Summary, Gleneagles Summit, 8 July,” 8 July 2005.

¹¹⁴ Reuters, “Chirac Urges Air Tax To Fund Africa Aid,” 26 July 2005.



generally,¹¹⁵ such tax in turn approved by the French parliament and, again, supported by the UN Secretary-General.¹¹⁶ It applies to flights departing France, the amount depending on distance travelled and class of travel. While the French tax came into effect on 1 July 2006, a Chilean tax of 2 USD on flights departing from Chile took effect on 1 January 2006.¹¹⁷ Brazil plans a similar tax.¹¹⁸

In early June 2006, France, Chile, Brazil and Norway, together with the United Nations and FIFA, announced an International Drug Purchase Facility to negotiate low prices for medicine to combat diseases affecting the developing world and funded by proceeds from the various airline ticket taxes.¹¹⁹ The French tax alone is expected to raise USD 250 million annually¹²⁰ and, as the number of States levying the tax increase, the total amount raised annually “could reach USD 1 billion.”¹²¹ States that have either approved or plan to approve an airline ticket tax to fund medical aid and assistance in the developing world include (in addition to France, Chile and Brazil) Britain, Cyprus, Congo, Gabon, Ivory Coast, Jordan, Luxembourg, Madagascar, Mauritius and Nicaragua.¹²²

For the International Air Carrier Association, however, “a development tax cannot be isolated from other burdens facing the aviation sector. The cumulative effect of soaring kerosene costs, environmental pressures and a development tax would be unbearable for many airlines.”¹²³ IATA also expressed opposition to the tax.¹²⁴

(ix) Rising jet fuel costs

The price of crude oil has significantly increased, and the possibility of long-term higher oil prices¹²⁵ is a real one. As against crude oil prices, jet fuel prices have been rising disproportionately – in part due to the high price of crude, and to issues including overburdened refineries, refinery outages and related issues, and

¹¹⁵ Reuters, “France To Introduce Air Ticket Tax to Fund Aid,” 24 November 2005.

¹¹⁶ Reuters, “UN Encourages Tax on Air Tickets,” 28 December 2005.

¹¹⁷ *Supra*.

¹¹⁸ Reuters, *supra*, note 115.

¹¹⁹ Martin Enserink, “Global Health a Taxing Problem,” *Science*, Vol 312, No 312, 16 June 2006, p 1583; Reuters, “Airline Tax Will Buy Medicine for World’s Poor,” 4 June 2006.

¹²⁰ Enserink, *supra*.

¹²¹ Reuters, *supra*, note 119.

¹²² *Supra*.

¹²³ International Air Carrier Association, Press Release, “IACA Reiterates Call to Abort Development Tax,” 13 July 2005. IACA further stated that it “continues to recognise the importance of a genuine and structural development policy, but believes it is fundamentally unacceptable to use air travellers as a source of development funding.”

¹²⁴ IATA expressed disappointment that some States “continue to believe that making air travel more expensive will benefit developing nations. A 10% increase in air traffic boosts GDP by 1.6%. And a 10% improvement in connectivity (new destinations or increased frequencies) supports a 3.7% increase in GDP. It is important that we do not kill the goose that lays the golden eggs with excessive taxation. We need to focus on improving the aviation infrastructure in the developing world—including Africa—so that it can be a catalyst for development.” International Air Transport Association, “A Summit of Significance for Air Transport - Effective Follow-up Needed,” Press Release, 13 July 2005.

¹²⁵ Stanley Reed, “Oil Prices: The New Reality,” *BusinessWeek*, 6 February 2006.



competition with other products in multi-product pipelines.¹²⁶ On 15 June 2006, in terms of average USD price per barrel, crude oil was 60.78; jet fuel was 88.33.¹²⁷

Airlines use purchasing practices such as hedging to mitigate the impact of high fuel costs. Such mitigation also consists of passing the higher cost of purchasing jet fuel on to consumers in the form of ticket surcharges. Further, there are a number of operational and fuel usage strategies and measures which airlines can and do deploy, in addition to examining more structural solutions; the push for more fuel-efficient aircraft and engines was outlined earlier (at "Aircraft technological developments"). How the aviation industry deals with ongoing high jet fuel prices, and how it adapts to such prices, over the longer term, are critical questions. One analyst has noted that "[h]igh jet-fuel costs will force a major restructuring in the airline industry."¹²⁸

The seriousness of this issue was demonstrated at the June 2006 IATA AGM in Paris where, notwithstanding clear competition and antitrust obstacles,¹²⁹ Malaysia Airlines CEO Idris Jala proposed that international airlines should consider collective fuel buying to save money: "I suggest IATA put together a little group, a fuel-buying house ... If you pool together, you get volume discounts."¹³⁰

(x) Development of alternative jet fuels

Concerns regarding significant increases in oil prices, the price of jet fuel, possible fuel taxes and aircraft emissions are driving increased research interest in alternative jet fuels. There are, however, real questions as to whether viable options to kerosene actually exist.¹³¹

Options for powering commercial jet engines with alternative jet fuels - such as biodiesel (made from soybeans, corn and other products), hydrogen (a long-considered alternative)¹³² and synthetics (made by turning coal, oil shale or

¹²⁶ Jet fuel is also more complex to refine: "Q&A on the Fuel-Related Challenges Facing US Airlines: ATA chief economist discusses the airline industry's energy situation," Air Transport Association (ATA), News Room, 21 June 2006: <http://www.airlines.org/news/d.aspx?nid=9194>. Further, as noted in the Q&A, airlines have no alternative to jet fuel.

¹²⁷ *Supra*.

¹²⁸ Scott McCartney, "Airlines Fly an Unsustainable Path," *The Wall Street Journal*, 23 August 2005.

¹²⁹ Obstacles which would ordinarily have prevented the proposal from being raised in such a forum.

¹³⁰ Reuters, "Airlines Should Team Up To Buy Fuel, IATA Told," 6 June 2006.

¹³¹ Robert Wall and Douglas Barrie, "Seeds of Change," *Aviation Week & Space Technology*, 17 July 2006, p 145.

¹³² See Rob Coppinger, "Green Light," *Flight International*, 23-29 August 2005, pp 36-38.



natural gas into a liquid that can act like traditional jet fuel) – are being examined by government and industry.¹³³ Particular focus is on coal-to-liquid and gas-to-liquid, and also biomass-to-liquid, technology. Ethanol¹³⁴ is another option, but an “ethanol” aircraft “would have to be 35% heavier, be fitted with a larger engine, and result in an aircraft that uses 15% more energy on a 500-nautical mile mission.”¹³⁵

Difficulties associated with one or more of such alternatives, however, include production, transportation, and their viability under harsh weather conditions. Further, at present, such alternative fuels are far more expensive than traditional fuels.

Boeing is examining both synthetic and biofuels not as replacements for but as supplements to Jet A. With regard to further aircraft applications, its director of environmental performance, Billy Glover, views synthetic fuel derived from natural gas or coal using the Fischer-Tropsch process as having more promise.¹³⁶

While the focus at present is clearly on making aircraft more efficient rather than producing alternative jet fuels, “[a]ny incremental fuel supply, especially if both environmentally friendly and economically viable, is something worth pursuing,” as the Air Transport Association notes.¹³⁷ And, as Boeing’s director of environmental performance states, “[w]e are interested in alternative fuels because we want to make sure that there’s fuel available for the future.”¹³⁸

Nonetheless, “it takes a long time to develop and validate alternate fuel sources ... [and] ubiquity of the alternative fuel source is also critical.”¹³⁹

(xi) Very light jets (VLJs) and the transformation of air travel

While Airbus’ A380 and Boeing’s 787 are driving revolutionary aircraft technological developments and research, a new type of small aircraft – the very light jet, or VLJ – may represent another kind of revolution and may transform air travel.¹⁴⁰

¹³³ See Linn, *supra*, note 6.

¹³⁴ Alexei Barrionuevo, “The Energy Challenge: For Good or Ill, Boom in Ethanol Reshapes Economy of Heartland,” *The New York Times*, 25 June 2006.

¹³⁵ Wall and Barrie, *supra*, note 131 p 146, citing Carl E Bureson, director of the Office of Environment and Energy at the FAA.

¹³⁶ Barrie, *supra*, note 76. Mr Glover notes that an issue with biofuels is that they “tend to freeze sooner than Jet A,” but notes that “there have been a couple of breakthroughs in the chemistry, in moving the freezing point down. It might become viable.”

¹³⁷ ATA, *supra*, note 126.

¹³⁸ Linn, *supra*, note 6.

¹³⁹ Wall and Barrie, *supra*, note 131.

¹⁴⁰ See, generally, James Fallows, *Free Flight: From Airline Hell to a New Age of Travel* (Cambridge, PublicAffairs, 2001).



