Green Flight Times

Environmental news from across the aviation industry

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CDA plan produces win-win-win: saving fuel, cutting emissions and reducing noise

GENEVA – Aviation partners from across the industry in Europe have been working together for the past year on the European Continuous Descent Approach (CDA) Action Plan which aimed to get CDA implemented at 100 airports across Europe by 2013.

A continuous descent approach is when a flight starts the landing process into an airport, but instead of the traditional 'stepped' descent in which the aircraft drops from cruising altitude to the runway in stages, a CDA is one smooth, low-powered process.

The Action Plan, developed by close collaboration between partners Eurocontrol, ACI Europe, CANSO, ERA and IATA, was presented for the first time at this year's Aviation & Environment Summit in Geneva.

Eurocontrol is coordinating this effort through its CDA Implementation Team which has met with operational stakeholders covering a total of 104 different airports across Europe.

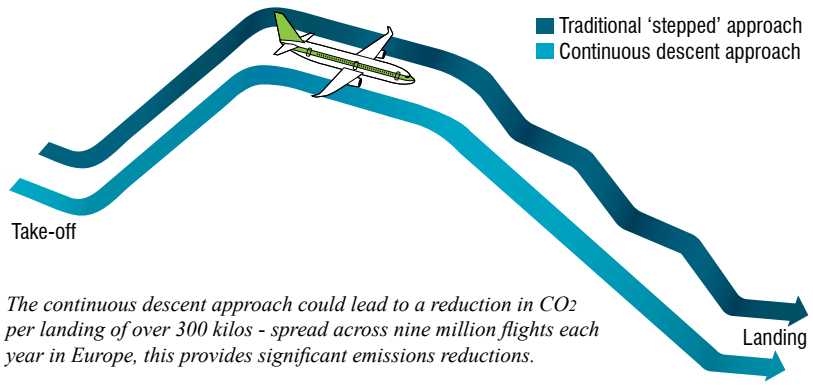
The support that the CDA Implementation Team has received from aircraft operators, airport operators and air navigation service providers has been crucial to commitments given thus far to implement CDA at 83 airports across 25 European States. Of these airports, 33 already offer CDA at some point in the day and a further 13 are currently carrying out flight trials.

This confirms that the project is clearly on track to reach the Joint Action Plan's target of CDA implementation at 100 European airports by 2013.

Operational flight trials and work in aircraft simulators confirm that a CDA from an altitude of about 10,000 feet should save approximately 100kg of fuel, and over 300kg of CO_2 compared to the classical stepped approach. As there are over nine million flights in European airspace every year, the widespread application of CDA in which aircraft fly higher for longer, has the potential to provide major cost savings for aircraft operators through reduced fuel use, reduced noise exposure for those who live near airports and considerable reductions in the emission of greenhouse gases.

"We are already seeing tangible benefits. Over the coming months we will be focussing on promoting the widespread usage of CDA and establishing a CDA culture which will pave the way to more advanced performance in the future," said Andrew Watt, environment manager at Eurocontrol.

"Through innovative tools like an interactive map showing the implementation of the plan, the CDA Action Plan is ahead of schedule in its aim to **reduce emissions by 500,000 tonnes of CO_2 a year**, and shows the industry delivering on its commitments to cap net carbon emissions from 2020 and halve net emissions by 2050."



The continuous descent approach could lead to a reduction in CO_2 per landing of over 300 kilos - spread across nine million flights each year in Europe, this provides significant emissions reductions.

From small messages come big reductions in CO_2

ATLANTA – As part of a programme of fuel efficiency and emissions reductions measures, Delta Air Lines employs the use of Attila, a sophisticated arrivals management system developed in cooperation with the ATH Group. Attila is designed to improve fuel efficiency and on-time performance by optimising the sequencing of aircraft arrivals into an airport.

Up to hundreds of miles from its destination airport, Attila sends an automated message (much like an SMS text message) providing a required time of arrival for an aircraft to reach a designated approach location near the airport. The aircraft then adjusts its cruise speed to meet the scheduled arrival time.

Delta has been using Attila at Hartsfield-Jackson Atlanta International Airport on a continuous basis since December 2006, and is achieving **more than five million gallons of fuel savings and 50,000 tonnes of CO_2 reduction annually**.

Delta continuously works with ATH Group to make improvements to the system, and recently incorporated gate availability into the optimisation model, thereby reducing the likelihood of an arriving aircraft not having an available gate and having to wait with its engines running.

Importantly, Attila's benefits accrue to the system and not necessarily to individual flights – meaning that at very busy airports like Atlanta, much more efficient operations are achieved across the whole fleet but occasionally at the expense of individual flights.

A final benefit is that Attila recovers unused slots in the arrival queue allowing much better utilisation of airspace and less need for flights to remain in holding patterns.

Attila will also play a role in future air traffic control as the air traffic control system evolves. As the Federal Aviation Administration begins the transition from ground-based to satellite-based navigation, four-dimensional air traffic control becomes possible. One important feature of the next generation air traffic system is time-based metering.

With precise vertical and horizontal flight path control, air navigation in the future will use better timing to allow more capacity in the airspace system. This will provide for very predictable vertical and horizontal paths, culminating in more efficient use of the approach paths to airports. This future system will allow Delta and other airlines to truly optimise how they fly their aircraft. The development of Attila is just a small preview of this larger concept of time-based metering.

First sector-specific approach is agreed in global climate change challenge. Aviation industry continues to show leadership with ambitious emissions reduction targets.

Flightpath set for Cancún

MONTRÉAL – The aviation sector became the first in the world to have a uniform sectoral-approach to addressing climate change when delegates at the 37th Assembly of the International Civil Aviation Organization (ICAO) agreed on a landmark resolution on climate change. The aviation industry, a long-time proponent of dealing with international aviation emissions at a global rather than national level, welcomed the outcome.

"Governments have taken an historic decision." said Giovanni Bisignani, IATA's director general and chief executive officer, "For the first time, we have globally agreed aspirational goals to stabilise emissions. No other industry sector has a similar globally agreed framework for managing its response to climate change in a manner that takes into consideration the needs of both developed and developing states."

Airports Council International director general Angela Gittens agreed, "We are pleased to see that ICAO delegations accept the need for a shared global vision and common goals as well as their willingness to move ahead on the agreed positions in the resolution, despite some remaining questions that will be addressed in future discussions."

ICAO resolution

The ICAO resolution calls for: improving fuel efficiency by 2% annually to 2050; striving to achieve a collective medium-term aspirational goal of capping aviation's carbon emissions from 2020; and a global CO_2 standard for aircraft engines with a target date of 2013.

It also outlines the development of a global framework on market based measures by the 38th Assembly in 2013 based on 15 agreed principles. These principles are designed to minimise market distortions, safeguard the fair treatment of aviation relative to other sectors, ensure that aviation's emissions are accounted for only once and recognise both past and future efforts of carriers.

Industry targets in line

The ICAO Assembly came two weeks after the industry held its Aviation & Environment Summit in Geneva, Switzerland. Addressing the opening of the summit, the Air Transport Action Group's executive director, Paul Steele, outlined the commitments to which the industry had already agreed: "Our targets are ambitious and they are unique - no other industry has come together in the way that airlines, airports, air navigation providers and the aviation manufacturers have.

"We should be proud of that, but the work has just begun. We have ten years to reach our 2020 target to cap emissions. Luckily, we are well on our way."

"When the Kyoto Protocol was agreed in 1997, governments were tasked with developing a strategy to reduce international aviation emissions through ICAO. A decade passed and although some progress was made, it was not enough. The industry therefore stepped up to the plate in a united and comprehensive way.

"We have global targets – a 1.5% average annual improvement in fuel efficiency between now and 2020, capping our net carbon emissions from 2020 and halving our net carbon emissions by 2050, compared to 2005. We also have many of the tools to achieve these ambitious goals. Now is the time for governments to come to the party."

IATA's Bisignani addressed the gap in the industry's commitment of a 1.5% average annual improvement in fuel efficiency and the ICAO goal of a 2% annual improvement. "We are confident that achieving a 1.5% average annual improvement in fuel efficiency is possible with efforts of the industry. The 2% ICAO goal means that governments must come to the table with much needed infrastructure improvements such as the Single European Sky or NextGen in the US."

Speaking at a European Aviation Summit shortly after the ICAO Assembly, vice president of the European Commission Siim Kallas said, "The freedom of mobility is one of the biggest achievements of the European Union. In many cases, there is no alternative to air transport. Therefore, our freedom of mobility depends on a safe, efficient, reliable and competitive air transport system. For air transport to be able to grow we need to address the environmental impact.

> *"Aviation will go to Cancún with its homework done!"*

"I am very satisfied that ICAO adopted a resolution on International Aviation and Climate Change. It is a major achievement to have 190 countries adopt a Resolution on such a sensitive issue. It is the first mode of transport to succeed. Aviation will go to Cancún with its homework done!"

Governments and industry together

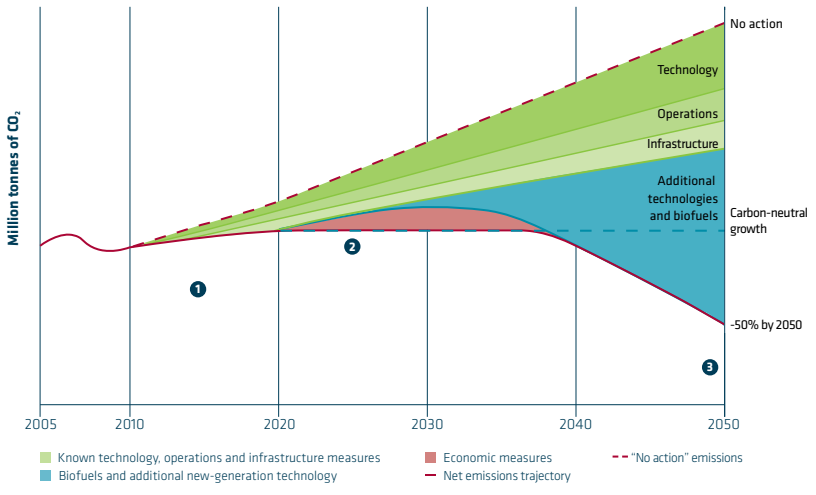
Representing global air traffic control providers, CANSO's director general Graham Lake said, "The air traffic management sector in particular requires more Government assistance if it is to achieve these ambitious targets. Greater political will is needed to help break down the institutional barriers to better civil-military cooperation, more flexible use of airspace, and better airspace design and management.

"In particular, transport and defence departments need to work together more closely to improve route efficiency. Our message to world governments is: help us to help you deliver the emissions reductions we all want to see."

Fançois Gayet, chair of The International Coordinating Council of Aerospace Industries Associations said that research had to be a top priority in the climate challenge.

"We call on governments to raise their level of support for research and development for new greener technologies. We also urge them to facilitate the deployment of more efficient air traffic management systems, such as SESAR in Europe and NextGen in the US Finally, we believe governments also have a key role to play to prepare the ground for the widespread use of aviation biofuels."

The aviation industry's long-term targets



Mapping out the industry commitments: ❶ *improve fleet fuel efficiency by 1.5% per year from now until 2020;* ❷ *cap net emissions from 2020 through carbon neutral growth;* ❸ *by 2050, net aviation carbon emissions will be half of what they were in 2005.*

(Schematic, indicative diagram only.)

