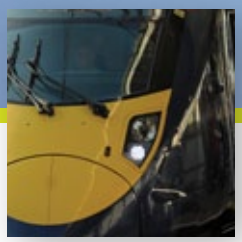
GSA mag.

making airports greener



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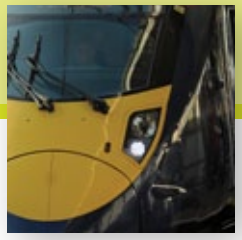


Ready for landing!

The GSA project is coming to an end - in aviation terms you could say the landing gear is in place! At such moments we tend to reflect on what has been happening and how it all started. One of the many good memories I have is of our first project preparation meeting and the dinner that followed. Before everyone departed at the end of a long day Lars Guren of Sandefjord Airport took a moment to speak and conveyed to the group that he had really enjoyed the warm and open atmosphere – it was a good sign for our future cooperation in GSA, he said.

He was right – the tone was set. The excellent atmosphere in this partnership has made our project a success. The willingness to learn, share and develop, together with a joint ambition to be really innovative and reduce CO_2 emissions, has remained strong throughout the course of the project.

For the airports and their regions it's not about getting results on paper; it's all about actually making a difference. Small and medium airports (SMAs) usually have limited funds and manpower. So, creative solutions based on sound finances are a must. Just one example of this is the tool we developed that helps airports to calculate, allowing for their own specific circumstances, if making the switch to LED lighting is a viable business case.

We are also very pleased with the cooperation of various European organisations. EASA, Eurocontrol, DG Move and ACI have always held the door open for us, given presentations at the GSA transnational seminars and listened closely to our remarks regarding the specific situation and challenges faced by SMAs. Although the situation at small and medium airports differs greatly in comparison to the big main hubs there are also some similarities. It was therefore very useful to exchange our 'GSA lessons learned' with some of the larger airports. Representatives from Helsinki, Oslo, Copenhagen and Frankfurt all came to our seminars to share their visions in terms of sustainable development, to present, to discuss and to listen to the GSA approach. This was a valuable learning experience for everyone.

Sustainable public transport, integrated ticketing and real time information systems for passengers were researched by the airports, together with their regional and local authorities and public transport organizations. This integrated approach and sharing of experiences made it possible to develop a plan in terms of process. Our partner airports are ready for the future now but the GSA methodology will, no doubt, offer useful lessons for others.

Whilst developing some of the tools we were supported by a number of important knowledge institutes including the National Physical Laboratory (the UK's National Measurement Institute), the NLR (aerospace knowledge enterprise in the Netherlands) and Bioforsk (Norwegian institute for agricultural and environmental research). Consultants from Schikkor Consultants, M2P, Enviro and Uniconsult contributed their specialist knowledge.

Cooperation in the GSA project has resulted in even more than we thought possible at the start. The ambitions of the participating airports and their regions have been heightened. You can read more about the partners' experiences in this magazine. Detailed reports have also been published per theme and are available on request or can be downloaded from the website www.greenairports.eu.

The project is now coming to a close but GSA will continue. The website and LinkedIn group will remain a source of inspiration for sustainable solutions for airport operations at SMAs and we would like to invite other small and medium airports to join this digital community. Because, if there's one thing we've learned from the Green Sustainable Airports project it is that working together and sharing knowledge leads to a more sustainable management of airports – and it cuts costs. And that is a combination that makes everybody happy!

Ben van Os,
Project Manager GSA

Partners

The GSA project was initiated by Groningen Airport Eelde (The Netherlands). The Province of Drenthe is responsible for project management and is acting as Lead Partner in cooperation with Groningen Airport Eelde. There are 18 partners and sub-partners from 6 countries in the North Sea Region.

The Netherlands
- Provincie Drenthe
- Groningen Airport Eelde NV

Belgium
- International Airport Kortrijk-Welvegem

Germany
- Zweckverband Verkehrsverbund Bremen / Niedersachsen
- Verkehrsverbund Bremen / Niedersachsen GmbH
- Senator für Umwelt, Bau und Verkehr
- Senator für Wirtschaft, Arbeit und Häfen
- Flughafen Bremen GmbH

United Kingdom
- London Southend Airport Co. Ltd.
- Kent County Council
- Institute for Sustainability
- National Physical Laboratory

Norway
- Sandefjord Lufthavn AS
- Vestfold County Council

Denmark
- Billund Lufthavn A/S
- Billund Municipality
- Thomas Cook Airlines Scandinavia A/S
- Billund Varmeværk Amba



What is Interreg?

The Interreg B programme has been initiated by the Euopean Commission to stimulate cooperation between the regions and has a budget of € 138 million for the duration, till the end of 2013.
Lead Partners can apply through the programme's 'calls' for project funding. If they comply with the programme requirements, half of their investments will be covered by the European Regional Development Fund (ERDF).

The Interreg IVB North Sea Region Programme

Investing in the future by working together for a sustainable and competitive region

'Transnational activities and joint analyses lead to positive achievements towards the EU 2020 objectives'

Interreg IVB

The Interreg North Sea Programme consists of three strands – A, B, and C. The GSA project falls under Interreg IVB. Projects focus on transnational cooperation in the North Sea Region and the programme is currently in its fourth phase (2007-2013), hence the name Interreg IVB.

Transnational

Transnational cooperation implies the cooperation of various regions across countries. Each partner contributes to the project's development and financing.
The issues that cross national borders require a transnational approach - measures taken in one country affect neighbouring countries.

The Interreg IVB North Sea Region Programme

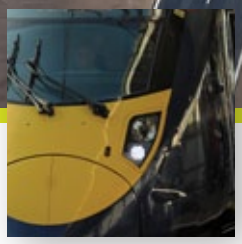
The North Sea Region includes regions in Sweden, Denmark, Germany the Netherlands, Belgium, Norway, England and Scotland. The Interreg programme sets strategies, priorities and socio-economic analyses for the North Sea Region (NSR) for 2007-2013.

The aim of the Programme is to make the North Sea Region a better place to live, work and invest in. The future development of the North Sea Region, however, will be determined by its ability to achieve economic progress through shared development objectives and shared resources, building on individual regional strengths and territorial potentials.

The Programme has four Programme priorities:

- Increase the opportunities for innovation
- Enhance the quality of the environment in the North Sea Region
- Improve the accessibility of places in the North Sea Region
- Deliver sustainable and competitive communities

Green Operations at Gron



ningen Airport Eelde

Groningen Airport Eelde is aware that the expansion of the airport has an impact on the environment. Air pollution, noise emissions, climate effects and safety are matters the airport does not take lightly, out of respect for local residents and the environment.

Within a period of just over three quarters of a century Groningen Airport Eelde has grown into a fully equipped international airport. Although located within the boundaries of the province of Drenthe, it is situated within a stone's throw from the bustling city of Groningen. The location of the airport, together with its excellent accessibility, convenient departure times and fast check-in procedures, has ensured that an ever increasing number of holidaymakers and business travellers prefer Groningen Airport Eelde to the crowded queues at Schiphol Airport in Amsterdam.