VLJs seat four or five people, including a pilot, generally weigh less than 10,000 lb,¹⁴¹ and have a range of over 2,000 kilometres.¹⁴² Costs range from USD 1.3 million for the Eclipse 500¹⁴³ to between USD 2 and 4 million for models from manufacturers such as Cessna, Adam Aircraft, Embraer and Honda.¹⁴⁴

The key potential market for VLJs is the incipient “on demand” air taxi business, which could make private jet travel available to the general public; “many people in aviation now see a future where thousands of tiny jets fly directly between smaller cities.”¹⁴⁵ Proponents of air taxis “envision a sophisticated planning, communications and air traffic control system that would match passenger pickups and destinations to minimize empty flight legs.”¹⁴⁶ A Virgin-branded air taxi service utilising Eclipse 500s is reportedly being considered.¹⁴⁷

Other potential VLJ markets include corporations¹⁴⁸ (afforded a cost-effective way of expanding their fleet, with increased mobility), fractional ownership operators, and individuals. NASA research reveals that VLJs could increase traffic at some US metropolitan airports by 25%.¹⁴⁹ Increasing security burdens at airports may also assist the development of the VLJ market as business travellers start to view VLJs favourably as against mainline carriers.

As some VLJs can operate on runways as short as 2,300ft, up to 5,000 small regional airports in the US would be available for VLJ use, and possibly 1,000 in Europe. Further, non-US markets for the VLJ include the Asia Pacific – China and India in particular – which accounts for only 2.6% of business jets worldwide, Russia and the Middle East, “particularly where long distances between secondary cities combine with poor surface transport infrastructure to make the use of business jets economically attractive.”¹⁵⁰ Europe appears unlikely to be an important market.¹⁵¹

Potential problems attending the introduction of VLJs include those related to air traffic control (the skies are already crowded), availability of trained jet pilots, a

¹⁴¹ Although the Eclipse 500, the first and best known such VLJ, weighs 3,536lb (when empty): http://www.eclipseaviation.com/eclipse_500/specifications/.

¹⁴² Daniel Solon, “Very light jets ready to take off,” *International Herald Tribune*, 2 May 2006; Kate Sarsfield, “Hail the Air Taxi,” *Flight International*, 25 April – 1 May 2006, pp 50-53; Joseph C Anselmo, “Time for an Eclipse?,” *Aviation Week & Space Technology*, 24 April 2006, pp 72-77.

¹⁴³ http://www.eclipseaviation.com/affordability/how_to_buy/.

¹⁴⁴ See “Flight of the bumblebee,” *The Economist*, 1 July 2006, p 67 and Solon, *supra*, note 142.

¹⁴⁵ “Flight of the bumblebee,” *supra*.

¹⁴⁶ Solon, *supra*, note 142.

¹⁴⁷ “Branson sets sights on Virgin air taxi business using Eclipse 500 very light jets,” *Flight International*, 14 February 2006.

¹⁴⁸ David Learmount, “Raburn flags single pilot air taxi future,” *Flight International*, 9-15 May 2006, p 7.

¹⁴⁹ Scott McCartney, “Air-Taxi Services Threaten to Jam Airports,” *The Wall Street Journal*, 28 March 2006.

¹⁵⁰ Solon, *supra*, note 142.

¹⁵¹ See Sarsfield, *supra*, note 142.



failure on the part of VLJ manufacturers to sell the required high number of VLJs needed to be profitable,¹⁵² and whether an entire air taxi business can be created by VLJs. In this last regard, many orders for VLJs come from air taxi businesses that have yet to operate.¹⁵³

Finally, like Airbus and its A380 and Boeing and its 787, some VLJ manufacturers are also driving innovative design, engineering and production techniques “never before seen in general aviation.” For example, Eclipse uses

friction stir welding rather than rivets to join panels and vastly reducing the parts count and assembly time in the factory by shipping in ready-built parts from suppliers.¹⁵⁴

Liberalisation

(xii) Liberalisation of international air services and the loosening of regulatory constraints

The international aviation industry is regulated by a complex web of bilateral government-to-government air services agreements. Continued growth in air travel depends in part on bilateral or, increasingly, multilateral “open skies” air services agreements, that is, liberal or expanded air services agreements, with greater frequencies, access for more airlines, fewer restrictions and more air “freedoms”. Liberalisation, however,

is not just liberalisation of traffic rights, it is also the liberalisation of ownership and control and of market access ... [and a]n agreement which excludes the right of establishment is a no-no.¹⁵⁵

Changing regulatory regimes, regimes previously in place for most of the last half-century, are facilitating the growth outlined earlier; as Boeing notes in its 2006 Market Overview, competition increases in response to liberalisation.¹⁵⁶ Air services agreements are increasingly being “liberalised,” and some liberal multilateral agreements have been concluded. For example, in 2001 Brunei, Chile, New Zealand, Singapore and the United States signed the Multilateral Agreement on the Liberalization of International Air Transportation (MALIAT).¹⁵⁷ Other features of the

¹⁵² Eclipse reportedly must sell 500 VLJs per year and 750 to be “decently profitable,” that is, a number about equal to the total output of all US business-jet manufacturers: “Flight of the bumblebee,” *supra*, note 144.

¹⁵³ See Murdo Morrison, “Vern’s vision silences the skeptics,” *Flight International*, 28 February-6 March 2006, p 33: “Sceptics claim Eclipse’s reliance on the nascent air taxi market makes it vulnerable. Around 1,300 of its orders are from six air taxi companies, some of which are scarcely more than paper companies.”

¹⁵⁴ Morrison, *supra*, p 32.

¹⁵⁵ Buyck, *supra*, note 89.

¹⁵⁶ Boeing, *supra*, note 62; “[c]ompetition causes airlines to reduce prices and increase service offerings which further stimulates air travel growth.”

¹⁵⁷ <http://www.maliat.govt.nz/sitemap.shtml>.



MALIAT include no “substantial ownership” requirement and no frequency, capacity or aircraft restrictions.¹⁵⁸

Further, regional and plurilateral aviation markets have been formed and are proposed. Europe has an internal aviation market, the Single European Aviation Market, with abolition of the internal barriers between member States. Australia and New Zealand concluded a Single Aviation Market in 1996, the agreement for which provides up to and including ninth freedom rights.¹⁵⁹ And ASEAN transport ministers have endorsed “Open Sky,” a target set for 2015 to further facilitate ASEAN’s overall economic integration.¹⁶⁰

While the skies are becoming more “open,” and the pace of change is increasing, many restrictions and obstacles remain. Together with calls for more liberal open skies agreements come calls for the national ownership requirements of bilateral air services agreements - the “substantial ownership and effective control” clauses of such agreements, the requirement that airlines be majority owned by their country of origin¹⁶¹ - to be abolished. Such abolition would have significant implications for international aviation regulation.

Further, a US-EU open skies agreement negotiated in 2005 stalled in June 2006 in part because a proposed US Department of Transportation (DOT) rule recalibrating how to determine whether US citizens are in actual control of US airlines (designed to increase the availability of foreign capital to the US airline industry) was delayed by a year by the US House of Representatives. Such rule was seen as important in winning European support for the agreement and satisfying European demands regarding foreign ownership.¹⁶² The EU ambassador to the US noted that

¹⁵⁸ Murray Denyer, “The Multilateral Agreement on the Liberalisation of International Air Transportation,” *Address to the Aviation Law Association of Australia and New Zealand*, Waitangi, New Zealand, December 2001, p 6.

¹⁵⁹ See David Hodgkinson, “Trading Restrictions Rather Than Opportunities: The ‘Liberalisation’ of Australia’s Aviation Policy, 1996-2006,” *John Howard’s Decade Conference*, Canberra, March 2006.

¹⁶⁰ Peter Forsyth et al, *Preparing for Open Sky: AADCP Regional Economic Policy Support Facility Research Project 02/008* (Melbourne, Monash International Pty Ltd, 2004), p i. However, Singh argues that “for all the rhetoric, it’s highly unlikely we will see an open skies aviation policy fully implemented in Asia in the foreseeable future.” Prith Pal Singh, “SIA can regain high ground only by changing approach,” 2006: <http://www.channelnewsasia.com/stories/analysis/view/153206/1/.html>.

¹⁶¹ Sir Rod Eddington, while Chief Executive Officer of British Airways, called for such ownership restrictions to be lifted: Steve Creedy, “Abolish national ownership, BA warns,” *The Australian*, 13 June 2005.

¹⁶² Although doubts were expressed that such support would be forthcoming as a result of the rule. The limit on foreign ownership – 25% voting control – was not addressed; it can only be changed by an Act of Congress: Perry Flint, “Open skies hopes fade as Congress, Spinetta, weigh in on DOT proposal,” *ATW Daily News*, 16 June 2006.



there has been an unfortunate revival of protectionism in the United States, and some are doing their best to stop [the agreement] ... from becoming a reality. Fearing foreign investments and influence, the arguments run the gamut from security concerns to potential outsourcing of American jobs.¹⁶³

In August 2006, the DOT slowed the rule-making process to allow for more consultation.¹⁶⁴ The text of the US-EU agreement has been negotiated; ratification by the parties is the next step.

Despite such obstacles, increasing liberalisation of international air services is taking place, and will accelerate given the clear causal link between liberalisation, traffic growth and economic development.¹⁶⁵ Major liberalisation in key global markets, given the obstacles to be overcome, and with forecasts for twice as much air traffic in 2020 as exists today,¹⁶⁶ would represent an aviation revolution.