This publication is a digest of press releases and other announcements issued by partners across the aviation industry from September - November 2010. It is not fully comprehensive, but provides a snapshot of the work being undertaken around the world by all parts of the aviation industry. Readers are encouraged to visit **http://newswire.enviro.aero** for the latest environmental news.

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Bringing blue to the skies of Mexico

MEXICO CITY – Volaris, Mexico's largest low cost high efficiency airline, announced that their *Por un cielo azul* (for blue skies) environmental programme has reached its second anniversary mark. The programme has transformed them into the only national airline in Mexico with a sustainable focus, reflecting the company's commitment to social responsibility.

Through the programme, Volaris is contributing to the reduction of environmental pollutants not just favouring the carrier's direct customers, but also society in general.

Some of the advantages offered by Volaris include operating the country's most modern fleet, averaging some 3.2 years, which in addition to **guaranteeing fewer CO_2 emissions by saving fuel on each flight**, reduces noise levels.

Through the creation of the "Green Team", Volaris has taken firm steps towards reducing negative impact on the environment, including:

- Development of permanent programmes for fuel savings, waste separation, and water and oil recycling;
- Water savings of up to 40% on each flight, by transporting strictly what is needed on each trip, reducing excess weight;
- Use of eco-friendly materials; recyclable or biodegradable airsick bags, napkins, cups, and wrappings;
- Use of ultra-light materials in manufacturing service cars and racks, generating less weight and fuel savings; and
- Use of stickers on all aircraft, instead of heavier paint livery.

Likewise, and in conjunction with the environmental organisation Pronatura, Volaris promotes reducing pollutants at the company's corporate offices in Santa Fe and Toluca, as well as their Virtual Air Terminal, by purchasing the so-called 'carbon bonds' towards reforestation activities in Mexico's southeastern region.

These actions contributed to the airline becoming the recipient of IATA's Latin American Green Airline award, which was presented for ecological responsibility.

Volaris was also the first airline in Latin America to receive the ISO 14001 Certification in 2009, after having successfully established a system for environmental management.

Volaris is quite clear on their intent to make sure these efforts are constant and the airline has established short and medium term goals that will consolidate them as the leading sustainable company in the industry. Some of these goals include using biofuels and implementing point-to-point routes, which are more direct and therefore generate greater resource efficiencies in terms of time and fuel.

JAL develops and introduces new refrigerant, saves CO_2

TOKYO – Japan Airlines (JAL) and Toppan Forms Ltd have successfully developed a high-functional refrigerant, named MechaCool, for in-flight beverage services and are the first to introduce the product to the airline industry. MechaCool was introduced on JAL flights between Narita and Honolulu from October 2010 and the airline plans to gradually extend the use of this new refrigerant to other flights.

Until now, in-flight beverages have been rapidly cooled on the plane by dry ice a few hours before flights. In addition to its high costs, handling of dry ice at very low temperatures of -79°C can also cause beverages to either freeze or not be cooled enough when using a buffering agent.

MechaCool is a cold storage solution which can replace the conventional use of dry ice.

The high-functional refrigerant can be re-used repeatedly without releasing carbon dioxide into the atmosphere, compared with dry ice. By introducing the solution on JAL's Honolulu flights (five roundtrips per day), the carrier can reduce approximately 350 tonnes of CO_2 per annum. JAL has a target to **reduce CO_2 output by 2,000 tonnes per annum** by extending the use of this new cooler to other flights, which is also 30% to 40% more cost effective.

IATA to deliver even more emissions savings with iFlex project

"We have some tough targets to meet" - Giovanni Bisignani, director general of IATA

GENEVA – Airlines can cut an average of 2% of total fuel burn per flight on certain long-haul trips under a new IATA project to implement more flexible routings across multiple flight information regions.

The International Air Transport Association has announced the 'iFlex' pilot programme. IATA will work with key airlines, air navigation service providers, and governments to implement more flexible routings to take advantage of wind patterns. The programme is aligned with ICAO's strategic objectives under the Global Air Navigational Plan and is consistent with the industry's environment targets and four-pillar strategy to reduce emissions.

"We have some tough targets to meet. The iFlex programme will help us get there with a practical approach that delivers real savings using today's technology. But we cannot do it alone. Coordination among ANSPs is critical," said Giovanni Bisignani, IATA's director general and chief executive officer.

Early modelling suggests that airlines operating a 10-hour intercontinental flight can cut flight time by six minutes, reduce fuel burn by as much as 2% and save 3,000 kilograms of CO_2.

The iFlex programme will concentrate on long-haul routes through low-density airspace in regions where maximum benefit can be achieved through a more flexible airspace structure. The South Atlantic and Africa will be the initial focus concentrating on the Johannesburg to Atlanta and Dubai to Sao Paolo routes.

In the coming months, IATA will work with airlines, ICAO, air navigation service providers and governments on proof-of-concept work which will include data analysis and route simulation using modern flight planning tools. A pilot project is planned for 2011 where flights will be able to better optimise their routing by taking advantage of the prevailing weather conditions.

FedEx inaugurates new solar-powered hub at Cologne Bonn Airport

COLOGNE – FedEx joined with Cologne Bonn Airport in Germany recently to inaugurate the new FedEx Central and Eastern Europe hub. The Cologne hub is the second solar-powered FedEx Express hub and the fifth solar-powered facility in operation within FedEx Corp. A sixth solar-powered facility is scheduled to open in California in the near future.

Cologne is one of the most modern FedEx hubs in the world. Its fully-automated sorting system can process up to 18,000 packages and documents per hour. The roof features the largest FedEx Express solar power installation worldwide and represents one of the largest rooftop solar installations in North Rhine-Westphalia, with an area of 16,000 square meters, producing about 800,000 kilowatt hours per year.

Including the Cologne hub, FedEx's five solar-powered facilities will **reduce annual carbon dioxide emissions by a projected 3,918 tonnes** – the equivalent of more than 440,000 gallons of gasoline or over 100,000 tree seedlings growing for ten years.

"This solar-powered facility is the latest example of our commitment to responsibly connect the world for our customers through innovative solutions," said Mitch Jackson, vice president of environmental affairs and sustainability for FedEx Corp.

FedEx has recently added all-electric delivery vehicles in Paris and Los Angeles, building on its existing all-electric delivery vehicles in London. The integration of all-electric vehicles is part of FedEx pledge to improve the fuel efficiency of its vehicle fleet by 20% through its reduce, replace and revolutionise strategy, and reduce carbon dioxide emissions from its aircraft fleet by 20% per available tonne mile by 2020.

The Cologne hub is a vital link in this FedEx worldwide network, acting as a central gateway for packages arriving by ground or air from Central and Eastern Europe and providing fast connectivity within Europe, to the US and Asia.

New fleet in Canada

FedEx Canada is will replace its fleet of 727-200 aircraft with five newer generation 757-200 planes. "Approximately 16,000 km are flown daily in Canada by the 727-200 fleet. We are very pleased to be able to **cut our carbon emissions and fuel consumption by up to 47% for each package carried** compared to our 727s," said Lisa Lisson, president of FedEx Express Canada. "Achieving environmental and economic sustainability requires more than just embracing more-efficient technologies. It also means making smart choices, matching the right plane with the right job."

The move is part of a global FedEx initiative to replace 727 aircraft with 757's. FedEx Express Canada expects the transition to the newer aircraft to be completed by early 2011. Improved fuel efficiency, coupled with greater payload capacity and flight range, allows more packages to be shipped daily across the intra-Canadian network with fewer flights.

Professor Feargal Brennan and Ilze Lee of Cranfield University, join Andrew Kershaw of British Airways and Christian Dumas of Airbus in launching the SURF project at September's ATAG Aviation & Environment Summit in Geneva.

British Airways, Airbus, Cranfield Uni accelerate availability of algae for fuel

GENEVA – Several powerhouses of the aviation industry are backing Cranfield University's pioneering project to solve how to harvest algae to produce jet fuel in commercial quantities. The Sustainable Use of Renewable Fuels (SURF) consortium which brings together Airbus, British Airways and Cranfield University, among many others, was announced at the Aviation & Environment Summit in Geneva.

The consortium will take a structured approach to addressing five major considerations for the successful use of fuels from a renewable source like microalgae. These will include: environmental impact; processing, capacity and distribution; commercial; and legislation and regulation. Specific studies will look at future sustainability modelling and environmental lifecycle assessment.

SURF is based around Cranfield's Sea Green project and will serve as an advisory group supporting the definition, objectives and outcomes of this project. The University already has a pilot facility on campus which is growing and processing algae for biofuels but the eventual aim is for Sea Green to be an ocean-based facility for the sustainable production of commercial quantities of biomass for biofuels. It will be designed to use the expanse of the world's nearshore waters to rapidly **grow microalgae at a faster rate than any other initiative and capture CO_2 from the atmosphere and seas at the same time**.

This will be done in an environmentally friendly, sustainable facility with a negative carbon mechanism (meaning that net carbon is taken out of the atmosphere) that does not compete with agricultural land, does not require fresh water, does not result in deforestation and does not damage the environment.

Air India to offer EcoPower engine washing to bring down emissions

MUMBAI – Air India has signed an agreement with Pratt & Whitney to establish an EcoPower engine wash service at Mumbai International Airport.

With this agreement, Air India will be able to perform EcoPower engine washes on various engines in its fleet of aircraft. In addition it will offer the services to other carriers in the region. The service centre will have the ability to perform washes on nearly all commercial engines in service today.

"Air India will offer to its customers the unique advantage of EcoPower engine wash services in India," said Mr K.M. Unni of Air India. "This will help airlines reduce their operating costs and emissions."

"This partnership will expand the availability of EcoPower engine wash services to India, one of the world's fastest growing aviation markets," said Joanne Hastings, director, Line Maintenance Services, Pratt & Whitney. "The service is especially valued since fuel prices in India are among the highest in the world."

Pratt & Whitney's patented EcoPower engine wash system **reduces fuel burn by as much as 1.2%**, eliminating three pounds of carbon dioxide emissions for every pound of fuel saved, while also decreasing engine gas temperature thus increasing the amount of time an engine can stay on wing. Pratt & Whitney is a world leader in the design, manufacture and service of aircraft engines, space propulsion systems and industrial gas turbines.

AIRLINE BRIEFS

Qantas Supports Climate Research Initiative in Southern Ocean

Qantas announced that it would back an important climate change research project in the Southern Ocean as part of its strong commitment to environmental sustainability. The project, to be undertaken by the Antarctic Climate and Ecosystems Cooperative Research Centre (ACE CRC) in partnership with the Great Barrier Reef Foundation, will enable the Foundation to better understand and respond to the impacts of a changing ocean on the Great Barrier Reef.

Qantas chief risk officer, Mr Rob Kella, said Qantas considered it imperative to pursue sustainable operations in all areas of the business and to support environmental research in the scientific community.

"Qantas has a comprehensive, strategic approach to emissions reduction and energy efficiency. This includes fleet renewal to introduce more fuel-efficient aircraft, a commitment to influence the commercialisation of sustainable aviation fuel in Australia (through membership of the Sustainable Aviation Fuel Users Group), more efficient flying techniques, emissions reduction initiatives on the ground and a highly successful carbon offset scheme for customers and staff.