Besides chartered and scheduled flights, the three flight academies (KLM Flight Academy, Dutch Flight Academy and Stella Aviation) are responsible for a major part of the flight movements. Other flights from our airport include business flights carried out with business jets, military flights, medical flights and recreational flights.

Groningen Airport Eelde strives for a responsible growth, in harmony with the environment and the people living close to the airport. The airport wants to guard for any inconvenience that may result from certain airport activities and limit these as much as possible.

"A responsible growth in harmony with the environment" – it's easy to say but how can this be achieved?
GAE was greatly inspired during a previous, very successful, cooperation with Bremen Airport and decided to put these words into actions.

Following an inventory phase of more than a year, we developed and initiated the Green Sustainable Airports project together with the Province of Drenthe. We then started the search for partners – keeping in mind that the partnership must be a good reflection of the countries, regions, airports and stakeholders dealing with similar issues in the North Sea Region. The Green Sustainable Airports (GSA) project was born and its scope was defined. While the Province of Drenthe is responsible for project management Groningen Airport Eelde is leader of Work Package 3, Sustainable Airport Solutions.

'GSA is a project designed to make regional airports frontrunners in sustainable development. It aims to establish strategies and solutions for a more eco-efficient and green regional aviation industry. In a multi-national partnership, the project focuses on regional airport communication, regional cooperation and policy resolutions to safeguard the role of regional airports as accessibility gateways by improving public perception and acceptance. As a major objective, GSA tries to conciliate all stakeholders' interests.'

Groningen Airport Eelde (GAE) has achieved a number of important goals within the project – one of the most important being a change in 'mind-set'. Sustainability was not as ingrained before the project but now it has become a standard principal in our approach. It is not always possible to opt for the most sustainable solution due to the high regulatory demands in

"A responsible growth in harmony with the environment" – it's easy to say but how can this be achieved?

aviation, but searching for the most sustainable, eco-friendly result has become part of our corporate culture.

With the recent runway extension GAE has done its utmost in terms of sustainability – and this has resulted in a great achievement! It was not just the 'green' choices made during every aspect of the building process, but the fact that the tender for contractors specifically requested a sustainable approach. As a result all parties involved, such as foremen, advisors, construction workers etc., had to think and act in the same way – practical implementation with a sustainable mindset. This was innovative!

Another green measure was introduced at GAE during the course of the project – the Continuous Descent Approach (CDA), also known as Continuous Descent Operations (CDO). A CDA is an aircraft operating technique in which an arriving aircraft descends from an optimal position, with minimum thrust and avoiding level flight. It is designed to reduce fuel consumption and noise levels in comparison to a conventional approach. Instead of approaching the airport in a stair-step fashion, CDA allows for a smooth, constant angle of descent towards the landing strip. The CDA trajectory has been designed in close cooperation with Air Traffic Control Nederland (LVNL), Eurocontrol and transavia.com. There are both environmental and economic advantages.

Touching on the subject of Public Transport, a new direct bus link was recently opened between Groningen Airport Eelde and the nearby cities of Groningen and Assen. The Airport Line is run by a local coach company, Drenthe Tours. This bus company, together with the Province of Drenthe, is currently investigating the possibilities for 'green gas' buses for the airport route. The Airport Liner bus timetable is synchronised with the flight schedules of Ryanair.

"Continous Descent Operations offer both environmental and economic advantages."

The Green Sustainable Airports network is transnational. This means that many unique experiences can be shared with other partners dealing with the same practical issues. Mutual recognition of the challenges faced and sharing experience has proven to be of great value within the partnership. Moreover, by taking a

look behind the scenes at other airports, creative ideas emerge regarding the implementation of procedures and techniques at home. At every airport the conversation always turns, within a few minutes, to the operational process, strategy and policy and, of course, sustainability. We are proud to be part of this green airports network.

The Province of Drenthe

Drenthe is one of the three northern provinces of the Netherlands and is excellently located between the large centres of economic importance in the West-Netherlands, Germany, Scandinavia and the Baltics. With its beautiful landscape, dynamic economy and excellent working and recreational facilities, Drenthe is a great place to live!

Capital: Assen
Total area: 2,680 km²
Population: 491,000
Population density: 183 inhabitants per km²

As a governmental authority the Province of Drenthe is responsible for many aspects of spatial planning, the environment, landscape and nature, traffic and transport, the economy, welfare, health, and culture. The province is headed by an executive committee, the Provincial Executive Board, which is appointed by a democratically chosen parliament, the Provincial States.
The Province of Drenthe co-operates with the two other northern provinces, Groningen and Fryslân, in the Northern Netherlands Provinces (Samenwerkingsverband Noord-Nederland, SNN). The province is involved, both at home and abroad, in various different partnerships with governmental organizations that focus on stimulating economic activities.
The House of the Dutch Provinces represents the interests of Drenthe in Brussels.

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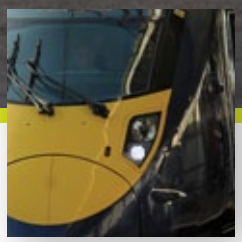
Noise abatement:
Noise reduction model an



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nd toolkit

The Senator für Wirtschaft, Arbeit und Häfen (local Ministry of Economics, Labour and Ports) of the Free Hanseatic City of Bremen, Germany and the other GSA partners give recommendations on how to reduce noise at airports.

The Senator für Wirtschaft, Arbeit und Häfen (Ministry of Economics, Labour and Ports) Bremen, Germany is responsible for work package 3 'Sustainable Airport Solutions', Sub-Activity 3.3 'Continuous Descent Approach and Noise Reduction Model', task 3.3.3 'Noise Abatement'.

With respect to GSA, the Ministry of Economics, Labour and Ports as being the Civil Aviation Authority of Bremen saw in 2010 the great advantage of this European project, which is that you can bundle your knowledge and resources and form better alliances with other partners all over Europe.
SWAH was especially interested in the subjects pursued in work package 3; particularly, eco-efficient airport operations, LED runway lightning, effective tree management on airport areas and of course noise abatement the partner is responsible for.

Concerning the two studies the partner carried out, the GSA participants learned about several measures to reduce noise emissions.

The first study, divided into three parts, has as key objective: noise reduction from aircraft ground operations and aircraft air operations. Furthermore, a strategy on noise abatement has been developed. The first part of the study involved finding ways to avoid noise while the aircraft is on the ground. Consider, for example, noise from taxiing on the apron before take-off, after landing or from engine test runs. This noise can be reduced by using protection walls or hangars, or by choosing an area which is less noise sensitive. Another possibility, at least for all turbo prop aircraft, is taxiing with one engine off. An aircraft requires power while standing on the apron. The electrical power is usually delivered by auxiliary power units (APU) and ground power units (GPU) which are much less noisy. So it is best to avoid using APU and GPU as long as possible. It is even feasible to use the public electricity network, combined with a transformer, instead of diesel-driven GPUs. Concerning the pushback, this could be performed in areas which are not noise sensitive and – in the future – probably even by an electric vehicle instead of a diesel-driven one.