(xiii) The low-cost carrier challenge to traditional views on airline operations

Ongoing liberalisation and the resultant entry of new airlines has affected and is affecting the airline industry enormously. Many new carriers “have innovated in order to find sustainable places in the market. In many cases this has involved their establishing a very low cost base and addressing ... particular segment[s] of the aviation market,”¹⁶⁷ such as point-to-point travel and “no frills” service. The impact of such low-cost carriers – or “LCCs” – on the airline industry has been without precedent. As the result of financial difficulties and regulatory burdens faced by major US and other “network” or “legacy” carriers, particularly since 2001, and the implementation of an LCC model which challenges traditional views on almost all aspects of airline operations, LCC capacity between 2000 and 2003 worldwide grew by just under 70%. Further, according to Peter Morris, chief economist at Airclaims international transport consultancy, current plans provide for the launch of 50 new carriers; 19 of such carriers will follow the LCC model. And, in September 2006, LCCs represent 14% of all services globally, compared

¹⁶³ John Bruton, “The sky’s the limit for trans-Atlantic air travelers,” *The Seattle Times*, 23 June 2006.

¹⁶⁴ See, generally, “Other News,” *ATW Daily News*, 17 August 2006; see also Aaron Karp, “Mineta calls rejecting foreign investment ‘pure folly’ in farewell address,” *ATW Daily News*, 10 July 2006, and Reuters, “US To Proceed With Airline Foreign Ownership Plan,” 9 July 2006.

¹⁶⁵ InterVISTAS-ga2 Consulting, Inc, *The Economic Impact of Air Service Liberalization* (Washington, DC, InterVISTAS-ga2 Consulting, Inc, 2006), p ES-6.

¹⁶⁶ John Hayhurst, Boeing, June 2003 cited in bmi, *20:20 – A Review of 20 years of deregulation in European Aviation*: <http://www.flybmi.com/downloads/bmi/2020Reportfinal.pdf>.

¹⁶⁷ Derek Sadubin, “Low Cost Airlines – A Revolution in Asia’s Airline Industry,” ALAANZ Conference, Sydney, September 2004. See also Lori Ranson, “Blurring the Lines,” *Aviation Week & Space Technology*, 21-28 August 2006, pp 43-44.



with 7% in 2001.¹⁶⁸ Finally, LCC growth in the Asia Pacific region is forecast to be enormous; the forecast for LCCs in Europe appears to be less certain.¹⁶⁹

And many legacy carriers are starting their own LCCs in direct competition with the new LCCs. For Tim Clark, the president of Emirates, it is only a matter of time before “the short-haul low-cost model migrates into long haul.”¹⁷⁰

Aviation security and the terror threat

(xiv) Aviation security and the terror threat a key concern for airlines

The aviation environment in terms of security - and safety - after the terrorist attacks of 11 September, 2001 changed dramatically and continues to change, particularly in light of the August 2006 trans-Atlantic terror threat. In addition to new aviation security procedures which States have implemented, such procedures and new legislation require international cooperation and, increasingly, the development of international conventions or agreements. In this regard the Secure and Facilitated International Travel Initiative (SAFTI), a 2004 ongoing initiative of the G8 nations, highlights the scope of the work involved¹⁷¹ - as do, again, the events of August 2006 in the UK. SAFTI identifies 28 areas to be addressed under four headings: Document interoperability through international standards; international information exchange; Man-Portable Air Defence Systems¹⁷² threat reduction; and capacity building and collaboration.

The formulation of State-based aviation laws, regulations and security and safety procedures, then, raises issues of harmonisation and the role of international regulatory organisations such as the International Civil Aviation Organisation (ICAO), the UN aviation agency, in addition to technical, regulatory, commercial, economic and policy issues. What IATA refers to as a “secure international aviation network”¹⁷³ is a network which must be able to adapt to continually

¹⁶⁸ Robert Wall, “Still in the Woods,” *Aviation Week & Space Technology*, 7 November 2005, p 48; Centre for Asia Pacific Aviation, “Perspective,” *Asia Pacific Airline Daily*, 7 September 2006.

¹⁶⁹ Consulting firm McKinsey & Co in June 2005 argued that, in Europe, “[t]he days when LCCs used market stimulation to expand, with practically no competition, are over.” As reported by Air Transport World, in arguing that LCC profitability was falling due to “increasingly saturated markets, aircraft orders exceeding likely demand and the growing competition among scheduled airlines, charter companies and LLCs,” McKinsey concluded that “[d]espite cost advantages for LCCs, expected growth will not suffice to achieve profitability” for many European LCCs: Air Transport World, “Future not so rosy for Europe’s LCCs, says McKinsey,” 24 June 2005.

¹⁷⁰ “Low cost can go long haul, Emirates shows,” *The Economist*, 29 October 2005, p 62.

¹⁷¹ G8 Gleneagles 2005, *Summit Documents*, “Secure and Facilitated International Travel Initiative Summit Progress Report,” 8 July 2005.

¹⁷² In this regard legislation was introduced in the US Congress that would require aircraft that carry more than 800 passengers to install technology to counter the threat from shoulder-launched missiles, or man-portable air defence systems (see Demetri Sevastopuloiu, “Bill would force Airbus to install missile defence,” *Financial Times*, 19 June 2005). The A380 is, at present, the only aircraft under development that can carry more than 800 passengers.

¹⁷³ IATA, “A Summit of Significance for Air Transport - Effective Follow-up Needed,” Press Release, 13 July 2005.



changing security and safety threats. These are unique circumstances which raise unique security concerns for airlines as well as safety, operational and legal problems.

As an example of such an issue with security and also safety, operational and legal problems, and with the attendant complexities, the European Court of Justice (ECJ) in late May, 2006, overturned a 2004 agreement between the EU and the US under which the EU provides data in 34 categories of information about passengers on all flights that originate from the EU's member states to US counter-terrorism authorities.¹⁷⁴ The ECJ decided that the EU could not legally agree to provide information contained in passenger records to the US, even for security purposes, as such information was collected by airlines for their own commercial use. While the European Parliament had argued that the agreement violated citizens' civil rights, the ECJ did not decide on the privacy question because it found that the agreement was procedurally flawed.

The European Commission (EC) has four months to conclude a new agreement with the US; the current agreement remains in force during that time.¹⁷⁵ The EC plans to overcome the objection of the ECJ to the agreement by basing the agreement on articles of EU law pertaining to security and organised crime.¹⁷⁶ In that event, EU member states (and not the European Parliament) would need to ratify the agreement. It could take effect provisionally prior to the completion of the ratification process.

Finally, as illustrated by the events at London Heathrow in August 2006, higher levels of security screening in response to real or perceived terror threats affect industry profitability, particularly that of airlines. Also, higher security levels may deter business travellers and may assist in developing the VLJ market (discussed earlier), thus further affecting the profitability of mainline carriers.

Aviation governance

(xv) Increasing focus on the aviation industry by antitrust regulators, grants of immunity and cooperation between competition authorities

Progressive liberalisation of international civil aviation "has allowed airlines to be more innovative and to develop new initiatives for serving new markets." These

¹⁷⁴ See Nicola Clark, "EU court bars giving passenger data to US," *International Herald Tribune*, 31 May 2006.

¹⁷⁵ As an example of confusion surrounding the decision and the issue, Graham Watson, a British member of the European Parliament, said that the ECJ decision "puts European airlines flying passengers in and out of the US in a real dilemma. Either they violate EU law and give the US what they want, or they risk the [United] States turning around and saying your airplanes can't come here." The European Data Protection Supervisor, Peter Hustinx, said that until a new accord is reached, airlines were entering a period of legal uncertainty if they continued to transfer passenger data to US authorities." Clark, *supra*.

¹⁷⁶ Reuters, "EU Wants Quick US Passenger Data Solution," 19 June 2006.



initiatives have involved business arrangements “that permit airlines from different countries to serve the global market together”¹⁷⁷ (emphasis added), such as code-sharing to strategic alliances,¹⁷⁸ the latter as a substitute for airline mergers prohibited by foreign ownership laws. All these developments have regulatory implications. Indeed, recent years have seen unprecedented regulatory activity by governments with regard to aviation. Much of this activity increasingly focuses on antitrust/competition issues and consumer rights and consumer protection (in this latter regard see the next section below), driven by progressive liberalisation, economic globalisation, governance and growth, all matters considered earlier.

There is increasing focus by anti-trust regulators on the aviation industry, and on airlines in particular. United States and United Kingdom competition authorities are investigating allegations of price-fixing by long-haul airlines flying to and from Britain, such investigations the latest by authorities concerned about additional charges imposed for fuel, insurance and security. These charges have also prompted an investigation by the US Department of Justice, European Union officials and antitrust authorities in Asia into a possible air cargo cartel,¹⁷⁹ and other aviation-related investigations in other jurisdictions are ongoing. For one newspaper,

[i]f the airlines are guilty of collusion they should be punished, but this [US-UK] price-fixing investigation is fiddling with symptoms. What the long-suffering customers of this industry truly need is full liberalisation.¹⁸⁰

Separately, on the basis that the growth of international airline alliances have, amongst other things, enhanced competition, the US Department of Transport (DOT) proposes to withdraw antitrust immunity from IATA’s tariff coordination conferences that set passenger fares and cargo rates for US-Europe and US-Australia flights; changes in international air services – such as the growth of alliances – have made the IATA conferences unnecessary, the DOT tentatively concluded.¹⁸¹ Competition authorities in Europe and Australia have also tentatively determined to either end or reduce the immunity the IATA conferences currently enjoy.¹⁸²

¹⁷⁷ Charles A Hunnicutt, “Competition Policy and International Airline Alliances,” (2004) *Annals of Air and Space Law*, vol XXIX, p xx.