"We also believe that we have a responsibility to assist organisations such as the Great Barrier Reef Foundation as they work to protect Australia's great natural landscapes. On the eve of World Environment Day, Qantas is delighted to be extending its relationship with the Foundation into this crucial research area."

SriLankan Catering wins prestigious Gold Award for energy efficiency

SriLankan Airlines Catering (Pvt) Ltd added to its growing reputation as a model of environmental conservation when it won the prestigious National Energy Efficiency Gold Award in the large scale state sector category.

SriLankan Catering recently became one of a handful of airline caterers in the world to receive the prestigious ISO 14001:2004 certification for Best Environmental Practices.

SriLankan Catering reduced its electricity consumption by 10% and fuel usage by a whopping 40% during the last year, among a series of planned conservation efforts.

Thai Airways and IATA join to offer offsets

Thai Airways International has launched a carbon offset programme with the International Air Transport Association (IATA) to provide customers with the opportunity to offset carbon emissions generated from flying. Mr. Piyasvasti Amranand, Thai president, said that Thai is the first airline in the Asia-Pacific region to join the programme with IATA. "Working with IATA, Thai is now able to offer customers a way to compensate carbon emissions through the Thai website when they book their flights."

Information about the amount of CO_2 emitted for the booked flight is available as well as the cost to offset the CO_2 amount. The system utilises the efficiencies and reliability of IATA's long-established financial system to enable airlines and their customers to purchase ticket and offset at the same time.

The IATA Carbon Offset Programme only invests in UN-approved certified emissions reductions projects and voluntary credits which comply with the recognised Gold and or Voluntary Carbon Standards. The entire customer contribution goes to the project. As transparency is critical to ensure that money collected result in reduced emissions the IATA offset programme has been independently accredited by the UK Government quality assurance scheme.

For further information on developments across the aviation industry: www.enviro.aero

World-leading solar power station for Alice Springs Airport

ALICE SPRINGS – Alice Springs Airport has launched a major solar power station project, using new Concentrator Photovoltaic (CPV) technology that will supply about 28% of the airport's energy needs. Concentrator photovoltaic systems are an emerging solar technology offering significant potential for cost reductions in photovoltaic (PV) systems.

The first of its kind in the southern hemisphere, the installation will comprise 28 solar arrays, each eight metres wide and seven metres high.

"We are installing one of the largest tracking solar systems in Australia and the largest in Alice Springs," said Ian Kew, chief executive officer of Northern Territory Airports.

Alice Springs will be the first Australian airport to have a large scale (over 100kW) photovoltaic system providing a direct source of renewable energy to its internal grid. It will be on display to travellers, visible from both the ground and the air.

Valued at about $2.3 million, the project will receive funding from the Australian Government, as part of the Alice Solar City Project.

"It will **reduce the airport's carbon emissions by about 470 tonnes of carbon dioxide a year**, the equivalent of about 70 Alice Springs households per annum," Mr Kew said.

"We are a major electricity user in Alice Springs, and this project seemed an ideal way to demonstrate our commitment to harnessing the benefits of renewable energy.

"We have also encouraged tenants to undertake their own solar installations. For example, one of the airport's tenants, Alice Springs Helicopters who were winners of the National Small Business Export Award for 2009, recently installed rooftop solar panels with support from Alice Solar City.

"These initiatives reconfirm Northern Territory Airports' commitment to sustainability. In addition to the solar project, $100,000 will be spent making the terminal more energy efficient."

The airport's solar power station is expected to be fully commissioned and operational by August 2010. The site has been chosen to allow for future expansion of the solar power station up to four times the size.

"Our location offers a unique opportunity to become the first airport in the world to be powered 100% by solar energy and we would be thrilled if we could make this happen some time in the future," Mr Kew said.

Situated in the centre of Australia, Alice Springs is a perfect location for solar power

Heathrow helps fliers cut carbon

Yellow pipes making a big difference - these deliver pre-conditioned air to aircraft parked at Heathrow and airports all over the world.

LONDON – Heathrow Airport's progress in tackling climate change has been recognised with a major award from the airport industry's trade body Airports Council International Europe. Airport Carbon Accreditation is the European standard for CO_2 management and Heathrow's success will be a major boost to government plans to improve international links while meeting strict EU environmental targets.

Heathrow has invested millions of pounds in more eco-friendly air-conditioning to keep people cool and lighting systems that dim down when areas are unoccupied. Like Terminal 5, the new £2 billion state of the art Terminal 2 will also maximise natural light, meaning customers get a brighter experience with great views of the planes at no environmental cost.

Smart metering has also been implemented across the airport to allow Heathrow to manage usage in energy hungry baggage systems.

While Heathrow cannot control emissions from planes flying, aircraft taxi times have been cut by 30% - helping reduce the length of time engines are powered up while on the ground.

During the last year 131,000 tonnes of CO_2 has been saved which is the same as cutting the carbon footprint of 13,000 people to zero. Airport Carbon Accreditation rates Heathrow at Level 3 'optimisation' - the highest level of performance achievable without offsetting emissions. Heathrow's success has come through three years of joint working across the airport, with airlines, air traffic control, baggage handlers and other ground staff focusing on:

1. improving energy efficiency, cutting energy use and waste
2. greening the energy supply through biomass and combined heat and power plant
3. steps to cut CO_2 from passenger and staff travel to the airport, such as the implementation of a clean vehicle scheme to emit less pollution

And with more than six million passengers each month, huge savings have been made by using hybrid vehicles for onsite transport while the airport's 77,000 employees use Europe's biggest car-share scheme to get to work, saving over 19 million miles of travel.

Colin Matthews, chief executive of BAA, said: "If you do not effectively measure and benchmark energy use, you cannot reduce it, but that is exactly what we are doing. This accreditation is an important milestone as we seek to make every journey better. Real improvements can be made through investment and joint-working. We are committed to helping the country meet its environmental targets and I am delighted that the great lengths that all our staff go to have been recognised."

AIRPORT BRIEFS

Fixed power units at Delhi cut costs, fuel, emissions

The new terminal at Delhi International Airport has become the first in India to install fixed electrical ground power (FEGP) on all its airbridges. This will cut down on the amount of jet fuel used, while also reducing emissions and noise pollution.

Across the world, airports are moving towards adopting FEGP units. The Indian CAA issued an environment circular asking Indian airports to begin installing FEGP units. Mumbai's airport will install these units in its new Terminal 2 as it is constructed around 2012.

Heathrow gives staff pedal power

For the second year running, Heathrow Airport is promoting an innovative scheme to get staff members ditching the car and cycling to work, in partnership with the UK's largest cycle retailer Halfords.

The Cycle2Work scheme is a government initiative to get employees cycling to work and eligible BAA staff will be entitled to tax-free benefits to encourage them to get a bike.

The scheme will help Heathrow in achieving their target of reducing employee car use by 1% year on year at the airport. Around 800 people a day cycle to work at the airport and to make it easier, BAA Heathrow have also provided off road cycle lanes on the Southern, Western and Eastern Perimeter Roads; at Terminal 5 and in the Colne Valley.

@ For further information on developments across the aviation industry: www.enviro.aero

Green approaches at Madrid Airport

MADRID – Iberia Airlines, Spain's airport and air traffic control authority AENA, and the Ineco transport engineering firm have carried out 620 test flights at the Madrid-Barajas airport involving continuous descent or 'green approaches'.

The results of the tests, as announced by the Single European Sky ATM Research Joint Undertaking (SESAR JU), show that the new landing approach technique yields an average **25% reduction in CO_2 emissions and fuel consumption, as well as significant reduction of noise.**

The success of the test has led AENA to analyse the results with a view to instituting these 'green approaches' at night at all Spanish airports before the end of this year. This was one of the measures included in AENA's 2009 Environmental Action Plan, aimed at achieving a total fuel savings of 25,000 tonnes per year and a reduction of 75,000 tonnes of CO_2 emissions during airport approaches.

The test flights, staged by Iberia, AENA and Ineco, were carried out at Madrid-Barajas airport, and involved Iberia Airbus A320s and A340s.

CO_2 reduced at Birmingham Airport through smarter flying

BIRMINGHAM – An operational technique introduced at Birmingham Airport last year to reduce noise, emissions and aircraft fuel consumption has **saved over 13,000 tonnes of CO_2 in the last 12 months** - enough to fill Wembley Stadium one and a half times.

The Continuous Descent Approach (CDA) technique allows aircraft to descend on minimum power, making a smooth approach without levelling off, rather than using a classical stepped approach.

After just one year of launching the scheme, 95% of aircraft arriving into Birmingham Airport now use CDAs, making a saving per flight of around 315kg of CO_2, 100kg of fuel, and reducing the noise around the airport by between one and five decibels per arrival.

The use of CDAs at Birmingham is as a result of a partnership between the airport company, NATS (the airport's air traffic control provider), and airlines operating at the airport. The technique significantly reduces fuel costs for airlines, creates a quieter environment for airport neighbours and reduces aircraft emissions.

Ben Hanley, the airport's environment manager said, "We're always seeking new opportunities to improve the noise climate for local residents and in 2006 we introduced the Operation Pathfinder scheme to create better communication channels and joined up thinking with our airlines and NATS.

"This partnership approach resulted in the launch of the CDA programme, and has led to improvements to our 'on-track' performance, which saw 99% of all our departures in 2009 keeping within the designated flight paths. We're really seeing the results of collaborative working and we thank our partners for their commitment to improve the local climate."

Paul Waite, operations and training manager for NATS, said, "Although CDAs are being used at a number of other UK airports, Birmingham is one of the most successful airports using the scheme, and I am proud to say that our team of controllers are exceeding targets every month."

Birmingham Airport's work on CDAs forms part of the national "Sustainable Aviation" initiative. Sustainable Aviation was set up by the aviation industry, as a commitment to work together to improve environmental performance, with challenging targets to reduce noise and emissions.

Through Sustainable Aviation, Birmingham Airport recently committed to implement measures to reduce ground based carbon emissions. Birmingham Airport is already leading the way by working with airlines through the Operation Pathfinder programme, to reduce emissions whilst aircraft are taxiing and operating on stand.

Sea-Tac Airport project to reduce emissions with pre-conditioned air service on gates

SEATTLE – Seattle-Tacoma International Airport will receive the largest grant of its kind, $18.3 million, from the Federal Aviation Administration for a project expected to reduce greenhouse gas emissions and save millions of dollars in fuel costs for airlines.

FAA administrator Randy Babbitt went to Sea-Tac to award the Voluntary Airport Low Emissions (VALE) grant to fund construction of a pre-conditioned air project that will make Sea-Tac one of the nation's few airports with a centralised system that covers the entire airport.

