

Aviation growth in a climate of change

Projected growth in aviation over the next 20 or 30 years could have implications for global temperature changes as the effects of greenhouse gases (GHG) take their toll.

While some other sectors of the economy are currently reducing their emission levels, the aviation industry looks set to move in the opposite direction unless mitigating steps are taken.

A 12-month Omega-funded study led by Manchester Metropolitan University (MMU) is assessing the impact of aviation growth on global temperature changes. Headed by Dr Sarah Raper and Potsdam Institute for Climate Impact Research secondee, Dr Malte Meinshausen, the study is building on previous research in this area and synthesising information to create an up-to-date picture in the context of various GHG emission scenarios up to the year 2050.

Commenting on her team's work at MMU, Dr Raper emphasised that their findings pointed up the consequences of aviation growth in a sequence of 'what if?' scenarios:

"The results of our study so far confirm that mitigating action will need to be taken at the policy-making level if our projections of aviation growth are correct."

MMU has used various time horizons – 2020, 2030 and 2050 – to assess its findings in the context of various climate mitigation scenarios, including those compatible with the EU directive target not to exceed 2°C above pre-industrial levels.

Reducing GHG emissions in an aviation context may require some radical re-thinking of aircraft design, fuels and associated emissions. Effects of aviation on temperature are being analysed by researchers using the internationally respected MAGICC model (Model for the Assessment of Greenhouse Gas Induced Climate Change).

The final results will provide invaluable data, not only for the wider scientific community but also for government authorities and aviation industry stakeholders. The aviation growth scenarios and their impact on climate change will enable informed decision-making on the future of aviation policy and investment strategies in the industry.

Understanding the climate effects of contrails

Aviation condensation trails ('contrails') may look pretty as planes streak across the open sky. Increasingly, however, the cirrus-like clouds that contrails create have come under closer scrutiny as agents of potential climate change.

Omega are currently undertaking a two-year study into the global effects of contrails. Spearheaded by Prof Piers Forster at the University of Leeds, the investigation is centred on creating a new UK climate model that links to one of the world's foremost climate models at the Hadley Centre (part of the UK Met Office).

Visit Omega's new website:
www.omega.mmu.ac.uk

Omega's new website was launched at the end of April! It is set to provide a growing source of information for academics, the general public and those who are undertaking policy or commercial analysis.

The new site reflects how we've progressed since we launched in early 2007. Along with much more content than our old website, we've re-categorised our knowledge-base into eight distinct areas.

These are: **CLIMATE CHANGE; LOCAL AIR QUALITY; NOISE; AIRCRAFT DESIGN & TECHNOLOGY; AIRCRAFT OPERATIONS; ALTERNATIVE FUELS; DEMAND; MITIGATION POLICY**

We will be adding briefing papers and newsletters together with study reports and findings on a wide range of topics. As you would expect, information on the site is characterised by Omega's academic independence of thought and sense of responsibility towards environmental issues.

It provides an authoritative 'knowledge transfer' resource for objective, accurate and up-to-date information - as well as bearing the 'Omega' label - an academic 'kitemark' reflecting the acknowledged expertise of our partnership of nine leading UK universities.



Omega Short Course 'Aviation Sustainability'

17 – 19 June, 2008. Cranfield University

Omega is offering a three-day course outlining current and emerging knowledge on many elements of aviation environmental sustainability.

The course will be valuable for air transport professionals, government department and NGO practitioners who will benefit from a broad understanding of aviation's environmental effects and options for improved sustainability performance.

COST £40 PER DAY
(admin charge only, course free, charge excludes accommodation)

To be sent details of the course, email Jo Lowe in the Omega office at j.e.lowe@mmu.ac.uk

"This is one of the first times aviation contrails have been included in climate modelling," said Prof Forster. "The initial findings of our study will be available in June when we expect to see new evidence of the effects of contrails on daytime temperatures."

Armed with a greater understanding of the longer-term impacts of contrails on our weather, policy makers will be able to make better-informed decisions about the future of air travel in general – and mitigation policies in particular.

Omega's contrails study is the first of its type to quantify the future impacts of aviation emissions as well as providing a geographically specific breakdown of this impact. By any standards, it represents a big step forward in the UK's capacity to analyze the climate effects of aviation.

Omega

Newsletter May 2008

Icarus helps reduce carbon footprint of business air travel

Business travel is critical for many organisations and clearly brings economic benefits. Nevertheless, as a sizeable proportion of all air travel; business travel is a significant contributor to aviation climate impacts. Omega offers a way to save 'business carbon' and cost at the same time.

How to reduce and manage this growing carbon footprint without damaging corporate growth was the main driving force behind Project Icarus. The year-long study – funded by Omega and completed in February 2008 – brought together the expertise of the Institute of Travel Management (ITM) and Cranfield University.

The main achievements of the project were showcased at a one-day workshop held in London earlier this year. It was attended by around 50 delegates including corporate buyers, travel suppliers and airlines.