The second part of the GSA noise abatement study regarded the noise from aircraft air operations. This noise often comes from above so protection walls etc. are not an option – other measures must be taken. There are administrative regulations, like airport charges depending on noise emissions or night flight restrictions. Other potential solutions are to raise penalties for night-time flight delays or to facilitate passive noise protection by funding investments such as new windows. Furthermore, the departure and arrival procedures can also be taken into account. Thrust or reverse thrust should be reduced when the situation allows and such advice could be presented in national aeronautical information publications.

Positive effects can be gained from restricting the use of certain runways and optimizing the departure and arrival routes to limit the noise in

"A strategy on noise abatement has been developed."

populated areas. Another alternative is to follow a continuous descent approach, which can lead to less noise in certain areas. Additionally – in the long term – the aircraft can be technically improved. All in all one can say that there are many measures which can be taken to reduce noise hindrance at, and in the vicinity of, airports.

The second study on noise abatement found out which measures the partners have implemented and which are feasible from their point of view, so the GSA partners can now present a toolkit for noise abatement. Summarizing, there are great differences at the airports e.g. concerning movements, passengers, residential areas in the vicinity of airports. So the partner „Senator für Wirtschaft, Arbeit und Häfen" together with the other partner airports gives recommendations for several different types of airports but also general guidelines:

The top measures for aircraft ground operation are ranked as follows:

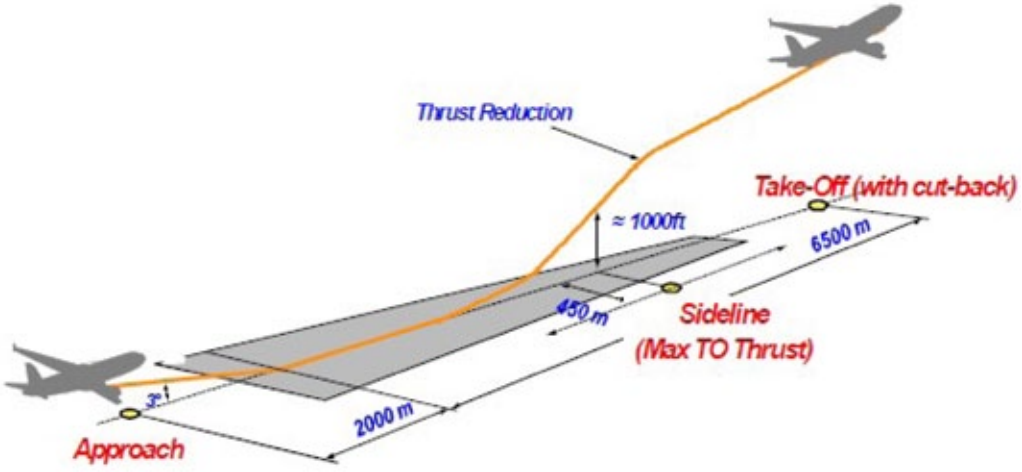
- Time restrictions for engine test runs
- Avoiding long taxi times and queues before line-up
- Use of ground power units (GPU)

The Top measures for aircraft air operation are ranked as follows:

- Night flight restrictions
- Restrictions for training purposes
- Precise definition of departure routes

Altogether you can say that all GSA partner Airports implemented a high number of noise abatement measures in order to protect the residents in the vicinity of the airports.

"Positive effects can be gained from restricting the use of certain runways and optimizing the departure and arrival routes to limit the noise in populated areas."



Configuration of measuring points for the certification of aircraft noise emission according ICAO Annex 16 (Source: CFM)

Ministry of Economics, Labour and Ports, Bremen

The Free Hanseatic City of Bremen is a city in the northwest of Gemany consisting of the two municipalities of Bremen and Bremerhaven. Altogether more than 660,000 people live in the state of Bremen.

The local Ministry of Economics, Labour and Ports (Der Senator für Wirtschaft, Arbeit und Häfen) of the Free Hanseatic City of Bremen is responsible for all questions regarding economic policy, labour policy and matters that are related to the ports of Bremen. Moreover, the Ministry operates also as the State's Highest Civil Aviation Authority and are responsible in the fields of marketing, technology, innovation, agriculture policy, food industry and consumer affairs.

The authority has a double function: on the one hand it is a Ministry of the State of Bremen – which consists of the cities Bremen and Bremerhaven – on the other hand it acts as the municipal administration of the city of Bremen.

The Civil Aviation Authority – a sub-department belonging to the Ministry of Economics, Labour and Ports – represents the interests of the State of Bremen in the fields of civil aviation and, with respect to aeronautical issues, the development of transport facilities. By fulfilling its statutory duties it is also the highest Civil Aviation Authority of the State of Bremen holding the supervisory control over the Flughafen Bremen GmbH (Airport Bremen). It is also responsible for matters regarding aviation safety and security and noise disturbances caused by aviation.

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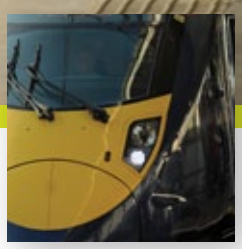
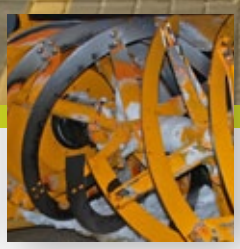
Public Transport Accessi to Regional Airports





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bility

Facilitating surface accessibility in the most sustainable way, regional airports and transport authorities have jointly developed innovative solutions and evaluated potentials for improved airport connecting public transport services.

Regional airports often serve modest urban areas or are in areas of relatively low population density. This geography, coupled with the fact that regional airports tend to have relatively low numbers of passengers, often makes public transport services unviable. As a consequence, passengers use private modes of transport to access regional airports. This results in additional greenhouse gas emissions; and in some locations adds to road congestion.

Tackling deficits of public transport surface connectivity, the GSA partnership has jointly worked towards a North Sea Region Public Transport Accessibility Model. The model, which is innovative in its approach to delivering solutions to small and medium sized regional airports, some of which have low passenger numbers, includes strategies to implement intermodal access improvements, i.e. rail and bus connections, pre-investment studies on rail access and feasibility studies on innovative, alternative and green engines for public transport services. The implementation of which will greatly improve the attractiveness and acceptance of regional airports.

In Kent, neither of the two airports (Manston, Kent's International Airport and Lydd, London Ashford Airport) are in close proximity to a rail line to enable them to invest in a new station that would give them direct access to a more sustainable form of transport than the private car. Due to the relative small size of the airports (in terms of current passenger numbers) and the fact that both airports are private commercial operations, neither is able to commit the level of investment required to improve sustainable surface access by rail. In such circumstances sustainable access to the airport would need to be multi-modal, i.e. bus services connecting the rail station and the airport terminal, and any investment in rail facilities needs to be considered from a regional transport planning perspective. Within this context the development of the airports and any transport infrastructure to support it would need to be viewed in terms of the wider economic and regeneration benefits that would be brought to the region. For example, delivery of the new Thanet Parkway railway station to serve Manston Airport would support the wider regeneration of East Kent by improving the accessibility and attractiveness of nearby business parks and facilitating access for local people to a wider employment market.