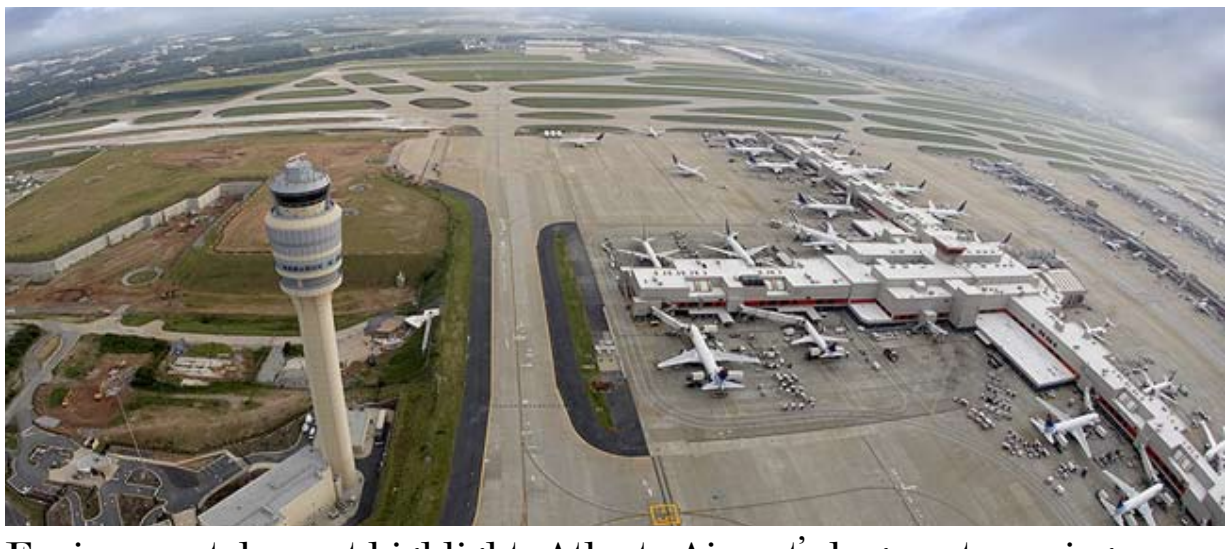
Once installed, the project is expected to **reduce emissions by more than 50,000 metric tons of CO_2**, save airlines up to five million gallons of fuel and $10 million in fuel costs per year. The CO_2 savings are the equivalent of taking 8,700 cars off the road. The project is expected to create 120 jobs.

"This programme is helping airports around the country make needed technological investments so they can be more environmentally friendly," said US transportation secretary Ray LaHood.

The project will allow aircraft to hookup to pre-conditioned air provided by the airport at each gate. This allows planes to shutdown their auxiliary power units. The cooled or heated air would be piped into the aircraft from a central utility plant at the airport. An estimated ten miles of piping will be used to complete the project.

"The Port of Seattle has made environmental leadership a priority; we are committed to reducing Sea-Tac Airport's carbon footprint and this grant will help us do that," said Port of Seattle commissioner Gael Tarleton.

The entire project is estimated to cost just over $33 million. The $18.3 million grant funding will cover the first phase of the project which will include 53 of Sea-Tac's 81 gates. Construction is expected to begin in October and the entire project is scheduled to be completed by the end of 2012.



Environmental report highlights Atlanta Airport's huge water savings

ATLANTA – Hartsfield-Jackson Atlanta International Airport has **cut annual water use by more than 20%** - enough water to fill more than 10 Georgia Aquariums. This finding is among those in Hartsfield-Jackson's 2009 Annual Environmental Report.

The debut annual report chronicles the airport's recent and current environmental management efforts, initiatives and programmes that address topics such as water and energy conservation, recycling, wetlands restoration, noise mitigation and sustainable buildings.

"Along with the City of Atlanta, the airport is working to reduce its overall environmental footprint," said Tom Nissalke, director of the airport's environmental and technical services unit, which prepared the report. "The annual report is a tool that benchmarks the current status and helps us to set targets for further sustainability initiatives."

One highlight of the report is the dramatic reduction in water use. From April 2007 to March 2008, the airport's terminal and concourses used 324.9 million gallons of water. The following year, water usage dropped by nearly 8%. Water consumption dropped by a further 61.2 million gallons - 20.4% - between April 2009 and March 2010. These savings are largely attributable to the installation of low-flow restroom fixtures and to significant upgrades and improvements in the heating and cooling system.

FROM THE DESK OF...

François Gayet, secretary general, ASD

An industry Europe can be proud of

The European aerospace industry is a world leader in providing environmentally friendly solutions for air transport. Through constant technological innovation, it has contributed to significantly improving aviation's environmental performance. For example, fuel consumption levels – and corresponding CO_2 emissions – from a jet aircraft have decreased by 80% since the 1960's. Such a spectacular result has been achieved thanks to our efforts in research and innovation, in areas such as aerodynamics, structural weight reduction, avionics, materials, engines, etc.

So a lot has already been achieved. But a lot more remains to be done. Civil aviation today represents 2% of man-made CO_2 emissions. With the growth in aviation worldwide heavily linked to economic development, it is clear that major technological improvements will be required to make tomorrow's air transport sustainable.

As an industry we are determined to explore every area where significant progress can be obtained. Together with the European Commission, we are working hard within the Clean Sky programme to achieve the ACARE goals thanks to technological breakthroughs. For instance we have been exploring innovative solutions such as the so-called 'Open-Rotor', a new type of engine which will significantly reduce consumption and emission levels.

We also see biofuels as a very promising area of progress, if their production can be scaled up sufficiently to meet our industry's needs. Airlines and aircraft manufacturers have already demonstrated that 'drop-in' biofuels can be used in-flight. We expect certification in 2011.

So we do have solutions in store. We also have very ambitious objectives (in the long-run, together with airlines, airports and air navigation service providers, we intend to cut CO_2 emissions from aviation by 50% by 2050 compared to 2005).

But we cannot manage all this on our own. Climate change is too important an issue to be tackled either by industry or regulation alone. In that context we call for the building of a new partnership between our industry and Europe's institutions and governments. We welcome the creation of a Research High Level Group at the initiative of Commission Vice President Kallas (with the support of Commissioner Geoghegan-Quinn) to define long-term objectives for aeronautics research, including goals for the next Framework programme. It is crucial that this 8th Framework programme maintains a high level of support for R&T in aerospace to give our industry the means to develop breakthrough technologies for tomorrow's sustainable air transport.

We also encourage the Commission to secure the full deployment of SESAR as part of the Single European Sky. That will bring substantial safety and environmental benefits reducing CO_2 emissions by up to 10% per flight.

To this end, we urge the Commission to include SESAR deployment in the white paper on transport and adopt a communication on the SESAR deployment strategy. We also encourage it to ensure, together with the private sector, appropriate financing for the deployment of SESAR.

Private and public organisations need to work hand-in-hand to prepare the green future of air transport that is within our reach. Europe is ideally placed to take the lead in that new era, if all stakeholders reinforce their partnership and increase their funding for research and technology. The time for action is now.

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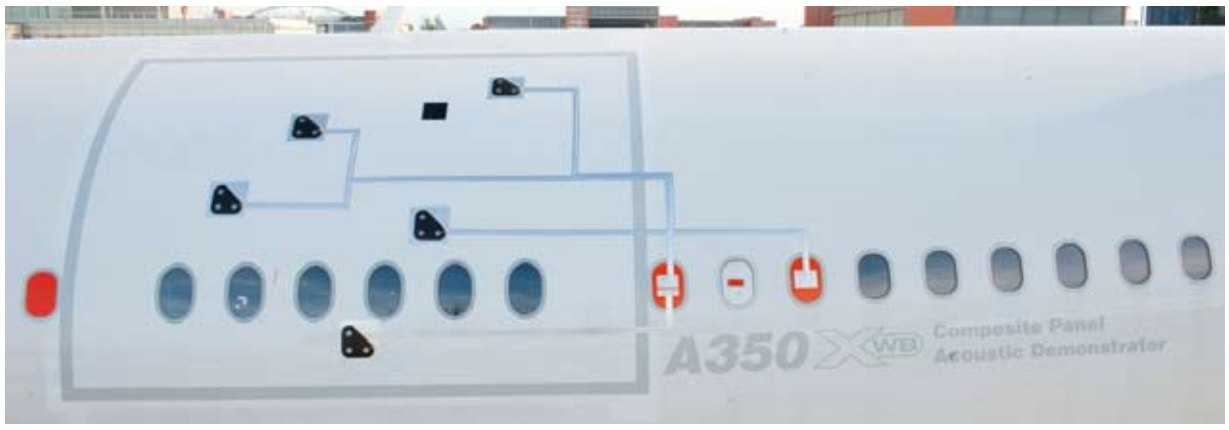
Airbus flight-tests A350 XWB composite fuselage panel

TOULOUSE – In the development programme for its new-generation A350 XWB aircraft, Airbus is flight-testing a fuselage panel made from carbon fibre reinforced plastic (CFRP). The 15m² structure (pictured) is fitted in place of an existing A340 aluminium fuselage section. The trials, conducted by Airbus' flight-test aircraft A340 MSN001, are part of a three-week campaign to evaluate pressurised CFRP acoustic properties and to help fine-tune sound insulation for the A350 XWB cabin. By using 53% lightweight carbon fibre composite materials such as this panel, the new Airbus has massive fuel-saving potential. Final assembly of the A350-900 is scheduled to start in 2011, with first delivery to an airline customer expected in 2013.



New composite wing reduces drag, increases efficiency

STOCKHOLM – Right now, preparations are being made ahead of the manufacture of Saab's most complex composite article to date. A wing shell where the parts are integrated into a single co-cured item. **The laminar flow will reduce drag and thereby lower fuel consumption and emissions**.

As part of its role within Clean Sky SFWA (Smart Fixed Wing Aircraft), Saab will develop and produce an upper wing shell which, together with parts from other partners will form an entire outer wing. This outer wing will be test flown on an Airbus A340-300 in 2014 to verify the laminar flow that reduces drag, thereby lowering fuel consumption and emissions. The wing concept is expected to form a key component of Airbus' future Single Aisle family.

One step is now ready in the preparations ahead of the production planned for 2012.

A test panel has been built to test the design and tooling concept and to ensure that the item meets the strict demands on surface quality.

Jonas Bohlin, sub-project manager at Saab within CleanSky SFWA, describes the test panel: "It is a 2 by 2 metre wing shell. The leading edge, stringers, front spar mounting and rib fastenings are integrated into a single item, and to avoid the fasteners piercing through the shell, the entire item is cured simultaneously.

This is a highly advanced composite article and is also the first piece of hardware we are producing within Clean Sky SFWA."

The newly produced test panel weighs barely 100 kg. The material is the same carbon-fibre pre-preg that is being used in the Airbus A350, and is the latest available on the market. The Alcas project, combined with experiences that have been built up over the past ten years, have provided much of the basis for the wing shell's development.

Gatwick's green stamp of approval signals decade of change at world's busiest single-runway airport

LONDON – Gatwick Airport has announced the launch of its first sustainability plan as an independent airport and becomes the largest UK airport to achieve the Carbon Trust Standard, signalling its commitment to become a sustainable airport. The plans - called a 'Decade for Change' - set out the airport's environmental targets across its business activities for the next 10 years with the overall goal of **reducing its carbon emissions by 50%**.

Other key goals include: contributing to Gatwick's local communities; transforming public transport access for passengers and staff; improving air quality through the use of new technology and systems; reducing operational noise; sending no waste to landfill; increasing recycling to 70%; reducing energy and water consumption by 20% and protecting local habitats at the airport.