¹⁷⁸ With antitrust immunity.

¹⁷⁹ Doug Cameron, “Airlines face passenger surcharge probe,” *The Financial Times*, 24-25 June 2006; John Durie, “Airline Oligopoly,” *The Australian Financial Review*, 24-25 June 2006.

¹⁸⁰ “Clip their wings: The airline industry has been protected for far too long,” *The Financial Times*, 24-25 June 2006 (editorial).

¹⁸¹ See <http://dms.dot.gov>, docket OST-2006-25307.

¹⁸² <http://www.dms.dot.gov>, docket OST-2006-25307 and Reuters, “US Wants to End IATA Antitrust Waiver,” 6 July 2006.



(xvi) Increasing focus on passenger rights

Protection of air passenger rights, after being ignored for most of the history of commercial aviation, is an increasingly prominent – and acrimonious – issue. While there has been some focus in the United States on the rights of the passenger,¹⁸³ in the European Union the European Commission has implemented a major programme of protecting and enhancing passenger rights.

Specifically, Regulation (EC) No 261/2004, which entered into force on 17 February 2005, establishes common rules on compensation and assistance to passengers in the event of denied boarding, cancellation or long delay in flights. Following a challenge to its validity by IATA and the European Low Fares Airline Association on the basis that, amongst other things, it caused inconsistency, at least with regard to delay, with the Montreal Convention 1999 (an international convention now in force which deals with international air carrier liability for the carriage of passengers, baggage and cargo), the European Court of Justice in January 2006 upheld its validity.¹⁸⁴ By 2007, as per Article 17 of the Regulation, the European Commission will submit a report to the European Parliament and the Council on the functioning of the legislation, together with new proposals if necessary.¹⁸⁵

Another regulation, Regulation (EC) No 2027/97, as amended by Regulation (EC) No 889/2002, deals with air carrier liability to passengers in the event of accidents.

It seems likely that focus on the rights of the passenger, together with legislation broadly similar to that enacted in the EU, will become a feature of government initiatives around the world. In that event, issues of inconsistency between international agreements, for example, and competing regimes will become more and more important.

¹⁸³ In 1999 the US Congress put legislation dealing with a passenger bill of rights and related matters on hold after a number of major carriers agreed to an Airline Customer Service Commitment undertaking to improve air travel. Those airlines developed customer service plans to implement the Commitment; the Congress requested that the DOT Office of Inspector General review compliance with it: <http://www.oig.dot.gov/item.jsp?id=12>; <http://www.oig.dot.gov/item.jsp?id=508>.

¹⁸⁴ <http://www.europa.eu/rapid/pressReleasesAction.do?reference=MEMO/06/293&format=PDF&aged=0&language=EN&guiLanguage=en>.

¹⁸⁵ European Commission, “Passenger Rights & Air Safety – A Commission Priority,” Memo/06/293, Brussels, 18 July 2006: <http://www.europa.eu/rapid/pressReleasesAction.do?reference=MEMO/06/293&format=PDF&aged=0&language=EN&guiLanguage=en>.



(b) **The Asia Pacific is a fulcrum for developments outlined above**

"[Asia] is where the action will take place ... The next 10 years will be the Asian years"

- Carlos Ghosn, Chief Executive, Nissan and Renault¹⁸⁶

With aviation growth in the Asia Pacific forecast to be greater than in any other region over the next 20 years, the Asia Pacific represents an aviation revolution and is a fulcrum for many of the aviation developments outlined earlier.

(i) **Aviation growth will be most significant in the Asia Pacific: "Renewed dynamism"¹⁸⁷**

While IATA forecasts an AAGR of 5.6% for international passengers and 6.3% for international freight tonnage for the period 2005-2009,¹⁸⁸ international passenger growth will be led by routes within the Asia Pacific. IATA's revised 2006 forecast for that period for those routes is 6.5% passenger AAGR, with an AAGR of 8.5% for international freight tonnage.¹⁸⁹ Passenger growth will be led "largely on the strength of Chinese and Indian economic expansion and liberalisation of markets;" freight flows will be "driven by the tremendous expansion in trade flows already in evidence in this region ... with an AAGR of 8.8% between the Middle East and Asia Pacific. China is expected to see the fastest rate of growth with an AAGR of 14.4%"¹⁹⁰

Rolls Royce estimates air traffic demand in the Asia Pacific to grow at an annual rate of 6.6% over the next 20 years. China would lead such growth, with Chinese demand for air travel growing at an annual rate of 8% to 2026.¹⁹¹

In terms of airline net profits in 2004¹⁹² and 2005 as recorded by ICAO and in 2006 as projected by IATA, Asia-Pacific carriers lead all other regions.¹⁹³ The region's operating margins in 2005, while averaging less than 2%, were the best in the world. Singapore Airlines returned 12%.¹⁹⁴ Seven of the 10 top-performing airlines in the world in 2005 were from the Asia-Pacific region.¹⁹⁵

¹⁸⁶ Maria Bartiromo, "Carlos Ghosn on Detroit's Odds," Interview with Carlos Ghosn, *BusinessWeek*, 5 December 2005.

¹⁸⁷ Airbus, *supra* note 100, p 11.

¹⁸⁸ IATA, *supra*, note 104.

¹⁸⁹ IATA, *supra*, note 105.

¹⁹⁰ IATA, *supra*, note 104.

¹⁹¹ Reuters, "Rolls Royce Sees Strong Asia-Pacific Demand," 20 July 2006.

¹⁹² In 2004 International air traffic in the Asia Pacific had risen 9% above 2000 levels.

¹⁹³ <http://www.iata.org/pressroom/speeches/2006-06-05-01.htm>.

¹⁹⁴ IATA, *supra*, note 105.

¹⁹⁵ Steve Lott, "Asian Tigers," *Aviation Week & Space Technology*, 10 July 2006, p 62.



The Asia Pacific “has always been the key market” for Airbus and Boeing: “It has the fastest growth, and it buys the biggest airplanes that generate the most profit.”¹⁹⁶ And, indeed, Airbus most recently forecast that

airlines domiciled in Asia¹⁹⁷ will experience the fastest growth rates, to the extent that by 2023 the North American domestic market will have lost its historical dominance ...¹⁹⁸

Airbus’ forecast further states that

Emerging markets will become increasingly important. Routes to China, for example, represent five of the top 10 fastest growing traffic flows. Airlines domiciled in China will grow 9.1% per year in the first 10 years, whilst airlines in North America and Europe will grow 4.8% and 5.8%, respectively, over the same period.¹⁹⁹

In terms of demand for passenger aircraft, “[h]igh traffic growth on routes to, from and within the region will drive the dynamic Asia-Pacific airlines to achieve the most rapid increase in both average seat capacity and installed seats.”²⁰⁰

Boeing’s July 2006 detailed analysis of the future 20-year, 2006-2025 demand for world air travel similarly forecasts significant growth for the Asia-Pacific region; it will account for 36% of the USD 2.6 trillion new aircraft market.²⁰¹ 7,900 new aircraft will be delivered for a total value of USD 930 billion,²⁰² the highest market share by value of deliveries; “Asia Pacific will be dominant.”²⁰³

Boeing has stated that

Developing economies and liberalization in the Asia-Pacific ... will foster significant growth in airline travel throughout the forecast period. Within China, for example, an annualized GDP growth rate of 6 percent will produce 8.8 percent yearly traffic growth [two and a half times that for travel within North America].²⁰⁴ Some flows, such as Europe to Asia-Pacific, will especially benefit from the availability of advanced long-range airplanes.

¹⁹⁶ Stanley Holmes and Carol Matlock, “Boeing Roars Ahead,” *BusinessWeek*, 7 November 2005, p 33.

¹⁹⁷ Airbus includes not only China but India, with the “potential to reshape the travel industry,” in this region: Airbus, *supra*, note 100, p 18.

¹⁹⁸ *Supra*, p 33.

¹⁹⁹ *Supra*, p 33.

²⁰⁰ *Supra*, p 41. And “the Asia-Pacific airlines greater appetite for very large A380-type aircraft means that they will account for the largest share of seats delivered [in the world]: p 44.

²⁰¹ Boeing, *2006 Current Market Outlook*: <http://www.boeing.com/commercial/cmo/regions.html>.

²⁰² Boeing, *2006 Current Market Outlook*: <http://www.boeing.com/commercial/cmo/index.html>.

²⁰³ Boeing, *supra*, note 201.

²⁰⁴ Boeing, *supra*.