Kent County Council (KCC) commissioned a study that assessed the deficiencies in public transport accessibility at all the GSA partner airports; and potential solutions to address them based on application of best practice from comparable airports. A further study assessed the options for bus services to Kent's two airports, sharing best practice from the GSA partner airports and offering some universally applicable solutions to the partner airports' own shortcomings in terms of types of bus services that could be beneficial. KCC also conducted a pre-investment study for a new railway station (Thanet Parkway) to serve Manston Airport and the intermodal connectivity that would be required to connect the new station

"GSA has jointly worked towards a Public Transport Accessibility Model for SMAs in the North Sea Region."

to the airport terminal, again learning from the experience of the other partner airports that are in a similar situation. The study also established thresholds in an airport's development as to when it is applicable to invest in new station facilities and the levels of bus connectivity, i.e. demand responsive, existing public bus services, dedicated shuttle bus etc, that would be required if the station is remote from the terminal.

Together with the work of GSA partners in Bremen, who assessed the potential for green engines, i.e. an electric trolleybus to replace a diesel engine on a bus route serving City Airport Bremen, the studies established a generic Public Transport Accessibility Model for Small and Medium Sized Regional Airports that could be applicable across the North Sea Region of Europe. This demonstrates how transnational working has led to common solutions to tackle common problems.

"Transnational working has led to common solutions to tackle common problems."

Kent County Council

Kent is located in the South East of England as the gateway between continental Europe and the UK. Kent is one of the largest counties in England, has around 1.4 million residents and has excellent connections to Europe via the Channel ports including Dover and the Channel Tunnel. The county also has two international airports and two international railway stations with direct high speed rail connections to London, Paris and Brussels; and good motorway access to other parts of the UK.

Kent is characterised by medium sized towns surrounded by historic small market towns and traditional villages. It also has one city, Canterbury. Known as the Garden of England due to its largely rural nature and significant agricultural activity (particularly the production of fruit and vegetables) the county has over 2500 km² of countryside, 500 km of unspoilt coastline, and more historic homes and castles than any other county. This is also a great place to do business – the economy is very diverse. Key economic sectors include environmental technologies, pharmaceuticals & biosciences, advanced manufacturing & engineering, tourism, hospitality & leisure.

Kent County Council (KCC) is the strategic Local Authority for Kent which is responsible for delivering services to the people; including roads, schools, social services, libraries, adult education centres, trading standards & planning. It is also the local transport authority for Kent, responsible for the management and maintenance of all non-strategic roads in the County and supports socially necessary bus services.

Manston, Kent's International Airport has the potential to develop into a regional airport and become one of the largest single generators of economic activity in the County. The airport predicts that it will serve around 5 million passengers and cater for 400,000 tonnes of freight by 2033. Lydd (London Ashford) Airport also has potential for growth in a niche market and has plans to extend its runway and expand its passenger terminal to accommodate up to 500,000 passengers per annum.

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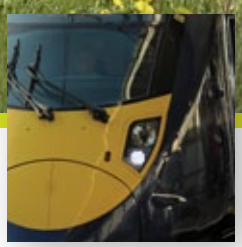
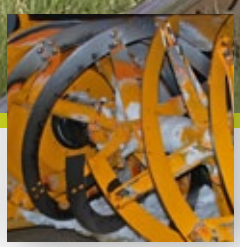
Sustainable Public Trans in Bremen





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sport

The City of Bremen strives toward improving mobility on an economically, socially and ecologically sustainable level for citizens and visitors. Comprehensive and inclusive transportation solutions that strive to expand accessibility between and to various modes of transport and promote innovative transport solutions, such as E-Mobility, are an integral part of the region's mobility concept.

The citizens of Bremen make nearly 1.8 million trips per day as they commute between home and work or school, for business, shopping or recreation. Weekend trips into the surrounding countryside, business trips and holidays outside the region can also be undertaken with train or plane. Bremen itself is also an attractive travel destination – both nationally and internationally. The number of people entering and leaving the city, for whatever reason, has grown steadily over the years.

While Bremen already features a wide modal share (percentage of travellers using a particular form of transportation) with a significant portion of environmentally-friendly modes of transport (pedestrian, bicycle, public transport and car sharing), the topic of transportation and mobility still concentrates on the automobile and a strong dependence on fossil fuels. It is clear that we must strive towards mobility solutions that offer additional economic, social and ecologically sustainable alternatives. In the future, it will become more and more important to offer city-compatible options for mobility; not by attempting to limit this but by providing transport solutions that are attractive, efficient, accessible and less harmful to the environment. The options should require fewer spatial resources without reducing the quality and freedom of mobility.

That is why the Ministry for the Environment, Construction and Transportation (Der Senator für Umwelt, Bau und Verkehr) follows a broad and holistic approach to reforming mobility in Bremen. The city's urban development concept, the 'Leitbild 2020', aims at developing a city that is more environmentally-friendly by tackling transport policy issues such as trans-regional and inner city accessibility. This includes improving accessibility between various modes of transport, pedestrian routes, the public transport network (bus, tram, rail, etc.) and supra-regional connections. Furthermore, Bremen aims at reducing traffic-related CO_2 emissions by creating a strategy to expand environmentally-friendly, city-compatible and barrier-free transport systems.

Within the framework of Bremen's urban development concept, the 'Leitbild 2020', it is emphasised that new alternative forms of mobility (i.e. E-Mobility) represent innovative approaches that should be analysed with regard to their suitability for urban areas and their environmental sustainability. This is where Bremen's participation in Green Sustainable Airports comes into play. Green Sustainable Airports offered a framework in which to analyse innovative forms of transport, opportunities for integrating green public transport into the existing public transport network as well as the expansion of the public transport network with airport access. The project set the stage for a feasibility study, 'Electrifying Public Transport: A Feasibility Study for a Trolley Bus Service on Bremen's Bus Line 52'.

"It is clear that we must strive towards mobility solutions that offer additional economic, social and ecologically sustainable alternatives."

"Green Sustainable Airports offered a framework in which to analyse innovative forms of transport..."

In order to increase accessibility to the benefit of passengers and employees working at and near Bremen's City Airport, a scenario was created for improving tangential and suburban connections in addition to the tram line already servicing the airport (airport – city centre – main station – university). Trolley buses are recognised as a high-quality, low noise, ecologically-friendly, low CO_2 e-mobility solution with a positive environmental image and, consequently, a high degree of public acceptance. Therefore, a trolley bus operating on the Bremen Street Car Authority's (BSAG) line 52 was analysed from an economic and technical point of view.