Commenting on the success of the workshop, Principal Investigator behind Project Icarus, Cranfield University's Dr Keith Mason – said:

"The workshop highlighted the excellent work done both by Cranfield University and the ITM to help companies reduce their carbon-related footprint. Of equal importance," he continued, "are the initiatives which help promote good practice by corporate buyers and travel suppliers to their peers."

The five main achievements of Project Icarus include:

- Carbon Reduction Toolkit – Provides companies with practical information on how to make business travel 'greener' by reducing their business travel carbon footprint. Historically, businesses have typically focused on service and price. With the Toolkit, they are now able to place more emphasis on environmental issues. Details are available on ITM's website: www.itm.co.uk/toolkit.htm
- Buyer Accreditation Scheme – A set of approved environmental accreditation standards for companies purchasing business travel for UK companies. They must commit to reducing their total air transport-related carbon emissions to meet government targets ie. 60% of their 1990 emissions figure by 2050. The figures can be used in Annual Reports as part of their Corporate Social Responsibility (CSR) commitment.
- Supplier Awards Programme – These prestigious annual ITM Awards demonstrate to buyers which travel suppliers – hotels, airlines etc – are the best environmental choice.
- Alternative Communication Methods – Cranfield research suggests that up to 20 per cent of business air travel is not necessary. Communication methods such as video conferencing have been shown to be equally effective in achieving business goals while avoiding the travel related carbon emission.
- Carbon Calculator – Many companies don't know how to compare airlines on their environmental performance. With Cranfield's 'carbon calculator', they will now be able to make informed choices at the point of sale.



Omega Workshop 'Attitudes to Aircraft Noise'

Jury's Inn, Heathrow, London
Thursday, 29 May 2008

This FREE one-day workshop looks at changing attitudes to aircraft noise. Drawing on recent research, the aim is to stimulate informed discussion among the stakeholder community on the status of current understanding. The workshop also aims to identify knowledge needs to support future policy directions towards less disturbance in communities around airports.

'Attitudes to Aircraft Noise' is an interactive workshop that will interest researchers, industry professionals, planners and consultants.

For information, contact:
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Welcome to this issue of Omega's new newsletter...

Responding to growing concerns about the effects of rapidly expanding air transport on our environment, we outline in this newsletter some of the initiatives Omega is working on since we were formed in early 2007.

No-one can ignore the world-wide concerns about the effects of man's activities on the environment. In our own back yard, we recently saw 'the climate camp' at Heathrow and roof-top protests at the House of Commons about airport expansion.

At Omega, we are working to take some of the heat out of the debate: the environment can, and often is, used as a PR football. This is not a sensible way to hold a serious debate. So Omega, led by Manchester Metropolitan University with Cambridge and Cranfield, has brought together some of the best aviation-environment experts in UK universities in a partnership to develop and share knowledge to shape the way forward. Omega's neutrality means we can work effectively with the industry and amenity groups alike on pressing environmental challenges. We are unique in this respect and it complements our position as a 'one stop shop' for aviation sustainability knowledge.

Ultimately, it is for society to decide the appropriate level of flying in an environmentally sensitive world. Sound decisions need sound evidence that responds to the main questions, whether on climate impacts or local community noise and pollution effects. The work Omega is doing takes an objective scientific view of issues such as non-CO2 climate impacts, emerging technologies, alternative aircraft fuels and carbon offsetting programmes.

The maturing 'knowledge transfer' work of Omega is building on a core of solid independent academic expertise – ably supported by contributions from industry, government and NGOs who add the essential 'hands on' wider context to our activities. We're tackling the challenges of aviation noise by improving understanding of how people

react to aircraft disturbance and by looking at lower noise technologies. On aircraft emissions and their effects on air quality, we are improving the essential modelling that makes it possible to take effective action to control pollution from aircraft and other sources.

Omega's climate science work is making a real contribution by narrowing uncertainties on the importance of – and balance between – CO2, NOx and contrail effects. Our 'scenario-growth' work is examining the range of climate forcing effects and we are testing the metrics that are essential to making robust decisions. Looking at blue skies technologies and how airports and air traffic management can operate in a more carbon-friendly manner is also part of identifying effective future climate-focused solutions.

'To fly or not to fly?' remains a valid question. We have delivered a tool to test ways to deliver business communication needs and how the flying part of that can be at minimum carbon and monetary cost. Refining understanding of the costs and benefits of aviation, public attitudes on flying and how the sector will react to emissions trading allows is all part of our work to support productive decision-making by regulators, the aviation sector and by the travelling public.

The Omega programme of studies, workshops and conferences in 2008 is charting the way towards a second phase of narrowing the big uncertainties and widening engagement with the public and interest groups. The Omega partnership exists to deliver knowledge and to work with all those concerned to bring about performance improvements. Academia is helping those at the coal face of aviation policy and delivery to make the best possible decisions and so improve the prospects for a sustainable future for aviation.

Roger Gardner
Chief Executive, OMEGA



Investigating the future of alternative aviation fuels

The development of a suitable alternative aviation fuel may provide the aviation sector with an opportunity to address harmful emissions from air travel by sourcing fuels from renewable sources that do not compete with food supply. With growth in aviation continuing, the need to develop a fuel that is technologically viable, sustainable, safe, ethically acceptable and has a guaranteed supply chain has never been higher.