Globalization is also leading to the development of new hubs and the growth of corresponding traffic flows, such as Middle East to Asia-Pacific.²⁰⁵

And, as Boeing further stated in its 2006 Market Overview 2006-2025 presentation at the July, 2006 Farnborough Air Show, the intra-Asia market share (including China) of world traffic will increase from 17% to 23%.²⁰⁶

IATA notes, and Airbus and Boeing affirm, that “China and India have the potential to reshape the travel industry.”²⁰⁷ In terms of India, Boeing has increased its forecast of the number of aircraft the Indian market needs over the next 20 years to almost 600, up from a forecast 250 in 2002; Airbus tripled its forecast for the same period to 950. Further, an estimated USD 25 to 40 billion dollars is reportedly needed over the next 5 to 7 years to finance aircraft purchases for an aviation sector that is growing faster than India’s GDP.²⁰⁸ And the number of passengers using Indian airports in February 2006 – almost 7 million - rose 36% from the previous February.²⁰⁹

In terms of China, Boeing estimated in June 2006 that Chinese carriers may purchase more than 2,600 aircraft valued at USD 213 billion by 2024.²¹⁰ The Civil Aviation Administration of China forecasts 11% annual growth in domestic Chinese travel between 2011 and 2020, and other estimates provide for around 220 commercial airports in China by 2020.²¹¹

(ii) Aircraft carbon emissions and aviation’s contribution to climate change in the Asia Pacific

It was said earlier that environmental concerns regarding aircraft carbon emissions and aviation’s contribution to climate change will be the most contentious issue with which the aviation industry will have to deal. With exceptional growth in air travel forecast for the Asia Pacific region over the 2006-2025 period – indeed, with the Asia Pacific set to lead the world in this regard – and with more than one-third of all new aircraft acquisitions being delivered to the region over that period, as outlined above,²¹² the Asia Pacific will become a focus for such concerns, perhaps exacerbated by significant population growth and extraordinary economic development in the region.

²⁰⁵ Boeing, *Current Market Outlook* 2005, p 5
(http://boeing.com/commercial/cmo/pdf/cmo_parisbook.pdf).

²⁰⁶ Boeing, *supra*, note 62.

²⁰⁷ Airbus, *supra* note 100, p 18.

²⁰⁸ Neelam Mathews, “Capital Needs,” *Aviation Week & Space Technology*, 13 March 2006, p 51.

²⁰⁹ Neelam Mathews, “Double Jeopardy,” *Aviation Week & Space Technology*, 15 May 2006, p 55.

²¹⁰ “Rising travel demand in nation boosts Boeing order book,” *Seattle Post-Intelligencer*, 11 April 2006
(http://seattlepi.nwsourc.com/business/266209_boeing11.html).

²¹¹ Nicholas Ionides, “Chinese carriers bound for top 10,” *Flight International*, 7-13 March 2006, p 14.

²¹² Boeing, *supra*, note 201.



Further, international aviation is not part of the Kyoto Protocol to the UN Framework Convention on Climate Change. And it should also be noted that mandatory commitments under the Kyoto Protocol to reduce greenhouse-gas emissions apply only to so-called Annex 1 nations; many Asia Pacific nations are excluded. As a result, emerging industrial powers such as China and India – non-Annex 1 nations – in which domestic and international aviation growth will be substantial²¹³ are not bound to reduce their emissions.²¹⁴

Given these developments and the projected aviation growth in the Asia Pacific and the certain increase in aircraft carbon emissions, *the time appears to be opportune for dedicated research and analysis in the region on these aviation-related environmental issues.*

(iii) The LCC phenomenon and liberalisation

LCC growth has swept through Asia and has spread faster in Asia than anywhere else. And, as Boeing noted in its 2006 Market Overview presentation at the July, 2006 Farnborough Air Show, the emergence of LCCs in the region is accelerating liberalisation and competition.²¹⁵ LCCs have

the potential to unlock massive growth throughout Asia – and especially in China²¹⁶ and India²¹⁷ ... [t]he process of economic growth, the parallel expansion of international trade, the urbanisation that follows economic development – all of these factors are just reaching a threshold now, which appears to be just the right medium to incubate [LCCs].²¹⁸

As a current reflection of such growth, Thailand is considering a dedicated LCC terminal at its new Suvarnabhumi international airport to serve the burgeoning LCC traffic in the region. Such a terminal would follow similar LCC terminals in Singapore and Malaysia.²¹⁹

It may be that LCC development in Asia may follow a different model to that followed in the US and Europe, given the dynamics of the region. The LCC model in the US and Europe is more or less a domestic one; in Asia, LCCs have demonstrated that the model is one that works both regionally and internationally.

²¹³ Forecast significant aviation growth in China and India was referred to earlier.

²¹⁴ See Elizabeth Kolbert, “Annals of Science: The Climate of Man – III,” *The New Yorker*, 9 May 2005 and Kolbert, *supra*, note 12.

²¹⁵ Boeing, *supra*, note 62.

²¹⁶ Indeed, China is widely believed to have perhaps the largest LCC market in the world.

²¹⁷ IndiGo recently became India’s sixth new LCC. One estimate forecasts that the LCC market in India will reach 70% by 2010: Centre for Asia Pacific Aviation, *Asia Pacific Airline Daily*, 7 August 2006.

²¹⁸ Peter Harbison, “Setting the Scene – the Asia Pacific Low Cost Airline Market,” Low Cost Airline Symposium, Macau, 26-27 April 2004.

²¹⁹ Boonsong Kositchotethana, “Suvarnabhumi may have LCC terminal,” *Bangkok Post*, 10 July 2006.



Reference was made earlier to the abolition of national ownership requirements in air services agreements - the "substantial ownership and effective control" clauses of such agreements - as part of the liberalisation of such agreements. In the establishment of LCCs in Asia, however, it has been shown that such clauses may not hinder liberalisation of international air services in certain circumstances (for example, Qantas in effect established an LCC in Singapore, and AirAsia established Thai AirAsia as a cross-border joint venture).

And on liberalisation, both Boeing and Airbus note its importance in the Asia Pacific region. Boeing states that

Governments continue to increase access to the marketplace by removing restrictions on carriers in their own countries and permitting additional levels of service across the globe. A decreasing regulatory burden frees new and existing carriers to improve their networks, innovate their business models, and pursue different strategies.²²⁰

(c) No multi- and cross-disciplinary aviation research institute such as that proposed presently exists

As stated in the introduction to this document, the Institute will be a not-for-profit aviation research centre. Its purpose will be to produce, through global multidisciplinary collaboration, innovative approaches and sustainable solutions to issues and problems facing the aviation industry today.

Through eliminating barriers, both physical and intellectual, its aim is to create an environment that revolutionises aviation research and the way that research is organised and undertaken.

The Institute will, subject to adequate funding and other conditions, be based in Perth at the University of Western Australia.

Our research reveals that no dedicated aviation studies institute such as that which we propose presently exists.²²¹ There are aviation institutes and centres, located at universities and elsewhere, or that stand alone, around the world. Many focus on teaching, however, or on graduate degree research. And many are vocational in nature, or

²²⁰ Boeing, *supra* note 205, p 3.

²²¹ The National Center of Excellence for Aviation Operations Research (NEXTOR), a joint initiative of 5 United States universities, the US Federal Aviation Administration (FAA) and certain aviation industry partners should, however, be noted. NEXTOR was established as a "national center of excellence" with regard to aviation *operations*. The structure and focus of the institute proposed in this document is clearly different, as are its objectives, to those of NEXTOR. While both are initiatives which envisage cooperation between industry, government and universities (see <http://www.nextor.org>), the similarities end there. The Centre for Asia Pacific Aviation should also be noted. This centre, however, is a for-profit consulting organisation and conference organiser.



focus on specific aspects of aviation, either in terms of industry sector, specialisation or otherwise.

None of the above organisations, however, approach the Institute's research scope, aims or model.

In terms of our proposed Institute, someone has to be first. Its not-for-profit structure may help to explain why nothing like it has been attempted before, as might its ambition. And, while a non-profit organisation, we propose to fill a "blue ocean." Blue oceans

defined by untapped market space, demand creation ... [they] are created well beyond existing industry boundaries ... In blue oceans, competition is irrelevant because the rules of the game are waiting to be set.²²²

²²² W Chan Kim and Renee Mauborgne, *Blue Ocean Strategy: How to Create Uncontested Market Space and Make the Competition Irrelevant* (Boston, Harvard Business School Press, 2005), pp 4-5.



5. PERTH AND THE UNIVERSITY OF WESTERN AUSTRALIA

Why Perth?

Goh Chok Tong, the former prime minister of Singapore, has noted that

Australia is a developed country rich in natural resources, talented people and technology. Its political and cultural values are Western but the society has a rich Asian mix. Australia enjoys close ties with the US and Europe. Australia is therefore well-placed to serve as another nexus between the West and Asia.

More specifically, he writes that “transport security ... will grow in importance. Trans-national health threats such as avian flu [spread in part through carriage by air] will be of concern. Australia could play a role in the overall regional effort to tackle these challenges.”²²³

Closer to Singapore than it is to Sydney, Perth, Western Australia, is uniquely located geographically to host an international institute for aviation studies. It is a gateway to Australia for international carriers – Emirates, perhaps most significantly²²⁴ - and it sits almost equidistant between India, China, the western parts of Asia and the western Pacific. With aviation growth in the Asia Pacific region forecast to be greater than in any other region over the next 20 years, the Asia Pacific represents an aviation revolution. Perth sits at the epicentre of this region and this revolution.