"Behaving in a responsible and sustainable way is at the heart of our business. As new owners we've grasped the opportunity to introduce new, challenging targets and initiatives to improve our environmental credentials," said Stewart Wingate, CEO of Gatwick Airport. "Over the past six months we've been working very hard to develop a plan that takes us through to 2020, that both recognises our responsibilities and fits with our aspirations for growth and success," added Stewart.

The airport is already on its way to becoming a sustainable airport, as recently, it became the largest airport in the UK to achieve the Carbon Trust Standard for reducing its carbon footprint with plans in place to further reduce carbon emissions year-on-year. Gatwick was already the largest airport in the country to achieve certification to ISO14001, the international environmental standard.

Concept aircraft points to future of flight

FARNBOROUGH – Air passengers got a glimpse into the future of flight at the Farnborough Airshow this year as Airbus unveiled its new concept plane.

More than a flight of pure fantasy, the concept plane illustrates what air transport could look like in 2050 – even 2030 if advancements in existing technologies continue apace. Airbus experts in aircraft materials, aerodynamics, cabins and engines came up with the design which is an 'engineer's dream' to meet the expectations of the passengers of the future. Ultra long and slim wings, semi-embedded engines, a U-shaped tail and light-weight 'intelligent' body all feature to further improve environmental performance or 'eco-efficiency'. **The result: lower fuel burn, a significant cut in emissions, less noise and greater comfort**.

Charles Champion, executive vice president engineering at Airbus, says, "the Airbus concept plane represents an engineer's dream about what an aircraft could look like in the long term future. It's not a real aircraft and all the technologies it features, though feasible, are not likely to come together in the same manner. Here we are stretching our imagination and thinking beyond our usual boundaries.

With the Airbus concept plane we want to stimulate young people from all over the world to engage with us so that we can continue to share the benefits of air transport while also looking after the environment."

Robin Mannings, a leading independent futurologist, looks ahead: "Most of us want reduced traffic congestion – both on the ground and in the sky – together with improved comfort for a better travelling experience. By 2050, we'll also expect seamless access to a plethora of technology and applications. And 'flexibility' will become the new mantra for air travel, with us as passengers choosing levels of speed or luxury in cruise ships of the sky."

Further future-gazing by Airbus shows blueprints for radical aircraft interiors. In 'The Future by Airbus' the company talks of morphing seats made from ecological, self-cleaning materials, which change shape for a snug fit; walls that become see-through at the touch of a button, affording 360 degree views of the world below; and holographic projections of virtual decors, allowing travellers to transform their private cabin into an office, bedroom or Zen garden!

'Green' energy sources like fuel cells, solar panels or even our own body heat might provide energy for powering some systems on tomorrow's aircraft. As aeronautics engineers continue to use nature as a source of inspiration, some of these aircraft may even fly in formation like birds to reduce drag, fuel burn and therefore emissions.

Industry and EU collaborate on technology challenge

TOULOUSE – In September, the Airbus A380 flight test aircraft MSN001 took off from Toulouse for a successful two-hour flight to evaluate the air intake aerodynamics and anti-ice performances of a new technology which reduces the noise emissions of large turbofan engines. The preparation of the flight demonstrator is part of the Clean Sky joint technology initiative, which is a European Union and aviation industry joint programme.

Clean Sky aims to develop cleaner and quieter aircraft. It is built upon six different technical areas: smart fixed wing aircraft; green regional aircraft; green rotorcraft; sustainable and green engines; systems for green operations and eco-design.

For several years now, aircraft, engine and nacelle manufacturers have been working on the development of an acoustic liner which could be installed on the front edges of aircraft engines, aiming at enhancing engine intake acoustic performances, while maintaining nacelle anti-ice and aerodynamic performances.

Airbus, with support of Rolls-Royce, achieved a major step forward in this technology development by completing the manufacturing and assembly of a full scale technology demonstrator on a Trent 900 engine recently.

The new intake technology will be extensively flight tested and ground tested in various environmental conditions to ensure safe and efficient operation of this new technology.

This flight test campaign will result in significant data advance the technology's maturity and enable design fine-tuning for a potential implementation in the next generation of large commercial aircraft.

Clean Sky is one of the largest European research initiatives ever, with a budget estimated at €1.6 billion over seven years, of which half is contributed by the European Commission in cash and half by the European aeronautics industry, in kind.

Clean Sky will assess, design, build and test many technological validation vehicles that will give the industry greener, more innovative and competitive aviation products.

One area of focus is the 'open rotor' engine, which could fit the next generation of single-aisle commercial aircraft, as well as future large regional aircraft. This engine would be a step-change in fuel efficiency from existing equivalent engines and would bring with it **significant (up to 30%) reductions in emissions**. The target date for flight demonstration is 2015, consistent with the currently anticipated market readiness.

Open rotor engine

European Commission commends airport CO_2 achievements

BRUSSELS – En route to the EU Aviation Summit in Bruges, Siim Kallas, European Commission vice president in charge of transport, presented Brussels Airport with the certificate for its latest achievement within Airport Carbon Accreditation, at a ceremony in the presence of Belgian state secretary for mobility, Etienne Schouppe.

Airport Carbon Accreditation is an initiative by ACI Europe enabling airports to measure their carbon emissions in a uniform and independent way as well as promote initiatives to reduce their carbon emissions. The programme acknowledges the efforts made in carbon emission management and reduction.

The accreditation scheme contains four levels of the award. The first level confirms the determination of the carbon footprint of the airport operator, verified by an independent third party. In a second stage a carbon reduction action plan including long-term targets is drawn up. The third stage comprises the engagement of our airport partners in developing and adopting measures to reduce the emission of greenhouse gases. A fourth level awards airports that achieve carbon neutrality.

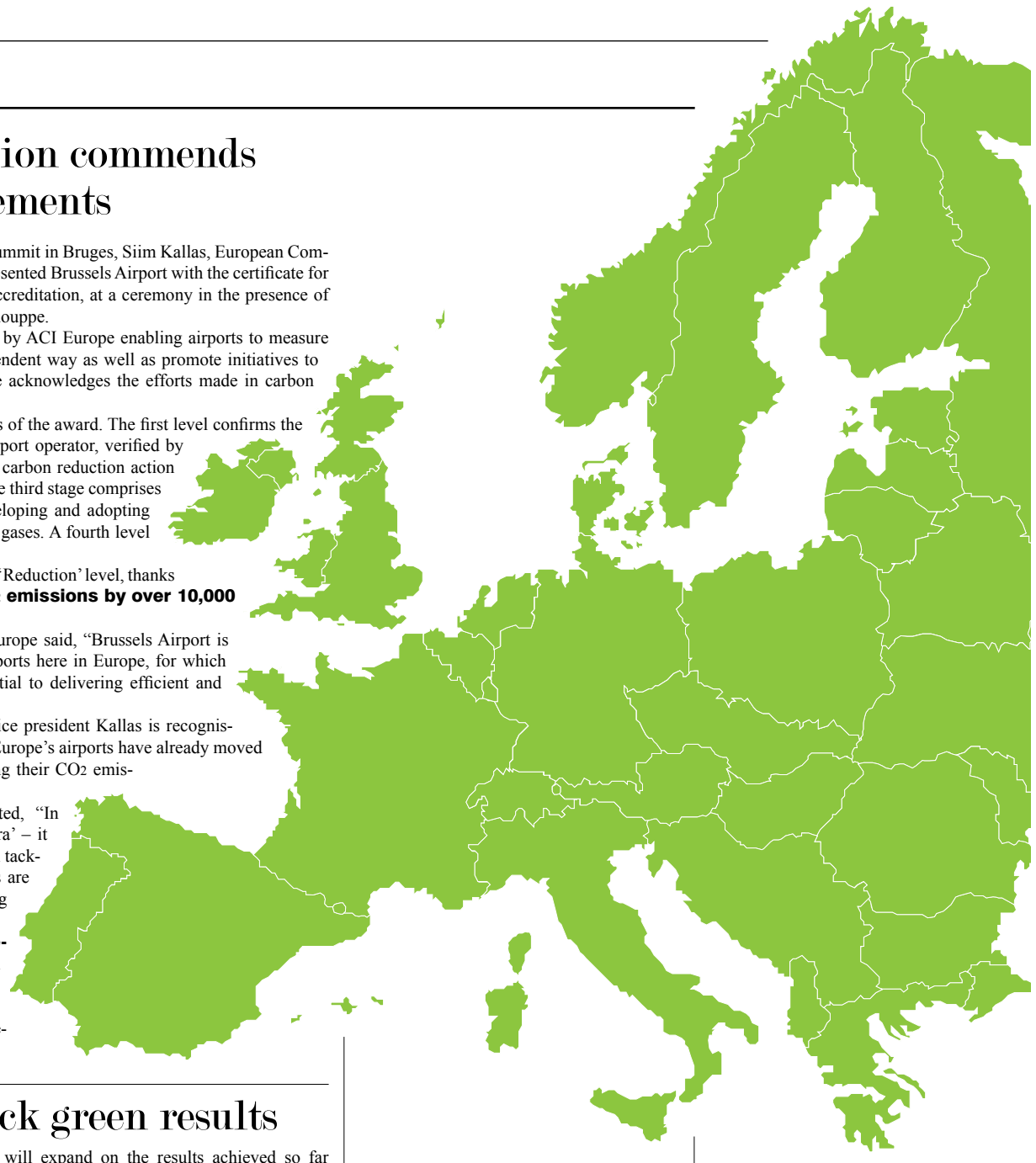
Brussels Airport has became accredited at the 'Reduction' level, thanks to its achievement in **reducing its own CO_2 emissions by over 10,000 tonnes in the past year**.

Olivier Jankovec, director general of ACI Europe said, "Brussels Airport is testament to the business transformation of airports here in Europe, for which ambitious environmental management is essential to delivering efficient and sustainable airport operations."

He added "We are extremely grateful that vice president Kallas is recognising that through Airport Carbon Accreditation, Europe's airports have already moved from words to action, when it comes to tackling their CO_2 emissions."

Presenting the certificate, Kallas commented, "In transport, sustainability is not an 'optional extra' – it has to come as standard. We can only succeed in tackling climate change if the actions of regulators are complemented by citizens and businesses taking action of their own.

"With **over 550,000 tonnes of CO_2 reduced so far**, I believe that Airport Carbon Accreditation is playing a crucial role in helping move European aviation onto a more sustainable footing in line with the historic agreement reached in ICAO."



SESAR getting quick green results

BRUSSELS – The SESAR Joint Undertaking (SJU) selected 18 projects involving 40 airlines, airports, ANSPs and industry partners to expand the Atlantic Interoperability Initiative to Reduce Emissions (AIRE). Under the initiative, the SJU supports integrated flight trials and demonstrations validating solutions for the reduction of CO_2 emissions for surface, terminal and oceanic flight operations. Seven of the 18 proposals include green gate-to-gate projects, among others between France and the French West Indies. One highlight of the programme will be a series of green transatlantic flights with the Airbus A380, the world's largest airliner.