The results of the study showed that the economic feasibility of a trolley bus service to airports depends on several parameters. These include:

Infrastructure and the possibilities for easily refitting existing transit lines to accommodate the technical infrastructure of a trolley bus line, Consistent passenger demand for continuous/ frequent transit service to peripheral areas

A ratio of fossil fuel costs vs. electricity costs that would ensure a reasonable return on investment for the initial electrification of the bus line.

While the (local) environmental benefits of a trolley bus are indisputable, the financial feasibility is a premise for deployment given the parameters of an already strong tradition of public transit in Europe.

The Green Sustainable Airports partnership provided a valuable network for sharing and exchanging these and other ideas on a regional and international level. In addition, the project provided the opportunity to learn from the best practice examples of project partners from a range of disciplines that make up the complex organisational structure of airport operations and transportation planning. When striving to provide sustainable solutions for transport to and from airports or in urban areas, in general, the ability to learn from others and to transfer ideas for mobility solutions to one's own city is an invaluable and indispensable commodity.

The Ministry for the Environment, Construction and Transportation

The Hanseatic City of Bremen is a city-state in the north of Germany near the North Sea and is divided into the two municipalities of Bremen and the North Sea port, Bremerhaven. The city of Bremen is Germany's 10th largest city with a population of nearly 550,000 inhabitants and is perhaps best known for its UNESCO cultural heritage marketplace, the folktale of the 'Town Musicians of Bremen' and its maritime traditions. However, it is also a lively city with many public green spaces, diverse cultural and business opportunities. We can boast a bicycle and pedestrian-friendly infrastructure, a well-developed public transport system and an airport that is one of the closest and most easily accessible urban airports in Germany, located just 3 km from the city centre.

The Ministry for the Environment, Construction and Transportation is the supreme building authority for the City of Bremen and is responsible for a wide range of administrative activities. The mobility concept for the city includes coordinated, non-discriminate planning for all modes of transport – pedestrian, bicycles, public transport, passenger rail transport, automobiles and commercial transport – geared toward efficiency, accessibility and social, economic and environmental sustainability. Transportation planning, environmental protection, urban development and quality of life play an important role in creating a mobility concept that promotes a balanced, liveable, attractive and functional urban realm.

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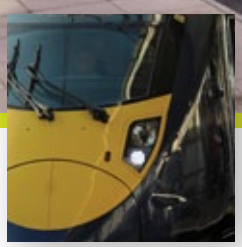
London Southend Airport



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t & LED Lighting

London Southend Airport (LSA) joined the Green Sustainable Airports Project, with the aim of knowledge sharing with other small & medium sized airports. At the time the airport had just been bought by the Stobart Group and was at the start of a major transformation of the airfield and associated facilities. There was a number of project topics that interested LSA especially as being a growing airfield, it considered that knowledge gained from others who had more experience in specific topics would be invaluable, for example the noise study from Bremen and winter operations at Sandefjord.

As part of Work Package 3, Green & Efficient Airport OPS, LSA became the responsible partner for LED lighting. The original scope of works was to implement and test LED runway lighting. This seemed a viable project, as LSA was looking at completely replacing the Aeronautical Ground Lighting (AGL) as part of the redevelopment works. However, LSA was also looking to attract airlines and had a target completion date prior to the Summer 2012 Olympic Games. This meant a very tight programme of works, with deadlines that couldn't be missed, and to add complication the CAA had not and did not appear to be in a place to licence LED lights for use on runways. Based on this, the scope of the works at LSA changed to the installation of LED lights on the taxiways and a knowledge sharing exercise of LSA's experiences.

After the LED taxiway lights were installed and became fully operational in March 2012, the airport commissioned a study into the Business Case for Installing LED lights, which focussed on the main comparisons between standard Tungsten and Halogen Lights and LED lights and understanding the credibility of the claims by manufacturers and experiences of other airfields, including partners in the GSA group. One of the outputs from the study was a business case model which allows airports who are considering installing or changing to LED lights to input real data to understand whether there is a real saving to be made by installing LEDs.

LSA is also an active partner in some of the other elements of Work Package 3 – Green / Eco-efficient Airport OPS as well as Sustainable Accessibility Concepts and Green Airport Marketing.

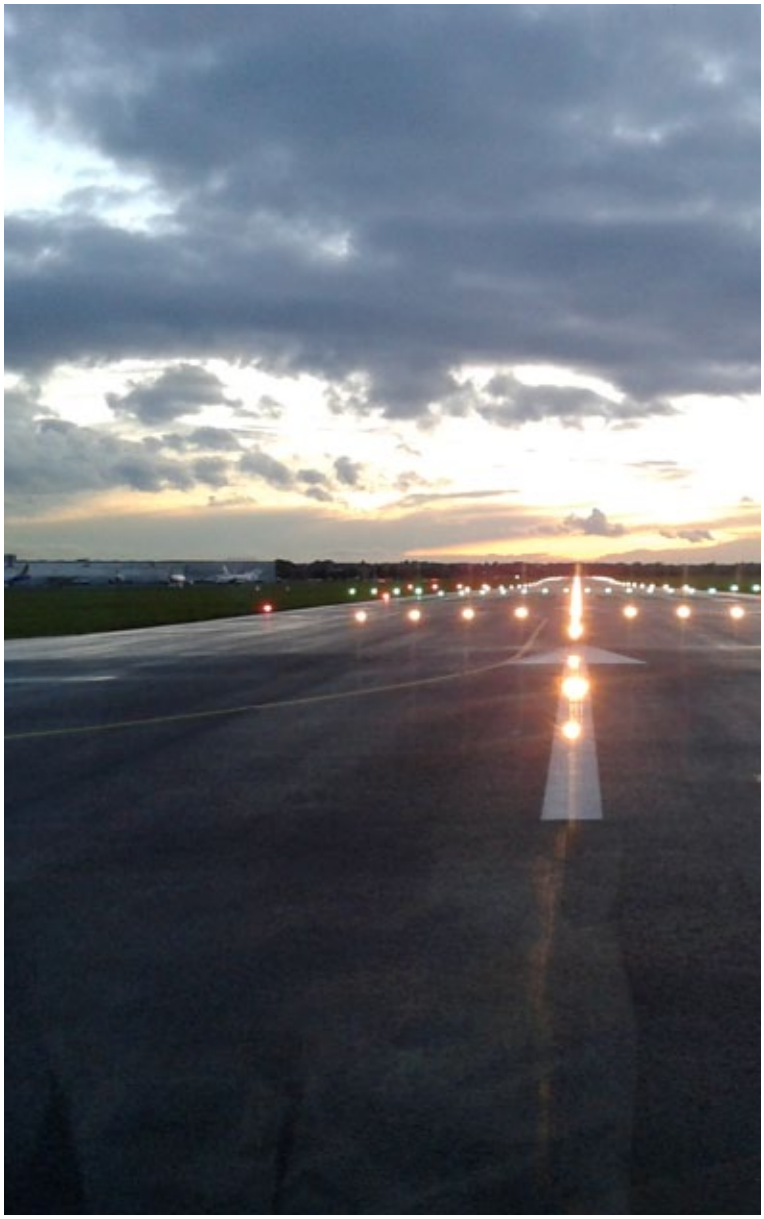
Throughout the duration of the project LSA has gained a tremendous amount of knowledge from the other partners, by understanding their experiences. During the transnational seminars there have been visits and presentations by numerous airports and industry specialists which have again been insightful and useful. We have shared information regarding our own experiences, for example with KCC, on our onsite railway station which was built and is operated by LSA. We have also participated in the noise study for the Institute for Sustainability (IfS) and the National Physical Laboratory (NPL). Of particular interest was the de-icing project led by Sandefjord. At the beginning of the project LSA was developing winter procedures so information gained during the transnational seminars and visit to Sandefjord was valuable. Currently LSA is assessing management of the de-icing process and the production of the Winter Management Toolkit covering winter services, aircraft de-icing and run off treatment