Perth is also a non-threatening environment in which to conduct both research and business; it is an environment in which one can ask questions and seek answers. It is home to a wide mix of cultures and backgrounds, and it has a significant Asian population. It is not attended by adverse political, social or religious conditions.

Further, over the past 10 years, Western Australia has been Australia's fastest growing state economy, averaging 5% annually compared with the national Australian average of 2.8%; in the year to March 2006, growth was 10.6%, with a 31% increase in business investment. Its resources, mining and energy-backed economy is booming such that WA now contributes almost a third of Australia's total exports.²²⁵

Perth's location enables its international corporations to communicate in real time for a number of hours at the beginning and end of each day with businesses in North America

²²³ Goh Chok Tong, “Regional ties strengthen in evolving Asia,” *The Australian*, 26 September 2005.

²²⁴ See, generally, Damien Horth and Tabitha Alwyn, “What does Emirates mean for Europe,?” *UBS Investment Research*, 13 January 2005.

²²⁵ Andrew Burrell, “Call me Carps: Premier coasts as WA soars,” *The Australian Financial Review*, 24 July 2006; see also <http://www.westernaustralia.com/en/Industry/Investor+Information/Why+Invest+Here/Economy.htm>.



and Europe. And, of course, it is either in the same time zone as, or is plus or minus 1 hour from, all major Asian cities.²²⁶

Given its location and the associated advantages outlined above, the Institute could also play an instrumental role in building interaction and exchanges with the People's Republic of China and North Asia, in addition to India and southeast Asia. Bilateral relations between the two countries particularly in the economic sphere are expanding significantly, and aviation is an area in which a number of opportunities exist for research cooperation and integration.

Finally, major non-profit research organisations are located in Perth, including the UNESCO Intergovernmental Oceanographic Commission's Indian Ocean Tsunami Warning and Mitigation System²²⁷ and the Western Australia Institute for Medical Research (WAIMR).²²⁸

From its base in Perth, then, the Institute's multidisciplinary research projects will be undertaken internationally, either by individuals or research teams (such teams themselves not necessarily located in the one place). Through eliminating barriers, physical and intellectual, our aim is to create an environment that revolutionises the way aviation research is organised and undertaken. As Avram Miller, formerly vice-president of business development at Intel and a co-founder of Intel Capital, has noted,

The cornerstone for this millennium is the end of time and space ... Moving forward, it really isn't going to be important where you are in order to do your job. Ideas are being worked on 24 hours a day. Nobody seems surprised anymore if I wake up in the middle of the night and start IM-ing someone in Europe, because the fact is, they don't even know where I am. And it doesn't matter.²²⁹

The University of Western Australia and the International Institute for Aviation Studies: "Campus creativity"

Lawrence Summers, formerly president of Harvard University and secretary of the US Treasury, notes that

Universities are places where very talented people can come - sometimes for very short, intense periods - to work with and learn from other very talented people ... research universities are decentralised organisations - that is, they give their people

²²⁶ Bangkok, Beijing, Hong Kong, Jakarta, Kuala Lumpur, Shanghai, Seoul, Singapore and Tokyo; 3 hours ahead of New Delhi and Mumbai; 4 hours ahead of Dubai.

²²⁷ "Tsunami detection centre for Perth," *The Australian*, 12 July 2005.

²²⁸ Professor Peter Klinken, Director of WAIMR, in an address at the University of Western Australia, said that "I often get asked why bother doing research in WA. I have the perfect answer for that: [2005 UWA Nobel Prize Winners] Barry Marshall and Robin Warren ... [UWA is] integrated into the world research community." "Holding cancer in check," *Uniview*, June 2006, p 28.

²²⁹ Danielle Sacks, Interview with Avram Miller, *Fast Company*, March 2006.



general guidelines, provide them with resources and create environments in which they can do their best work.²³⁰

Universities are, of course, environments conducive to achieving research excellence. For that reason, for the reasons put succinctly by Professor Summers above, and because they will be mutually supportive research environments, the Institute will be based in Perth at the University of Western Australia (UWA).²³¹ UWA is one of Australia's leading research universities, ranked by the Times Higher Education Supplement in its "World University Rankings" as one of the top 100 universities in the world.²³² In 2005 one of its faculty - and a former graduate - won the Nobel Prize for Physiology or Medicine.

The mutually supportive research environments represented by the Institute and UWA are additionally important given particular elements of the Institute's research programme and work product as outlined in the next part of this document.

Synergies that will exist between the Institute and its host institution, UWA, become even clearer when one considers Professor Summers' conclusion that business can learn from what he terms "campus creativity:"

Organisations that foster an environment where creativity is rewarded, that prepare themselves to respond to challenges and execute their strategy in a nimble way, and that discourage rigid adherence to hierarchy will best be able to meet the challenges of this new century.²³³

Such elements will characterise the International Institute of Aviation Studies' unique, UWA-based research community.

²³⁰ Lawrence Summers, "Why business must study campus creativity," *The Australian Financial Review*, 2 September 2005 (reprinted from *Harvard Business Review/ New York Times Syndicate*).

²³¹ Subject to adequate funding and other requirements.

²³² *The Times Higher Education Supplement*, *supra*, note 2. UWA is ranked equal 80th, up from #96 in 2004.

²³³ Summers, *supra*, note 230.



6. RESEARCH PROGRAMME, WORK PRODUCT AND UNIQUE RESEARCH COMMUNITY

(a) Directed research

The Institute's Board, in association with its International Advisory Council, will determine at the outset and from time to time aviation research priorities. Depending on the nature of the particular research priority and the specific issues and/or problems to be addressed, the Institute will then seek – through requests for proposals, expressions of interest, public calls and announcements, and individual approaches through the Institute's industry, government and academic networks – leading researchers, scholars, analysts or consultants, or teams of such individuals, across disciplines, to undertake the relevant research projects. The nature of the research to be undertaken, the issues or problems to be addressed and the required work outputs will determine whether an individual, a number of individuals or a cross-disciplinary team is selected.

The *challenge* we offer - to build research teams to provide better, innovative, sustainable solutions to the global problems facing the aviation industry – will attract the best people anywhere, together with the *possibility* we offer: Unique, integrated, multi- and cross-disciplinary research solutions to these problems.

We offer the opportunity to make a difference.

Research projects may be conducted either at the Institute or elsewhere. The focus of the Institute's directed research programme is the research itself. Geographic and other boundaries (disciplinary or intellectual) will not be material.

Over time we plan to establish specific research streams, each to be led by individuals, again either at the Institute's physical premises or elsewhere. Such a structure, in our view, will further add to the Institute's global reach.

Research conducted as outlined above would be funded by grants from the Institute.

The results of such research would be disseminated as **research monographs** published by the Institute – the core research work product of the Institute. **Research reports** and **briefing notes** on such research would be disseminated to industry, academia, government and interested individuals through media releases (as appropriate), journals, industry periodicals and the Institute's website. Further, such reports and notes would be disseminated to the Institute's members/subscribers worldwide, and through **briefings** which the Institute would conduct (see below).



Research monographs, together with related research reports and briefing notes, would also be available for purchase through the Institute's online store (again, see below). They would be provided to Institute financial donors at no charge.

(b) Third-party commissioned research

The Institute will also commission research through the same search process as outlined above (from leading researchers, scholars, analysts or consultants, or teams of such individuals) which has, in turn, been commissioned from the Institute by third parties.

This commissioned research must be broadly in line with the research priorities of the Institute. Commissioned research and the relevant research project team will be approved by the Institute's Board, in part to ensure compatibility with the Institute's research priorities and also to ensure research transparency.

All commissioned research projects would be publicly disclosed by the Institute at the point of commissioning, and the results of that research, whether in the form of a report or paper, could be available for purchase (subject to agreement with the commissioning party). Further, research reports and briefing notes on commissioned research could be disseminated in the ways as outlined above with regard to the Institute's directed research, although such dissemination would again be a matter for agreement between the Institute and the commissioning party.

Against this background, there are clear advantages for organisations in commissioning aviation-related research, studies or reports from the Institute. Unlike consultants and consulting organisations, the Institute offers a "whole of aviation" approach. In part as a result of the Institute's structure and unique research community, organisations commissioning research from the Institute receive truly cross-disciplinary, integrated research solutions – with no agenda, no predetermined answer, and no bias.

(c) Working Paper series

A "Working Paper" series will be published by the Institute. Researchers, scholars, analysts or consultants, with or without an institutional affiliation, would submit manuscripts to be considered for publication as Working Papers by the Institute's Board in association with its International Advisory Council and, if necessary, further third party review.

After the commencement of the Institute's research activities, and then periodically, calls for submissions of research for consideration for publication in the series would be made through notices in selected journals and periodicals and through other avenues. Beyond being aviation-related, no specific subject matter or other criteria would be set for publication of research as a Working Paper. In this way all aviation research would be considered, further enhancing the Institute's multi- and cross-disciplinary credentials. Moreover, the Working Paper series could provide a forum for emerging and early career



aviation scholars, researchers and analysts, as well as promoting research creativity and new perspectives.