AIRE was launched in 2007, designed to improve energy efficiency and aircraft noise in cooperation with the Federal Aviation Administration (FAA). The SJU is responsible for its management from a European perspective. **In 2009, the SJU supported 1,152 green flight trials under the AIRE umbrella. 18 partners in five locations participated in the trials.**

As a result of a complementary call for tender, more partners will be involved in AIRE in additional pioneer locations such as Austria, Belgium, the Czech Republic, Germany, Canada, Morocco, the Netherlands, the United Kingdom and Switzerland. "AIRE 2 means more partners in more locations with more trials for more results. We will demonstrate that green flight operations can be applied everywhere immediately, when partners agree to work together with a common goal. This is not the future, this is SESAR's reality," says Patrick Ky, executive director of the SJU.

Other new features of the programme are for example gate-to-gate flight trials performed between European city pairs as an addition to complete green transatlantic flights. Some of the validation projects will be conducted in the most congested European airspaces and on the busiest European airports (e.g Schiphol). Some projects will focus on vertical and speed optimisation, while partners who have already participated in 2009, will expand on the results achieved so far with a strong link to routine use of green procedures. AIRE is building the first blocks of the SESAR Concept of Operations by testing SESAR 4D trajectory-based operations and SESAR's concept of performance-based navigation.

Key green projects

The second AIRE call for tender sought for commercial flight trial projects for energy-efficient air traffic management (ATM) operations enabling lower engine emissions and aircraft noise.

The project 'greener airports operations under adverse conditions' executed by DSNA in partnership with Aéroports de Paris and Air France will study operational situations in adverse conditions, caused by bad weather or other factors that constrain runway use.

Out of the five projects selected for terminal operations, one is conducted by Lufthansa in cooperation with DFS and Germanwings. The partners propose to trial a new procedure coupling the arrival flows of Dusseldorf and Cologne. This area has a high traffic density and is a complex area entailing the achievement of significant environmental benefits when implemented.

For en-route/oceanic, four projects are selected covering five new locations (Portugal, Canada, Morocco, the United Kingdom and the United States). NAV Portugal will for example with TAP Portugal and the Moroccan ONDA (Office National des Aéroports) aim to offer shortest flight paths across the flight information regions of Lisbon and Casablanca to heavy long-range aircraft that operate those routes. The miles and minutes saved using this procedure entail significant fuel savings and CO_2 reduction.

In total, seven gate-to-gate projects will be conducted through the programme. Amongst others, Airbus, Air France, NATS, and NAV Canada will perform a series of transatlantic green flights with the A380. Another one is looking at green shuttle flights between Paris and Toulouse.

NATS, British Airways and BAA in UK-first with "Perfect Flight"

LONDON – Britain's aviation industry has come together to reach an important environmental milestone, turning the normal Saturday evening service from Heathrow to Edinburgh into the UK's first "perfect flight".

Every factor within the journey – from pushback from the stand and taxiing to an optimised flight profile and continuous descent approach – was calibrated to achieve minimal emissions and delay.

Data from a British Airways flight will now be gathered and analysed, together with air traffic control and airport information, to understand the benefits. Initially, it is believed up to **a quarter tonne of fuel could be saved, equating to nearly one tonne of CO_2**.

NATS and BA worked with BAA at Heathrow and Edinburgh to achieve this landmark flight, which was proposed by NATS' Andy Sampson and Kel Kirkland. Kel said, "Unlocking each individual link in the chain on a single flight is not easy. Everyone has had a part to play.

"It will be some time before we can expect to see the 'perfect flight' replicated day in, day out but we have demonstrated it is possible and we can work towards it in the long-term."

BA strategy and environment manager Dean Plumb said: "This highlights what can be achieved if every individual part of a flight is optimised. The data obtained should show that what seemed to be a normal, scheduled flight actually achieved something extraordinary."

BAA Heathrow airside operations director Colin Wood said, "This flight is a great example of what can be achieved when the aviation industry works together.

"The benefits should include reduced taxi time, lower carbon emissions, improved air and noise quality and lower airline fuel costs. We are always looking for ways to improve the environmental efficiency of ground operations at our airports and trials such as this are fundamental in delivering new procedures and technologies."

The Airbus A321 was able to fly without the everyday but necessary constraints imposed on air traffic because it was a one-off. It was also able to fly at its most fuel-efficient altitude for longer than usual.

Green taxiing proves its worth

FARNBOROUGH – Messier-Bugatti, part of the Safran group, is a world leader in carbon wheels and brakes and landing systems. It recently showcased developments in its green taxiing initiative, which will enable aircraft to autonomously manoeuver on ground without relying on thrust from the main engines.

To avoid using engine thrust, Messier-Bugatti is developing several solutions to power the main landing gear, as these gears support up to 90% of the aircraft weight. Messier-Bugatti is targeting 2016 for introduction on single aisle aircraft.

Today, two CFM-type engines burn 12kg of fuel per minute during taxiing phases. An average A320 or 737 aircraft operates up to 14 flight cycles per day, and travels several kilometres on the ground both before and after takeoff.

In addition to generating a **4-5% reduction in on-ground fuel burn and CO_2 emissions**, the advantages of such a system are numerous:

- Complete autonomy in on-ground manoeuvres, replacing the use of a tractor to push back from the terminal.
- Less solicitation of the brakes during the taxiing phase, no longer needed to counter residual thrust from the main engines
- Noise reduction during on-ground taxiing
- Improved safety for on-ground personnel
- Optimised engine maintenance, avoiding injection of potentially damaging debris from the tarmac
- Facilitated manoeuvring of the aircraft during maintenance operations

This technology will facilitate efforts for both airlines and airports to meet noise reduction and emissions regulations.

Image: Pascal Le Doaré / Safran

A380 arrival at Manchester welcomed by UK aerospace industry

MANCHESTER – The UK's Aerospace, Defence and Security trade organisation welcomed the arrival of the Airbus A380 as it made its debut at Manchester Airport in September. Manchester is its second UK destination and the first regional (or non-hub) airport to have the A380, an important milestone in the increasing use of this efficient aircraft.

The A380 is more fuel-efficient than a hybrid car, travelling 100 passenger kilometres in standard three class configuration, using less than three litres of fuel (a hybrid car uses four litres) and produces about the same perceived noise on take-off (82 decibels or dB) as that produced by heavy traffic, less than that experienced inside a London underground train (93dB). When fitted with Rolls-Royce engines and with major contributions from other UK companies the A380 is up to 50% made in Britain.

Ian Godden, chair of A|D|S, said: "The UK aerospace sector is number one in Europe and second only to the US globally. The Airbus A380 is an embodiment of this success. Up to half of the aircraft is made in Britain with major contributions from many world-leading companies of all sizes, especially the wings made by Airbus in the UK."

Boeing launches real-time service to help airlines save fuel

SEATTLE – Boeing is introducing new subscription-based services to help airlines save fuel and increase environmental efficiency. InFlight Optimization Services are designed to be implemented within current air traffic and airline operating procedures using existing communication channels. No regulatory changes and little to no new equipment are needed. The services, 'Direct Routes' and 'Wind Updates', provide up-to-the-minute information to airlines and their flight crews, enabling adjustments en route to account for weather and air traffic control status.

"We are bringing to market easy-to-implement solutions to help our customers reach new levels of operational and environmental efficiency by reducing cost, fuel use and CO_2 emissions," said Sherry Carbary, Boeing vice president of flight services. "As part of our commitment to offer lifecycle solutions to our customers, we are now providing real-time flight efficiency advisories."

Direct Routes automatically alerts an airline's operations centre and flight crew every time a simple, more fuel-efficient path opens up along the intended route of flight. To increase the likelihood of air traffic controller approval and to keep workload to a minimum, the advisories are pre-checked for traffic conflicts, wind conditions, established airspace constraints and other factors. Initial Boeing projections show that Direct Routes can save more than 40,000 minutes of flight time per year for a medium-size U.S. airline - the equivalent of operating hundreds of flights that use no fuel and produce no emissions.

Boeing's second InFlight Optimization Services offering, Wind Updates, increases fuel efficiency and improves aircraft performance by sending datalink messages directly to the flight deck with real-time, flight-customised wind information. These messages enable the aircraft's flight management computer to re-calculate flight control inputs based on more accurate and precise information.

Currently, if flight crews obtain wind data prior to departure, that data can be as much as 12 to 20 hours old as a flight approaches its destination. Inaccurate and limited weather data can prevent airplanes from operating at optimum speeds, altitudes and trajectories. Wind Updates delivers a fleet-wide solution using existing onboard equipment and requiring minimal investment.

Boeing projects potential **savings of 100 to 200 pounds (55 to 111 litres) of fuel for the descent portion of a typical single-aisle flight** and is conducting operational trials with KLM Royal Dutch Airlines and Alaska Airlines.

First phase of new Bombardier wing manufacturing and assembly facility in Belfast complete

BELFAST – The first phase of construction of the 600,000 sq. ft. (55,742 m2) facility in Belfast that will house the manufacture and assembly of the advanced composite wings for the new CSeries commercial aircraft has been completed on schedule.

Bombardier's Belfast operation is responsible for the design, manufacture and integration of the advanced composite wings for the CSeries aircraft, including all flight control surfaces and highlift systems.

The facility, which is part of a £520 million investment by Bombardier in its Northern Ireland operation, is being built to meet high environmental standards. The building's layout and design are optimised for energy efficiency and minimal environmental impact.

The facility will be a Leadership in Energy and Environmental Design (LEED) building, and a particular focus is being given to waste segregation and recycling. LEED is a third-party certification programme and an internationally accepted benchmark for the design, construction and operation of high performance green buildings.

"A year ago, we celebrated the start of construction of this brand new facility, and I am delighted that the first phase of this major investment – the largest ever in Northern Ireland – is now complete," said Michael Ryan, vice president and general manager, Bombardier Aerospace, Belfast. "We are also progressing with the composite wing development and test programme as planned, and look forward to starting production of the CSeries aircraft wing early next year."

As part of the wing research and development programme, Bombardier's Belfast operation has developed an innovative Resin Transfer Infusion (RTI) technology to manufacture the large onepiece wing skins and structural spars for the wing torque box. It has manufactured and assembled a pre-production demonstrator wing, which has been successfully tested to ultimate load, replicating 150% of the most severe forces the wing is ever likely to experience in service.

AFRA targets 90% recyclability of global fleet by 2016

SEATTLE – Jeanne Yu, Boeing Commercial Airplane's director for airplane environmental performance, believes the industry coalition Aircraft Fleet Recycling Association (AFRA) is a key catalyst in reaching ambitious industry targets of **90% recyclability of the end-of-service world fleet by 2016**. AFRA and its key member Boeing also aim to reduce the amount of aircraft manufacturing waste which goes into landfills by 25% by 2012.

Ms Yu emphasised that "AFRA is the only global organisation committed to the environmentally responsible management of airplanes as they reach the end of their service life, and AFRA is relentlessly pursuing continual life cycle improvement opportunities".

The Boeing director believes that partnerships such as AFRA "create innovative models which accelerate technology development and allow the industry to set challenging recycling goals to enhance environmental performance." AFRA's companies focus on all aspects of dismantling and recycling in all phases of an aircraft's end of service life.