"The business case focussed on the main comparisons between standard Tungsten and Halogen Lights and LED lights."

will be of great benefit to understanding best practices of other partners.

London Southend Airport (LSA) is based in South Essex in the South East of England. The airport is approximately 40 miles East of London in the seaside town of Southend, which boasts a population of around 160,000. LSA is around the same distance from the M25 as Stansted on dual carriageways currently being improved to the tune of £100M. London Southend Airport also sits on the London Liverpool Street-Southend Victoria commuter line connecting it to the City of London over 120 times a day. The airport falls within the Thames Gateway which is the UK's largest regeneration programme, the South Essex portion of which lies firmly in the LSA Catchment. Southend has a catchment area of over 350,000 people and over 6 million visitors annually. There are targets for the creation of 6,500 new homes and 13,000 jobs by 2021. Dubai Ports are investing £1.5 billion in a site no more than 10 miles from the airport site which is banded to become the port for the UK.

"Currently LSA is assessing management of the de-icing process... the Winter Management Toolkit will be of great benefit."



London Southend Airport

LSA is a regional airport currently handling around 30,000 movements per annum. LSA is popular for GA flying and has 3 flying clubs based. There is plenty of apron parking, hangar space, no slot restrictions and operations are 24/7. LSA is often referred to as a one-stop-shop for airlines; the airport hosts an aircraft painting company, numerous engineering and maintenance companies (including avionics) and even an aircraft seat manufacturer. The airport also has a number of based private jet operators who provide a tailored service for both business and leisure customers.

In 2008 the airport was purchased by the Stobart Group. Since then there has been over £100M invested in the redevelopment of the airfield, which has resulted in the creation of over 500 new jobs. Planning permission for the runway extension was granted in 2010. A brand new, re-sited control tower and new onsite railway station became operational in 2011. The rail station provides fast and frequent services to London Liverpool Street, with up to 8 services an hour at peak. A new terminal building opened in February 2012 and is already undergoing an extension which is due to complete late 2013/early 2014. The runway extension became operational in March 2012 allowing more modern and fuel efficient aircraft to operate from LSA. 2012 also saw the opening of the onsite hotel and private executive lounge. easyJet started scheduled services in April 2012, with Aer Lingus operating a 3 times daily service to Dublin.

As well as all of the major projects, there are also a number of sites at the airport that have been earmarked for development with the potential of attracting new business to the airfield. easyJet based a fourth aircraft at LSA in June 2013 and the range of destinations has increased to 16, since flights started in April 2012. Over 1 million passengers have travelled through the terminal with easyjet since they started. Passenger numbers have surpassed the previous peak in 1967, with 2012 seeing the airport handle over 620,000 passengers.

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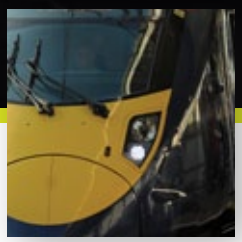
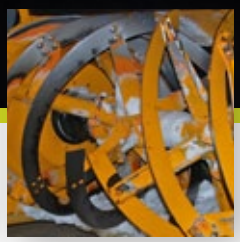
Kortrijk-Wevelgem: a green sustainable busi





ness airport

A typical business aviation airport in the North Sea Region has discovered how to reduce its impact on environment not only by noise abatement. The concept of finding smart and low cost solutions for a range of problems by brain storming and benchmarking has changed profoundly the way we act and think as a business airport operator.

Kortrijk-Wevelgem Airport is a typical business aviation airport serving commerce and industry in the Western parts of Belgium and Northern France. It has several professional flying schools and no less than 120 private aircraft and helicopters based. Before 2010 we only focused on the reduction of aircraft noise produced by our operators for the surroundings – this was our environment program.
By participating in the GSA project we learned that protecting the environment entails much more than noise abatement, although this remains hugely important.

On meeting our new partners we discovered that there is a wide range of tools available to support our goals for sustainable and environment friendly operations.
Most small and medium-sizes airports (SMAs) have to work with rather limited financial means - you have to be smart and inventive! During the seminars and partner meetings we became increasingly aware of the opportunities for sustainable airport operations. Some of the solutions studied and elaborated on by the partners, and resulting in best techniques available, are now ready to be implemented at our airport.

Meanwhile Kortrijk-Wevelgem Airport has looked for solutions to absorb aircraft noise and emissions when constructing or reconstructing an airport – considering its typical infrastructure and buildings.
All our collected data is shared with the GSA partners. The exchange of ideas and experience within the partnership has stimulated our endeavours to act and think in a sustainable and energy saving way. As in the past, we continue to take every opportunity to communicate this approach to the people and politicians of our region and we are convinced that we have succeeded in enlarging airport acceptance by joining the Green Sustainable Airports project.

“Most small and medium-sizes airports (SMAs) have to work with rather limited financial means - you have to be smart and inventive!”

“The exchange of ideas and experience within the partnership has stimulated our endeavours to act and think in a sustainable and energy saving way.”

Kortrijk-Wevelgem International Airport

The Belgian & Flanders (www.vlaanderen.be) region www.west-Vlaanderen.be is situated in one of the economically most powerful and wealthiest regions of Europe. Industrial activity and entrepreneurship are at a high level and unemployment is almost non-existant.
Flanders and the Province are investing substantially to strengthen the economic growth in a quickly changing world where transport, distribution and logistics are increasingly important.
The www.westpoort.be gateway concept is bringing together different logistic and international transport actors, including www.kortrijkairport.be.
The airport is indeed considered as a 'Poort' (gateway) for business aviation and freight express to and from all corners of Europe – and even beyond.
Famous touristic highlights as www.brugge.be (Bruges) www.gent.be (Ghent) and www.ieper.be (Ypres -World War I Remembrance Site). WWI sites attract millions of visitors each year and are within a 25 minute drive form the airport.
The cities of www.kortrijk.be and www.wevelgem.be have around 110,000 inhabitants and form a centre of commerce and industry stimulating 'Innovation, Design and Creation'. Kortrijk has a major exposition hall www.kortrijkxpo.com and a brand new city shopping centre (www.k-in-kortrijk.be) which attracts tens of thousands of people to the city.