The Working Paper series, then, could be a prescription for innovation.

Working Papers would be available for purchase through the Institute's online store. They would be provided to Institute financial donors at no charge. Research reports and briefing notes on research published in the Working Paper series would be disseminated in the ways and manner as outlined above with regard to the Institute's directed research.

(d) Online journal and open-access publishing

We plan to launch, under the Institute's auspices, a quarterly online, multidisciplinary aviation journal. Authors (in effect, their grant providers) whose articles are accepted for publication in the journal – through the usual peer review process – would be charged a fee. Access to the journal would be free for everyone. No subscription fee would be charged.

Given the journal's online nature, the Institute would also publish more frequently in it reports or updates by scholars and researchers of work or research *in progress* with a forum for online discussion (in real time or otherwise) of that work or research.

Our aim is to ultimately create a public, one-stop repository of aviation research - an "open-access"²³⁴ electronic "journal" containing research articles, research updates and "posts" of research in progress. Over time our aim is for this online journal to become the obvious place to go to for first-rate aviation research and almost "real time" information concerning the latest aviation developments and ideas.

(e) Scholar(s)-in-residence programme

In addition to providing work space and research facilities for those researchers, scholars, analysts or consultants conducting directed research at the Institute²³⁵ and within the broader environment of a world-class university,²³⁶ a programme to provide work space and research facilities for researchers and scholars wishing to undertake research at the Institute would be an integral part of the Institute's research programme.

Through this "scholar(s) in residence programme," as part of their period of residence at the Institute, such researchers and scholars would provide a seminar or seminars, either for a selected audience, the general public or for the university community (such seminars available for free as either live webcasts or subsequently downloadable for free,

²³⁴ "Scientific publishing: Creative destruction in the library," *The Economist*, 1 July 2006, p 80.

²³⁵ Again, depending on the nature of the research being conducted, the specific issues being addressed and the required work outputs, researchers, scholars, analysts or consultants, or teams of such individuals, will undertake the relevant research either at the Institute, at an international location or locations, or at a combination of such places.

²³⁶ The University of Western Australia; see note 2.



on demand). They would also be available to discuss research with those researchers, scholars, analysts or consultants conducting directed research at the Institute, and with students and staff at the University of Western Australia.

(f) Host visiting researchers and scholars

As an adjunct to the scholar-in-residence programme, the Institute would provide work space and facilities to scholars visiting the Institute and would, if appropriate, facilitate the provision by such visiting scholars of a seminar or seminars.

(g) Institute conferences, round table discussions, seminars and briefings

(i) Conferences

A major part of the life of the Institute would be the provision, once a year or biannually, of a major cross-disciplinary aviation conference. The conference would provide a global forum for the presentation of aviation-related research. In addition to research produced under the auspices of the Institute – whether through directed research, commissioned research or research presented in Working Papers – the conference would consist of multiple research streams in which aviation research would be presented and discussed, such streams focused at least initially on the Institute’s research priorities.

It is envisaged that a major part of the first Institute conference would deal with aviation and the environment – that is, aviation emissions trading schemes, environmental drivers in the aviation industry, and strategies for airlines on climate change issues.

Issue or subject-specific conferences could be held periodically at the Institute, such conferences driven by the research being undertaken by the Institute or elsewhere and/or by aviation industry matters, issues or problems at the relevant time.

Proceedings of annual and other Institute conferences (papers and presentations) would be available for purchase through the Institute’s online store, as would transcripts of conference debates and questions and answers.

In holding such conferences the Institute will convene experts, policymakers and investors.

(ii) Round table discussions

Internal Institute “round table discussions” - held either in person, by teleconference or videoconference (or a combination) - will be convened at periodic intervals during each directed research project between Institute personnel and project members to monitor research progress and to deal with research or practical issues that have



arisen (in this regard see also the section below headed **Unique research community**).

Such discussions will also take place periodically between Institute officials, the Board and the Institute's International Advisory Council to discuss aviation developments and ongoing Institute research priorities.

Round table discussions will be convened when it appears that the Institute - given its multidisciplinary research expertise and capabilities, its global network and its global reach - may be able to contribute in some way to specific events, to the resolution of specific aviation-related issues or problems, or to dialogue on aviation matters of immediate concern.

(iii) Webcast seminars

As with Institute conferences, one-off issue or subject-specific seminars would be held periodically at the Institute. A seminar would be offered, for example, by a visiting Institute scholar, a specific research project member, or a prominent individual in the aviation industry. These seminars would be offered at the Institute or at venues around the world, and would be recorded live in front of an audience. They could also be watched free as live webcasts, or the webcasts could be subsequently downloaded for free, on demand (in this regard see, again, the section below headed **Unique research community**).

(iv) Briefings

The Institute will provide one or two-page briefings on current aviation issues and problems, as they arise, in the form of issues papers, research notes and "backgrounders" (and accompanied by references to relevant sources and research). They would be suitable for use by industry, government, research communities and the media (the latter in slightly different form from the former), and would be circulated as appropriate by the Institute. Such briefings would also be available for purchase through the Institute's online store.

(h) Global monitoring of aviation research, developments and trends

Over time, as the Institute's resources, research facilities and global reach grow, it should be possible for the Institute, with input from various locations around the world, to provide global monitoring of aviation research, developments and trends. Provision of such monitoring would be provided electronically and could be provided on either a weekly or monthly basis.

There is no present dedicated digest or summary – monitoring - of multidisciplinary aviation research, developments and trends. Over time, such digest or summary, perhaps with some commentary and analysis, could become indispensable reading for the aviation research community, the aviation industry and governments on a global basis.



(i) Membership

Individuals and corporations will be able to join the International Institute of Aviation Studies as either associate or full members. Benefits of membership, depending on membership level, will include subscription to Institute publications, advance notice of upcoming events and publications, reduced rate attendance at Institute conferences and seminars, and the opportunity to sponsor Institute events at a full sponsorship rate discount.

Institute sponsors and donors are automatically conferred membership of the Institute for the period of their sponsorship, in addition to the benefits of being a sponsor or donor as previously outlined in this document.

(j) Online store

The Institute would provide an online store at which its research output and products – (i) research monographs (together with related research reports and briefing notes); (ii) working papers (together with related research reports and briefing notes); (iii) proceedings of annual and other Institute conferences (papers and presentations) and transcripts of conference debates and questions and answers; and (iv) briefings on current aviation issues and problems in the form of issues papers, research notes and “backgrounders” – could be purchased. Institute membership could also be purchased at this online store.

(k) Physical structure of the Institute and the breaking down of intellectual and physical barriers

We envisage that the interior design of the Institute will reflect the Institute’s purpose: to produce, through global multidisciplinary collaboration, innovative approaches and sustainable solutions to issues and problems facing the aviation industry today. Through eliminating barriers, both physical and intellectual, our aim is to create an environment that revolutionises the way aviation research is organised and undertaken. To that end, the Institute’s *physical* environment – its offices and research space, its layout and design - will be characterised by open spaces, waist-high cubicles, high ceilings, conference rooms with glass walls, common areas and loose, eclectic arrangements. We believe that

a lack of walls conveys the idea that communication is free-flowing. And an absence of private offices suggests that teamwork is the highest priority.²³⁷

The Institute’s design will reflect “a trend toward [a] more creative, interactive work environment ...”²³⁸

²³⁷ Joseph Weber et al. “ ‘Mosh Pits’ of Creativity,” *BusinessWeek*, 7 November 2005, p 78.

²³⁸ Elizabeth Woyke, “Work Life,” *BusinessWeek*, 29 May 2006.



Barriers - in relation to communication and collaboration – will also be eliminated through the Institute's use of Web 2.0 technologies, which "flatten a raft of organizational boundaries – between managers and employees and between the company and its partners and customers,"²³⁹ and through use of networking and innovation tools like IBM's "ThinkSpace" which help create environments that encourage collaboration and the networking of ideas for innovation. With reference to such tools,

one of the keys to innovative thinking – and innovative outcomes – is to provide [people] ... with easy and effective mechanisms for networking across divisional boundaries as well as geographic borders."²⁴⁰

Innovation, however, is not just about technology. It is also about possibility.

(I) Unique research community: Collaboration and innovation

In establishing the Institute's research community, our guiding principle is that the whole is greater than the sum of its parts – notwithstanding that some of those parts will be world research leaders.

While the physical Institute will be located in the Asia Pacific – in Perth, Western Australia – the research reach of the Institute will be global. The research programme of the Institute, its conferences, round table discussions, seminars and briefings, and its structure will all be designed to eliminate intellectual and physical barriers, and promote research integration. Communication between the Institute's physical community in Perth and its international research communities will be effected using the most advanced technologies and networking and innovation tools. To paraphrase AT&T,

[o]ur research workday will never end. Ending the workday in one place will not stop our best thinking from moving forward somewhere else. The Institute will enable collaboration around the world. And around the clock.²⁴¹

Our belief is that great ideas know no bounds.

Again, no other research community is designed to ask and answer the questions we want to address. Through such design, our unique research community can make a difference and effect global aviation solutions – and change. Innovation is achieved both in terms of the research and the research approach.

There are compelling reasons for a research community such as that which we propose, and compelling reasons why our vision will attract a great network of people to make a difference.