"Using technology demonstrator projects is another way AFRA global partnerships can be utilised", said Yu, "as has been seen with carbon fiber recycling demonstrators, which have increased focus and accelerated the emergence of technology solutions." There is a need to improve the quality of recycled composite materials, find new applications and new markets both inside and outside the aviation sector.

Using recycled carbon fibre instead of Virgin fibre reduces CO_2 emissions by 90-95%. Recycling also makes good business sense, as the needs of the market are satisfied at lower costs.

The growth in the number of retired aircraft provides opportunities and challenges to AFRA. More than 12,000 aircraft are expected to reach the end of their service life in the next 20 years. A challenge for AFRA is to enable asset owners to extract greatest value from aircraft, making recycling a more attractive option.

AFRA currently has 46 members and has grown by more than threefold since being established in 2006. The members of AFRA have many years of combined aircraft recycling experience, recycling around 150 commercial aircraft a year, representing a third of aircraft scrapped around the world.

Obama administration backs aviation biofuel

WASHINGTON – As part of the Obama Administration's effort to promote production of fuel from renewable sources, create jobs and mitigate the effects of climate change, agriculture secretary Tom Vilsack recently announced a series of measures, including with the Federal Aviation Administration (FAA) a **five year agreement to develop aviation fuel from forest and crop residues and other green feedstocks**.

"Domestic production of renewable energy, including biofuels, is a national imperative and that's why USDA is working to assist in developing a biofuels industry in every corner of the nation," said Vilsack. "By producing more biofuels in America, we will create jobs, combat global warming, replace our dependence on foreign oil and build a stronger foundation for the 21st century economy."

Under the partnership, the agencies will bring together their experience in research, policy analysis and air transportation sector dynamics to assess the availability of different kinds of feedstocks that could be processed by bio-refineries to produce jet fuels.

The participants will develop a tool to evaluate the status of different components of a feedstock supply chain, such as availability of biomass from farms and forests, the potential of that biomass for production of jet fuel, and the length of time it will take to ramp up to full-scale production.

The agencies already have existing programmes and collaborative agreements with private and public partners and resources to help biorefiners develop cost-effective production plans for jet aircraft biofuels.

The US aviation industry responded warmly to the agreement, with Boeing's Bill Glover saying, "Today's announcement is welcome news for the commercial aviation industry, which sees sustainable biofuels as a key element of its plan to lower its carbon emissions. Through test flights with a number of our customers, we have proven that fuels made from plant matter and algae can power jet aircraft safely and efficiently, and we look forward in the months ahead to the approval of these fuels for commercial use.

"The challenge then will be to prime the production pump, and bring biofuels to an attractive price point for airlines. The USDA-FAA partnership will further help in that regard. We applaud their efforts and look forward to working with them to commercialise biofuels that can help the aviation industry meet its aggressive carbon reduction goals."

The Air Transport Association of America, which represents the largest airlines in the US, also welcomed the announcement, "ATA and its member airlines are working hard to procure and deploy environmentally preferred, economically viable, domestically produced jet fuel; this includes through long-term purchase agreements," said ATA president and CEO James May. "These new and enhanced USDA programmes will accelerate production of renewable aviation fuels by US farmers.

"After formally launching the 'Farm to Fly' initiative just three months ago, Secretary Vilsack has taken a leadership role in this significant endeavor for aviation and for rural America," said May. "Secretary Vilsack's announced programmes will provide investors, farmers, bankers and US energy companies with the confidence to invest in these proven, green technologies."

Rolls-Royce receives CLEEN Technologies programme contract

DERBY – Rolls-Royce has received awards valued at $16 million for its participation in the US Federal Aviation Administration's (FAA) Continuous Lower Energy, Emissions and Noise (CLEEN) Technologies programme.

Under this contract, Rolls-Royce will perform aero engine test demonstrations specifically focused on reduced fuel burn technologies and evaluating alternative aviation fuels. The goals established by the FAA's CLEEN programme are to **achieve a 33% reduction in fuel burn**, against a baseline of current performance technology and advance sustainable alternative aviation fuels, by 2015.

James Skinner, programme manager, CLEEN technologies, Rolls-Royce said, "We are committed to evaluating alternative fuels and advancing future technologies that are 'match fit for purpose' and meet criteria of critical importance for our environment, energy conservation, energy and industry economies."

This segment of the CLEEN programme will be performed in concert with undertakings already established under the Environmentally Friendly Engine (EFE) programme. Rolls-Royce will evaluate alternative product designs to achieve fuel burn reduction by providing large gains in cycle efficiency through reductions in turbine cooling airflow.

Rolls-Royce future engine technologies are aimed at progressing advanced engine cycles that meet or exceed CLEEN goals for fuel burn reduction, while improving engine weight and noise.

A complementary alternative fuels programme of laboratory-scale, rig and engine testing will also be performed in a controlled environment at Rolls-Royce in the UK.

Pratt & Whitney part of MIT team that wins Breakthrough Innovator award for eco-friendly green aircraft design of the future

NEW YORK – Pratt & Whitney engineers are part of a team that recently received *Popular Mechanics* magazine's Breakthrough Innovator Award for designing a greener aircraft of the future that could use **70% less fuel than current planes while reducing noise and emissions**.

The Massachusetts Institute of Technology (MIT)-led team, which also includes Aurora Flight Sciences, is looking at the potential application of Pratt & Whitney's PurePower geared turbofan technology as an integral part of the design for this eco-friendly narrowbody plane. The team's work is part of a $2.1 million NASA contract to deliver benefits for future single-aisle aircraft designs.

"It's possible that in the not-too-distant future, highly efficient aircraft will be designed based on a fuselage shape that's not round, as conventional aircraft are today, but incorporates two side-by-side cylinders that create an oval – or 'double bubble' – cross section," said Alan Epstein, Pratt & Whitney vice president, technology and environment, who is an MIT professor emeritus. "It's estimated that the advanced concept in airframe design could use significantly less fuel than the conventional shape while also reducing noise and emission of nitrogen oxides (NOx)."

The craft's unique "double bubble" fuselage dispenses with the tube-and-wing structure of current airplanes, providing extra lift while reducing drag. Three engines are located on the upper rear of the fuselage. This will allow the engines to ingest slower moving air, using less fuel than under-wing engines. The plane's body and tail will shield the engines, reducing noise. A model of the aircraft is undergoing tests in the MIT Department of Aeronautics and Astronautics' Wright Brothers Wind Tunnel.

The double bubble concept in-service target is currently set for 2035, by which time commercial air travel in the USA is expected to have doubled. As the project proceeds, the technology required to make the concept a reality will be a system game-changer.

"This integrated approach to vehicle and engine will yield vastly improved efficiencies compared to today's applications," said Epstein. "Pratt & Whitney's role on the MIT team strongly positions us to influence the technology that will define the future of air travel."

MANUFACTURER BRIEFS

GE Aviation receives award for FAA CLEEN research

GE Aviation received an award from the Federal Aviation Administration (FAA) as part of the Continuous Lower Energy, Emissions and Noise (CLEEN) programme. The programme goal is to enable the new technologies to enter the fleet beginning in 2015. GE and the FAA will share the investment of up to $66 million for up to a five-year period.

The CLEEN award will help fund three GE technologies including TAPS II Combustor, Open Rotor and Flight Management System - Air Traffic Management (FMS-ATM) technologies.

"GE has always invested in advanced technologies to lower fuel burn, emissions and noise," said Dale Carlson, advanced engine systems for GE Aviation. "This CLEEN award will allow us to quicken our pace on research on key technologies that will provide our customers with more fuel efficient technologies to help reduce their costs and their impact on the environment."

One of the technologies being funded includes the TAPS II Combustor which GE is developing for its new engine core, called eCore. eCore will be part of CFM International's new LEAP-X engine for narrowbody aircraft as well as the new core for GE's next generation regional and business jet engines.

The new core will offer up to 16% better fuel efficiency than GE's best engines in service today. GE began testing the TAPS II combustor in June 2009 at a special altitude test chamber in Evendale, Ohio, as part of the first eCore tests. The results were very positive.

Boeing recognised as a leader in climate change

For the second consecutive year, the Carbon Disclosure Project recognised Boeing as one of the world's leading companies in reporting climate-change risks and taking actions to improve environmental performance.

"Boeing's environmental improvement stems directly from our innovative and engaged employees," said Mary Armstrong, vice president of Environment, Health and Safety.

"We've seen many instances where impressive cost savings and productivity improvements resulted from employee-led activities to reduce our environmental footprint. This has helped us enhance our product performance, reduce costs and meet the needs of our customers while becoming more environmentally efficient."

Boeing has set – and is achieving – aggressive environmental performance targets. At major US facilities since 2002, Boeing reduced CO_2 emissions by 31%, energy consumption by 32%, water consumption by 43% and hazardous-waste generation by 38% on a revenue-adjusted basis.

CANSO joins ACI Europe and Eurocontrol's partnership to combat airport congestion and reduce fuel burn and CO_2 emissions

AMSTERDAM – CANSO has joined the ACI Europe and Eurocontrol partnership to increase operational efficiencies at European airports. The threat of climate change, the global economic crisis and the resulting changes in the structure of the European aviation market have led to a renewed focus on efficiency and performance for Europe's airports.

In October 2008, ACI Europe and Eurocontrol signed a collaboration to increase operational efficiencies at European airports. This collaboration revolves around the implementation of an innovative operating practice called Airport Collaborative Decision-Making (A-CDM) which allows airports into the Air Traffic Management network and vice versa. This gives users access to a range of operational data allowing them to make their operations more efficient. Successful implementation of A-CDM leads to **significant reduction in CO_2 emissions**, which in turn helps airlines save fuel.

Today at the 5th Annual ACI Europe Airport Exchange, CANSO – the global trade body for Air Traffic Management – is joining this partnership, giving the initiative even more momentum. Over the last two years, the A-CDM programme has made great progress with more than 30 airports so far engaged in implementing the programme.

The latest target was announced in October: to have A-CDM fully implemented at ten of these airports by the end of 2011. Further roll-out of the programme will continue with ACI Europe, Eurocontrol and CANSO all actively encouraging new participants, through promotion of the benefits gained early pioneers of the programme.

David McMillan, director general of Eurocontrol said, "A-CDM is also a fine illustration of the way that improvements in performance can often be achieved without major capital expenditure. But it depends upon partnership – working together to improve performance. It is based on an integrated approach, with information being shared across different players. It emphasises the network nature of ATM where an apparently local decision can have implications across Europe. And of course it is focused on airports – at the heart of the need to increase capacity."

Olivier Jankovec, director general ACI Europe commented, "I am delighted to welcome CANSO into this initiative, as the enhanced, timely exchange of information that is at the heart of A-CDM creates a virtuous circle of operational gains on the ground for all partners involved: airports, air navigation service providers, airlines and ground handlers. Ultimately, this optimisation of resources helps to make the journey smoother for the passenger and reduces environmental impact."

Graham Lake, director general of CANSO said, "Delivering operational improvements through collaborative partnerships is a key objective of CANSO. I am delighted that we have been approached to assist with this valuable A-CDM project. CDM is a key component of the European Flight Efficiency plan, which CANSO supports, and over the coming months CANSO's European members will be working with our airport partners and colleagues at Eurocontrol to find ways to accelerate CDM roll-out in Europe."