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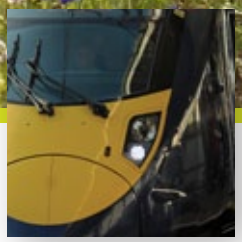
Billund Airport and the sustainability



road to

Billund Airport is determined to be leading in terms of green sustainable airport solutions. In fact, it is part of our company's vision and the reason for our dedication to the GSA project.

Billund Airport became involved in the Green Sustainable Airports project with the aim of sharing knowledge with other small & medium sized airports. We had several ideas and projects in the pipeline and realized it would be of great value to join the project in order to share knowledge and find best practices. The opportunity to find more sustainable solutions for heating and powering Ground Power Units (GPUs) of AC was obvious. A public transport connection to the airport was also something we wanted to focus on. The timing was just right. There were several other project topics that interested Billund Airport, for example winter operations at Sandefjord.

When Billund Airport's new terminal building was built in 2002, allowances were made for an aircraft heating system using district heating. The airport's old diesel powered heaters were ready to be replaced and we were searching for a new, more sustainable solution. A partner had to be found in order to develop this solution. Other issues, such as the possibilities for switching from diesel powered ground power units to electric units and the challenge of minimizing the risk for bird strikes without 'loosing' nature, were also important for Billund Airport.

Billund Airport has worked on a landscaping plan for areas owned by the airport. The objective is to optimize the conditions for nature at the airport, taking into account that airports have a responsibility in terms of minimizing the risk of bird strikes. The plan involves a continuous effort to reduce the risk of bird strikes in combination with a more sustainable approach to land maintenance. We are working on two fronts: planting willow trees and eco-friendly landscaping, and aviation safety.

Willow is an energy crop and is planted with the aim of delivering wood chips to produce heat at a local heating plant. It is necessary – and common sense – to replace fossil energy with more CO_2-friendly energy sources. But there are more benefits. It turns out that the willows attract wildlife and birds that fit in quite well with airport operations. Moreover, it is a crop that requires little fertilizer. Weed control is needed in the beginning – this can be done mechanically. Another plus point is that it's a crop that meets our groundwater protection demands as well. The net energy output of this type of willow cultivation is 20 times more than the input. We started planting willow on 15 hectares of land in April 2011 and currently (2013) have 25 hectares in total. This will cover 20-25% of the airport's energy consumption for heat.

Heating and cooling of aircrafts

Billund Airport has a number of older diesel heaters that have to be replaced in the near future. This is an opportunity for the airport to move to a more environment-friendly way of heating and cooling its planes.
The possibilities of using the airport's ground water cooling system (Aquifer Thermal Energy Storage) and/or using existing district heating has been investigated; a solution has been

"We aspire to being a leading airport in terms of sustainability- to the benefit of both the environment and our economy."

developed in cooperation with the Nilan company, resulting in a unit for heating and cooling aircrafts based on green technology. Costs and energy savings have also been calculated. Possibilities for using the existing ground water cooling-system have also been researched. A preliminary impact analysis shows a potential reduction of nearly 80% in CO_2-emissions. At Billund Airport the area does have very strict limitations for the use of APU, so the benefits will not be that high.
Traditional diesel heaters will be replaced by district heating powered devices, using biomass, biogas and solar panels and electricity-based cooling. The district heating plant has set a goal for 75% CO_2-neutral heat by 2015 and 90% by 2020. Billund Airport will contribute to the production of biomass (willow).

"It's not easy being green..." - this is particularly true if you 'walk alone'!"

Ground Power Units

In cooperation with the GPU users, the airport's department for Ground Support Equipment has developed an electric GPU with a cable-coiling system whereby the possibility of using electricity rather than diesel is improved. The first of these units was put into operation in Spring 2011 – there are now 3 units in use and more are on the way. External advisors have calculated that the energy efficiency of Billund's diesel powered ground power units is 11% on average, while that of the electric units is approximately 90%.

Willow Design Exhibition

We want to share our dedication for green sustainable solutions and our participation in the GSA project with our passengers, and inspire others to a greener and more sustainable way of thinking. To communicate our efforts with the energy willow we teamed up with TEKO,, the largest school of design for textile and furniture in Scandinavia. Using our rough cut 'energy' willow, a group of students presented avant-garde willow seating furniture of which 9 pieces were selected for the Billund Airport Willow Exhibition held in December 2012.

Since January 2011 no chemicals (only sand) have been used for deicing in areas on the apron where the handling staff works. During the winter season 2012/13 we tested various products (slate, sand, granite, leca) and experimented with sweeping to keep the runway dry – resulting in a significant reduction in the use of deicing chemicals. Studies on airport accessibility and noise abatement have been made, and LED lightning was installed on one of our taxiways in 2011.

'It's not easy being green…' – this is particularly true if you 'walk alone'! At Billund Airport we might see sustainable technical solutions for certain issues, but it is difficult as a small or medium sized airport to establish strategies in a broader perspective. Within GSA we've discussed and exchanged knowledge and experiences on all fronts with our partners.

Billund Airport – West Denmark

Billund Airport, which is located in Billund municipality (approx. 6,000 inhabitants and world famous for LEGO and the Legoland Park)Park), is the second largest airport in Denmark with almost 3 million passengers per year. Billund Airport is a public limited company (public owners operating as a private company). We provide easy access,onaccess, on a global scale, with, with routes to over 60 international destinations. Nine out of ten of our passengers travel abroad, so we can rightly call ourselves West Denmark's International Airport.

We want traveling via Billund Airport to be an experience in itself. Our dedicated and competent staff arestaff is committed to creating the best environment for our passengers by generating optimal conditions for airlines, charter operators and goods transportation services. We aspire to being a leading airport in terms of sustainability- to the benefit of both the environment and our economy. Billund Airport has two terminals. The new passenger terminal is 40,000 m² and designed to handle 3.5 million passengers a year with the existing traffic pattern. The airport has one runway (3.100 meters), a cargo center and a border control station.

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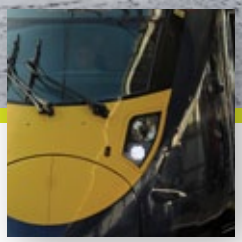
Torp Sandefjord Airport in white conditions



– Green solutions

Torp Sandefjord Airport joined the GSA project to enlarge its network with airports of similar size dealing with similar environmental challenges.

Located in the southern part of Norway, Torp Sandefjord Airport has challenging winter conditions – and the winters can be quite long in this part of Europe! The airport took early steps to operate in a sustainable way and qualified for the ISO 14001 certificate in 2002.

With a growing number of passengers, we need to take great steps in the next few years to redesign the airport in order to cope with tomorrow's demands. This is a great motivation and opportunity to search for smart solutions in other parts of the northern hemisphere.

We joined the GSA project to expand our network with airports of a similar size dealing with comparable environmental challenges. For a small airport with limited economical power, it is also necessary to look for adapted technology that matches both our needs and our possibilities.