²³⁹ Robert D Hof, "Web 2.0: The New Guy at Work," *BusinessWeek*, 19 June 2006, p 58.

²⁴⁰ Simon Lloyd, "A Place to Think," *Business Review Weekly*, 15-21 June 2006.

²⁴¹ See http://att.sbc.com/common/files/pdf/alan_spread.pdf.



Hasso Plattner, the co-founder of SAP, has said that “many disciplines together distil the best ideas.”²⁴² The challenges and problems facing the aviation industry today are multidisciplinary; they are also unprecedented. The Institute, then, has two essential characteristics: (a) a unique research programme and structure; and (b) collaboration across boundaries and borders with a view to providing innovative research solutions.²⁴³

We aim to identify the best people to provide the best answers. Put another way, talent expands possibilities.

²⁴² “Interview with Hasso Plattner: To Innovate, Collaborate,” *BusinessWeek*, 17 October 2005, p 72.

²⁴³ As an example of such innovative research, it was said earlier in this proposal that governments are contemplating the implementation of an ongoing tax on airline tickets to fund development and other aid, including medical aid, for Africa. However, the potential for the aviation industry worldwide to play a significant role in development aid and disaster relief in terms of transport, logistics and provision of supplies, personnel and cargo (for example) has largely been ignored. Recent events suggest that research is urgently needed to examine how an integrated, coordinated approach to these issues by the aviation industry – governments, airlines, airports and suppliers to aviation together – could be developed and implemented. This is one of the Institute’s proposed research priorities.



7. STRUCTURE OF THE INSTITUTE

A public company limited by guarantee

The Institute's structure will be that of a company limited by guarantee. The use of the guarantee form is prevalent among not-for-profit type companies. Indeed, the company limited by guarantee has been utilised primarily by non-profit companies in Australia. Like the company limited by shares this type of company limits the liability of its members to a fixed amount, the amount of the guarantee. Unlike the company limited by shares, members do not contribute money while the company is a going concern. The guarantee would only be called in a winding up situation.

As companies limited by guarantee do not have a share capital, they cannot be formed as proprietary companies. Guarantee companies are, then, subject to all of the disclosure requirements that apply to public companies.

The Australian Securities and Investments Commission (ASIC) may register a company limited by guarantee without the word "Limited" in its name – that is, The International Institute for Aviation Studies - if its constitution provides for certain matters.²⁴⁴

A company limited by guarantee must, at a minimum, have 3 directors.

Board

The Institute would be governed by a Board which would set the strategic direction for the Institute and its overall research priorities.

International Advisory Council

Whilst cognisant of the need to maintain a simple and unadorned structure for the Institute, we propose an International Advisory Council (IAC) to be available for formal consultation by the Chair and Board, as agreed, primarily to advise on the Institute's research priorities and associated matters.

The IAC would not perform any constitutional role. Its function, in addition to the above advisory one (its main role), would be to promote the Institute and for its members to allow their names to be associated with the Institute as a member of its IAC so as to promote the reputation of the Institute.

Nothing would preclude IAC members from being involved in specific Institute projects, matters and initiatives on an ad hoc basis.

²⁴⁴ Corporations Act 2001 (Cth) section 150.



The IAC would comprise individuals distinguished in the areas of aviation, scholarship and business.

People

(a) Executive

The Institute would be run by a *Chief Executive Officer*. A *Director of Research* would be responsible for the Institute's aviation research programme and its direction as advised by the Board. David Hodgkinson would fill the position of Chief Executive Officer.

(b) Other staff

- (i) Office manager
- (ii) Administrative support officer (this position may be conflated with the office manager position, at least at the outset)
- (iii) Given the proposed projects of the Institute, its work product and output - research monographs (together with related research reports and briefing notes); periodic, electronic research updates; third-party commissioned research; a working paper series; an online journal; a scholar(s)-in-residence programme; Institute conferences; round table discussions; seminars and briefings; daily global monitoring of aviation research, developments and trends; and an online store – additional staff, some with particular expertise in specific areas, will be needed. *Such staff will not be required at the outset* (mindful as we are of costs and of over-staffing) but, rather, over time as the Institute progresses and as more of its proposed programmes, projects and initiatives come online.

(c) Research programme leaders

As mentioned earlier, over time – and not at the outset - we plan to establish specific research programmes, or streams, each to be led by individuals either at the Institute's physical premises or elsewhere – that is, individual research programme leaders will be located both at the Institute and at a (physical) distance.

(d) Advisors

The Institute would also retain a firm of accountants, an auditor, and – given its scope and the nature of its international endeavours and research programmes - an international law firm.



8. FUNDING REQUIREMENTS

We aim to raise 8 to 10 million USD over the first two years of the life of the Institute.

A detailed business plan and budget can be provided to potential donors upon request.

Please contact David Hodgkinson, either by telephone, email or fax, to discuss support for the Institute. His contact details are provided at Part 10, page 72.



9. PEOPLE

The Institute's designated Chief Executive Officer, **David Hodgkinson**, 41, is a principal of The Hodgkinson Group, Aviation Advisors (www.hodgkinsongroup.com). The 11-member Group has advisors located around the world.

David was formerly Director of Legal Services at the International Air Transport Association (IATA), the organisation of the world's international scheduled airlines, in Montreal. At IATA, amongst other things, he led an industry-wide legal taskforce in relation to the IATA Operational Safety Audit (IOSA), a world-wide, standard operational safety audit for airlines, and acted as chief counsel to the IOSA Advisory Group. David also served as chief counsel to the IATA Clearing House, a multi-billion dollar international banking mechanism through which the world's airlines conduct financial transactions with each other.

He has previously been a partner in a national Australian law firm. Earlier he was Senior Legal Research Officer at the High Court of Australia, where he completed most of his work for Justice Sir William Deane.

His PhD thesis is on the regulation of aviation in federal systems.

David holds a Bachelor of Arts degree with First Class Honours, a Bachelor of Laws degree and a Master of Philosophy degree (with a thesis on treaty interpretation), and was a Postgraduate Fellow at Columbia University, New York. He has taught constitutional law at universities including the Australian National University, and has taught international law and international relations at other Australian universities. He has run the aviation law component of the International Aviation MBA programme at Montreal's Concordia University, and provided air law seminars at McGill University.

A regular contributor to international journals, David has been published in journals including *Air & Space Law* (the world's leading aviation law journal), the *Virginia Journal of International Law*, the *Loyola of Los Angeles International and Comparative Law Journal* and *Asia Law*. He is a member of the Editorial Board of the *World Review of Intermodal Transportation Research* and is a contributor to *Air & Space Law* on aviation developments in Australia and New Zealand. David has authored, co-authored or edited four monographs or books and is a regular speaker at aviation law conferences.

In 1997 David was the recipient of an Evans Grawemeyer Fellowship awarded by the Australian Government for research and activities aimed at improving the global order.



Assisting in the preparation of this document, **Professor Alex Coram**, a member of The Hodgkinson Group, is Professor of Political Economy, Aberdeen Business School, Robert Gordon University, Scotland, and Professor of Political Science at the University of Western Australia. In 2006 he held the Helen Sheridan Barber Chair of Economics at the University of Massachusetts, Amherst.

The focus of Alex's current research is on strategic choice (game) theory, optimisation theory and formal modelling with reference to transportation – aviation in particular - and problems of conflict over resources and resource sharing. Most recently he has concentrated on the problem of analysing large dynamic systems. He also works on problems involving differential games.

Alex has held the following appointments:

- Visiting Professor, University of Chicago
- Visiting Professor of Economics, Institute for Advanced Studies, Vienna
- Simon Visiting Fellow, University of Manchester
- Fellow, Institute for Advanced Studies in the Humanities, University of Edinburgh
- Visiting Professor, University of Essex

The author of *State Anarchy and Collective Decisions: Some Applications of Game Theory to Political Economy* (Palgrave Macmillan, 2001), Alex has published over 30 papers in international journals and a number of research papers for governments and government agencies. He is the author of "Managing consumption of bad producing goods: Limits to use with changing distribution of wealth," which looks at the effect of inequality on collective decisions about the level of permissible consumption of goods which produce a collective bad such as air travel; restrictions on the consumption of such goods are sometimes thought preferable to rationing through a market and may become increasingly common.

He is also the author, with David Hodgkinson, of the article "Climate Change, Business and the Value of Anticipation."

Also assisting in the preparation of this document, **Brett Duthie** was formerly deputy General Counsel with Air New Zealand, Corporate Lawyer with Qantas and Legal Counsel at Airservices Australia. He has also worked as Legal Adviser to Standard Chartered Bank and as Manager of IT Contracts for Morgan Stanley & Co International Limited in London.

He has been involved with a number of major aviation-related negotiations including merger discussions between Air New Zealand and Qantas, the contract for the acquisition of Airbus A320s by Air New Zealand, a joint venture agreement with Pratt & Whitney,



an EMU compliance consultancy agreement with KPMG and a telecommunications agreement with British Telecom.

Brett is a solicitor of the Supreme Courts of England and Wales, New South Wales and the Australian Capital Territory. He is also a solicitor of the High Court of New Zealand.



10. CONTACT DETAILS

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