The University of Sheffield has led a collaboration with four other Omega university partners in a two-year study into sustainable fuels for aviation. Professor Chris Wilson, Project Co-ordinator based at the University of Sheffield, is optimistic about future prospects for bio-fuels, particularly algae which grows abundantly and is much easier to farm than other bio mass material. At a time when there are difficult ethical issues surrounding land devoted to bio-fuel crops, this is a reassuring development.

"At this stage," says Professor Wilson, "we're putting together a system to quantify and evaluate all

the issues surrounding alternative fuels. That includes assessing each fuel for noise, emissions and engine performance.

"Not surprisingly, there are several technical issues which we hope to overcome. These include: fuel weight on take-off and fuels with lower energy density which result in more engine noise; more restricted journey ranges; and the possible need to create fuel 'blends' which replicate the flexibility of fossil fuels."



The study, which involves several air transport sector and fuels stakeholders, is investigating the relative performance and environmental impact of a range of fuels. These include kerosene and other fossil-fuel derivatives; synthetic liquid fuels manufactured from coal, biomass or natural gas; and bio-fuels made from agricultural crops, algae and others.

Professor Wilson said:

"We're currently looking at a range of alternatives from which we could eventually create products with similar performance characteristics to fossil fuels – but without the same level of environmental drawbacks."

Omega is holding an international conference in November 2008 to explore the potential for alternative fuels to be a part of a more sustainable future for the sector.

Visit Omega

at the
**Farnborough
Airshow!**
14 – 20 July, 2008

If you'd like to discuss environmental issues that relate to a more sustainable future for air transport, drop by for a chat at our stand, C33, in Hall 2.

Farnborough showcases the best of new technology. It is also expected to pick up on the sector's environmental effects and to promote solutions. Omega will be there to raise the profile of the sustainability issue and extend the partnership's linkages who produce and but what we fly.

Farnborough is an opportunity for the sector to commit to and make bigger steps towards a greener future: Omega is working with many stakeholders to provide knowledge that makes these steps possible. Come and talk to us about aviation sustainability.

Carbon offset schemes for aviation –

Carbon offset schemes aim to compensate for carbon emissions by investing in carbon saving initiatives such as wind farms and reforestation. Unfortunately, customer uptake of offset services for aviation has been low and questions have been raised over the accuracy of carbon calculators and the efficacy of emissions saving projects.

Manchester Metropolitan University (MMU) launched a 12-month study to investigate air passengers' preferences towards carbon offsetting, including their willingness to pay. The study was headed by MMU's Dr Paul Hooper and comprised three elements: a review of offset literature; a review of various offset schemes provided internationally; and a survey of passengers at Manchester Airport.

The findings uncovered a lack of transparency among those providing offset schemes in areas such as how the offset levy was calculated, and where the money raised was being invested. This undermines the credibility of offset schemes as a whole – a factor which was further exacerbated by the variance in offset charges which ranged from 31 pence right up to £12.95 on a short-haul flight!



will they work?

Results from the 487 passengers surveyed at Manchester Airport indicated that, whilst most respondents had heard of offsetting, less than a tenth had done anything about it. One of the main reasons why uptake was not greater may be that people do not regard limiting the climate impacts of flight as their responsibility. Instead, passengers look to airlines or the government to deal with aviation's environmental impacts.

Overall, there were high levels of uncertainty among the passengers surveyed about many aspects of carbon offsetting. Passengers were unclear how the money is used and how the schemes actually deliver benefits in terms of climate change mitigation. Some were sceptical that the environmental impacts of aviation are significant, while others viewed offsetting as simply another tax.

Conclusions are that efforts are required to present the benefits and purpose of offsetting the climate effects of aviation much more clearly to the public if uptake is to be increased. In addition, greater transparency and accountability of the schemes could help to build consumer confidence in offsetting. Omega is currently talking to DEFRA to ensure that these findings inform their best practice guidance.

Omega at Wilton Park Conference Centre

'Aviation: Post-Kyoto Control Structures'
June 26 – 28, 2008

This three-day residential conference at Wilton Park, the prestigious Foreign and Commonwealth Office Conference Centre, provides an opportunity to discuss how to include aviation in post-Kyoto Protocol climate change controls.

The event will be a neutral forum, allowing international policy makers, industry stakeholders and NGOs to consider options in a non-binding, 'Chatham House rules' environment, supported by input from Omega technical/scientific experts. This opportunity will promote a deeper understanding amongst key players leading to more effective international dialogue under the auspices of the UNFCCC.

There will be time to exchange views and understand the issues, differing opinions and possible areas for agreement/compromise in advance of the expected international dialogue on post-2012 Kyoto structures. A report of the conference will be added to the Omega website. For further information on the Conference and any enquiries on possible attendance, please access the following link:

www.wiltonpark.org/themes/environment/conference.aspx?confref=WP947