NATS on target for 10% CO_2 cut by 2020 as new CEO urges faster pace

LONDON – NATS, the UK's leading air traffic control company, has announced that it is on course to achieve its ground-breaking emission reduction programme as it reports **annual savings of 50,000 tonnes of CO_2**.

In 2008, the company became the first air traffic control provider to set targets to cooperate with the industry to reduce ATM CO_2 by an average of 10% of per flight by 2020.

Today, NATS has published its second annual report, which shows that 50,000 tonnes of CO_2 were saved last year. It also details how the company staged the first "perfect flight", between Heathrow and Edinburgh, to demonstrate the ideal fuel-saving trajectory for aircraft.

Chief executive Richard Deakin, who took over in April, told the ATAG Aviation and Environment Summit in Geneva, that NATS had made good progress and must build on its achievements to ensure it meets the climate challenge.

He said, "This is a win-win. The work we are doing not only removes CO_2 from the atmosphere, it also means cheaper fuel bills for the airlines and greener airport operations.

"NATS has devised the toolkit to measure the emissions produced by our network – no other air traffic controller has done this. In a way, this is the key to unlock air traffic systems across the world to see where and how savings can be achieved.

"As the aviation industry moves towards a more sustainable future, a future which cannot happen unless air traffic control is matching the pace the airlines are setting, we need to ensure we are focused on delivering benefits to our customers and for the environment."

Deakin added that other companies had already approached NATS to learn from its approach in both its air network plans and the project to make its buildings and day-to-day activities carbon neutral by 2011.

The report also notes that 150 fuel-saving suggestions from airlines and NATS staff are being put into practice. It also covers the partnership with the Irish Aviation Authority to create Europe's first functional airspace block.

NATS' carbon reduction target is in line with international aspirations. The Intergovernmental Panel on Climate Change has identified potential for cuts in aircraft fuel burn attributed to air traffic management of between six to 12% by 2020. SESAR, the project to harmonise air traffic control across Europe, has set its benchmark of 10% by the same year.

Debut of flightpath marks new era in airspace modernisation

The introduction of advanced airspace design tools will lead to reductions in congestion – at airports and in the air.

WINDSOR LOCKS – As American Airlines Flight 1916 touched down at Bradley International Airport, it became the first-ever United States flight to use a publicly available, commercially designed instrument flight path. The event heralds an acceleration of airspace modernisation efforts that use precise 'highways in the sky' to reduce delays, **slash aircraft CO_2 emissions** and improve airline operating efficiency.

Naverus, a part of GE Aviation, designed the path, which incorporates Required Navigation Performance technology (RNP), a core component of the FAA's NextGen airspace modernisation plan. RNP paths can be custom-tailored to reduce airport congestion, shorten trip distance, reduce an aircraft's time in flight, and create community-friendly flight trajectories that lessen the effect of aircraft noise.

"This flight marked a significant milestone for the flying public by augmenting the means to develop and deploy airspace improvements in the USA that will translate to fewer delays, less air pollution and greater system reliability," said Naverus general manager Steve Forte. "Modernising the US air traffic management system is a monumental task that requires the best efforts of government and private sectors alike. We have shown how third-party navigation providers, like GE, and airlines, like American, are helping accelerate these improvements."

The new landing procedure, which became a permanent fixture at Bradley Airport recently, allows pilots to use onboard technology to follow a precise track, independent of aging ground-based navigation beacons that limit where the aircraft can go. As a result, the Bradley procedure will enable airliners to land on Runway 15 during periods of low clouds and visibility that previously would have stopped them from landing there.

The inaugural flight carried as a passenger GE Aviation's Technical Fellow for Air Traffic Management, Steve Fulton, a long-time champion of RNP who developed the world's first RNP flight paths in the mid 1990s.

"RNP flight paths are an important part of a larger GE effort that is pioneering new ways to optimise aircraft operations from gate to gate," said Fulton. "Other components of this effort include advanced features of GE flight computers, like the one aboard the American Airlines flight, which allow pilots to fly RNP paths and enable them to select pre-designated arrival times at runways and even at exact points along the route".

ATAG AIR TRANSPORT ACTION GROUP

Air Transport Action Group Board members Bill Glover (Boeing), Hélène Gagnon (Bombardier) and Alan Epstein (Pratt & Whitney) join executive director Paul Steele (at back) to launch the Beginner's Guide to Aviation Efficiency *at the 2010 Farnborough Air Show. The guide is available from the website* ***www.enviro.aero/aviationefficiency*** *and was made possible due to the support of Pratt & Whitney, Boeing, Airbus, Bombardier and Embraer. Photo courtesy Flightglobal.com*

ATAG grows with addition of new high-level members

GENEVA – The Air Transport Action Group, the only global organisation to represent all sectors of the aviation industry, has announced at the global Aviation & Environment Summit the addition of a new Board member: Honeywell Aerospace; and two new associate members: ATR and the Aerospace Industries Association.

Paul Steele, ATAG's executive director, said, "The Air Transport Action Group is the forum where the industry can come together and work towards common solutions to common issues. We are the only group that represents the broad spectrum of the air transport sector at a global level."

Honeywell Aerospace joins Airports Council International, Airbus, Boeing, Bombardier, the Civil Air Navigation Services Organisation, CFM International, Embraer, GE Aviation, the International Air Transport Association, Pratt & Whitney and Rolls-Royce on the Board of ATAG.

"We also welcome as associate members the regional aircraft manufacturer ATR, which rounds out the top five airframe manufacturers as members of ATAG, and the Aerospace Industries Association (AIA), bringing expertise from their large membership in the United States."

Paul Steele welcomes Mario Formica of ATR to Associate Membership of the Air Transport Action Group.

Introducing ATAG

Established in 1990 by Airbus, Boeing and the International Air Transport Association, ATAG has grown to be the only industry association representing all sectors of commercial aviation sector – airlines, airports, air navigation service providers and the major aircraft and engine manufacturers. "We are really fortunate to have a strong Board of Directors," says Paul Steele, the group's executive director, "our Board is fully committed and actively engaged in our activities.

"ATAG focuses on issues that are not competitive in nature; issues where there is common interest. Therefore our work is all about collaboration – bringing together the engineers, the economists, the policy people – all those who have a clear vision for the sector and are committed to our industry's environmentally sustainable future.

"Aviation has, for many years, held safety and security to be absolute priorities, where even the fiercest of competitors work together for the good of the industry. Since the Aviation & Environment Summit of 2008, the same can be said for environment."

In addition to the funding members that make up ATAG's Board, the group has some 50 members ranging from trade unions to chambers of commerce and representatives of all parts of the air transport value chain.

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628,000,000 tonnes

Worldwide, flights produced 628 million tonnes of CO_2 last year.
Globally, humans produced over 30 billion tonnes of CO_2.

82%

A jet aircraft coming off the production line today is around 80% more fuel efficient per seat km than one delivered in the 1960s.

2%

The global aviation industry produces around **2% of all human-induced carbon dioxide (CO_2) emissions**.

12%

Aviation is responsible for 12% of CO_2 emissions from all transport sources, compared to 74% from road transport.

Over **33 million** people are employed worldwide in aviation activities and related tourism. Of this, **5.5 million people work directly in the aviation industry**.

The aviation industry consumes around 1.5 billion barrels of Jet A-1 fuel annually.

1,715 airlines operate a fleet of **23,000** aircraft serving **3,750** airports through a route network of **millions of kms** managed by **160** air navigation service providers.

Nearly a quarter of the operating costs of airlines is spent on fuel: **23%**, which is up from 13% in 2001. The proportion is likely to rise further as fuel prices go up. So this alone is a major incentive for the industry to focus on fuel efficiency.

Aviation.

$1.3 trillion

In order for the aviation industry to reach its target of 1.5% average fleet fuel efficiency per annum from now until 2020, the world's airlines will have to purchase **12,000 new aircraft at a cost of $1.3 trillion**.

Airlines saved **3.8 million tonnes of CO_2 in 2007** and **6 million tonnes in 2006** by shortening air traffic routes around the world.

80%

Alternative fuels, particularly sustainable biofuels, have been identified as excellent candidates for helping achieve the industry targets. Biofuels derived from biomass such as algae, jatropha and camelina have been shown to reduce the carbon footprint of aviation fuel by up to 80% over their full lifecycle. **If commercial aviation were to get 6% of its fuel supply from biofuel by 2020, this would reduce its overall carbon footprint by 5%**.

2.2 billion

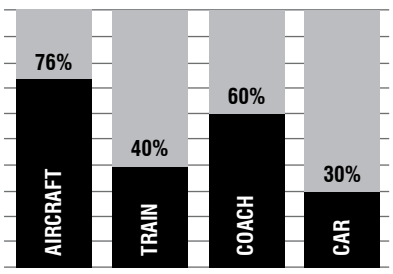
In 2009, over **2.2 billion passengers** were carried by the world's airlines.

If aviation were a country, it would **rank 21st in the world** in terms of gross domestic product (GDP), generating $425 billion of GDP per year, considerably **larger than some members of the G20** (and around the same size as Switzerland).

By 2026, it is forecast that aviation will **contribute $1 trillion to world GDP**.

76%

Globally, the average occupancy of aircraft is **around 76%**, greater than other forms of transport.



Figures for aircraft are worldwide. Figures for other modes are UK averages.

Our climate targets:

1.5%

We will improve our fleet fuel efficiency by 1.5% per annum between now and 2020.

Stabilise

From 2020, net carbon emissions from aviation will be capped through carbon neutral growth.

50%

By 2050, net aviation carbon emissions will be half of what they were in 2005.

3-5 years

With certification expected at the beginning of 2011, it is estimated that the first drops of sustainable aviation biofuel could be making their way into commercial flights in **3 to 5 years**. Once production is scaled up, the % of fuel supplied will increase rapidly.

35%

While air transport carries around 5% of the volume of world trade shipments, it is **over 35% by value** – meaning that goods shipped by air are very high value commodities, often times perishable or time-sensitive.

Deliveries of fresh produce from Africa to the UK alone supports the livelihoods of 1.5 million people, while producing less CO_2 than similar produce grown in the UK, despite the energy used in transport.

80%

Around 80% of aviation CO_2 emissions are emitted from flights of over 1,500 kilometres, for which there is no practical alternative mode of transport.

3 litres

The new Airbus A380, Boeing 787 and Bombardier CSeries aircraft use **less than 3 litres of jet fuel** per 100 passenger kilometres. This matches the efficiency of most modern compact cars.

The aviation industry was the **only global sector** to present a united plan for reducing its emissions to governments at the 2009 Copenhagen Climate Talks.

The South African horn made infamous at the 2010 World Cup, the vuvuzela, at full blast is rated at **127 decibels**. An A380 on the other hand takes off with a relative whisper at **82dB**.

Sources:
IATA Economics, ATAG *Beginner's Guide to Aviation Efficiency*, IPCC, ICAO, United Kingdom Department for Transport, Oxford Economics Study *Aviation: the Real World Wide Web*, Airbus, Boeing, ATAG *Beginner's Guide to Aviation Efficiency*, ATAG report *The Social and Economic Benefits of Air Travel*, the Intergovernmental Panel on Climate Change (IPCC), IATA, ATAG, BBC News, AERO modelling system.