The issues Torp wanted to address within GSA were:

- Use of chemicals for de-/anti-ice purposes
- Run-off treatment
- Energy consumption
- Noise abatement

Based on our extensive experience in winter management Sandefjord Airport Torp, with input and exchange from the five regional airports involved in GSA, has developed and compiled solutions to:

- Ensure more efficient use of de-icing fluids and solids
- Substitute chemicals with alternative substances and procedures
- Reduce environmental impact from contaminated run-off

Inspiration and new contacts within parts of the Nordic and North-European airport system have also been useful.

Airport and aircraft de-icing activities are essential for maintaining safe winter operations. Safety of flight movements, compliance with environmental regulations and compatibility with aircraft components and airport infrastructure must be taken into account. With the support of Bioforsk, a research and development agency with a sustainable approach to environmental challenges, we have made significant headway in the development of alternative, sustainable solutions. However, not all approaches are suitable for regional airports (e.g. infrared-facilities) because of high investment and operational costs. Based on experience and knowledge, desktop research and workshop discussions with de-icing experts, 17 measures have been compiled in GSA's Sustainable Winter Management Toolkit. Airport managers can select an individual set of measures to improve winter management depending on local conditions and circumstances at their regional airport.

Torp Sandefjord Airport is located in a densely populated area and we also want to minimize the impact of noise on the neighbourhood. The exchange of knowledge and measures regarding noise abatement within the GSA partnership will be of great value to us when approaching this issue in the future

"For a small airport with limited economical power, it is also necessary to look for adapted technology that matches both our needs and our possibilities."

"We have made significant headway in the development of alternative, sustainable solutions for de-icing."

Terminal expansion

At the moment we are expanding the international terminal building with 6000 m² on two floors. This will improve the baggage capacity significantly as well as facilitate a brand new duty free area, with separate shops for departure and arrival. To improve the sustainability of heating and cooling in the new building, an energy well system is currently being built to serve both the new and existing terminal building. The thermal wells (63 in total) are drilled 250 meters into the bedrock. The new terminal will be finished in the spring of 2014.

Vestfold County has been involved in Work Package 4 of the GSA-project which deals with sustainable accessibility to regional airports. The Municipality has a dual connection – as one of the owners of the airport and as the authority dealing with regional development. Their activities in GSA have been partly carried out by Torp Sandefjord Airport and focus on improved possibilities for travellers to and from Torp by public transport.
Sandefjord Airport Station is located on the Vestfold Line, about 3 kilometres from the airport. It is served by regional trains that operate hourly in each direction, supplemented by rush-hour trains. A shuttle bus meets all trains during airport opening hours and is included in the price of the train ticket.

Torp Sandefjord Airport

Sandefjord Lufthavn AS owns and operates TORP Sandefjord Airport under license by the Norwegian Ministry of Transport and Communication. The airport is situated in Sandefjord, Vestfold County, about 110 kilometres south of Oslo. Sandefjord is a modern town with an interesting history, beautiful nature and a variety of cultural happenings. It is a popular holiday destination.

Widerøe is the only airline to have an operative base at Torp, with services to the largest domestic cities and an international service to their main hub in Copenhagen. KLM Cityhopper operates two daily services from Torp to Amsterdam. The remaining services are provided by the low-cost airlines Ryanair, Norwegian Air Shuttle and Wizz Air, providing a range of international services throughout Europe.

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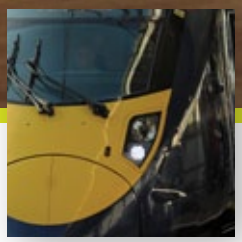
Bremen Airport – Combi
and greener ops



ning acceptance

City Airport Bremen strives to balance the need for safe and efficient aviation operations with the wants of the neighbouring community. The reduction of noise and CO2 emissions has high priority.

Bremen is one of the oldest yet most modern and evergreen airports in Germany. It serves as the north-western Mobility Portal. Through history, the economy in the Bremen region has been based on trade and logistics; nowadays this has been expanded to include industrial production.

The airport is situated only three and a half kilometres from the City Centre. Although this is a great advantage for passengers it is simultaneously a disadvantage for people in the neighbourhood. This contradictory situation is – together with many other important aspects in terms of environmental protection – the major challenge Bremen Airport has to face. Our goal is to balance the need for efficient aviation with the protection of the people in the neighbourhood and the environment. Decreasing the noise emissions from aircraft is a high priority in this regard. The airport has made every feasible effort to retain the acceptance of the citizens in the region and we remain alert to their needs.

The additional runway for general aviation was only built to protect the neighbours at the western end of the main runway. A new charging system was installed to promote the usage of less noisier engines. For night movements in particular – the charges where increased: the later the movement the higher the extra charges.

In 2012 the main runway was renewed and we took the opportunity to use a so-called 'whisper asphalt', with the sole purpose of noise reduction. The latest programme, with a budget of approximately 4.8 million euros, aims to further improve noise protection for those living and sleeping in our neighbourhood.

In the course of the GSA project we have looked for – and found – new ideas to progress further, not only regarding noise mitigation but also for the improvement of communication with our neighbours, the development of airport accessibility and the reduction of CO_2 emissions.

Together with our GSA partners we are working on a high level study to monitor CO_2 emissions so that we can learn how to achieve the best results for reductions. The partnership is also exchanging best practices for communication with local communities; the different approaches in each European country have offered new insights on how to handle this essential topic.

Local acceptance and greener operations; this is the goal of Bremen Airport and it's a goal worth aiming for!

"Local acceptance and greener operations; this is our goal and it's a goal worth aiming for!"

"Together with our GSA partners we are working on a high level study to monitor CO_2 emissions."

Bremen Airport

Bremen Airport, also known as City Airport Bremen, serves the northwestern region of Germany and the city of Bremen and is located 3.5 km south of the city.

The beginnings of the airport date back to the early 20th century. The Bremer Verein für Luftschifffahrt, a local aerospace club, conducted the first experimental flights at the present site in the summer of 1910. Official permission for the opening of an airport was granted on in 1913.
In the mid-1950s, the terminal buildings which had been badly damaged in the war, were reconstructed and Lufthansa began scheduled flights to the airport. The German airline also established its pilot training operations (Lufthansa Flight Training) at the airport. During the 1960s, scheduled jet flights began to be operated at Bremen and a large radar system was installed on the southern perimeter of the airport.
In the 1990´s a complete new Terminal was built and the main runway was extended to a physical length of 2.600 m.
Bremen Airport now handles in excess of 2.7 million passengers per year travelling to more than 50 different destinations worldwide. Besides seasonal flights to a wide range of holiday destinations, several airlines run scheduled flights to a number of European cities. Since 2007 a low-fare airline plays a significant role at Bremen.
The Bremenhalle inside the airport hosts a small aviation and space exploration museum, displaying the Junkers W33 Bremen airplane.

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Improving accessibility o at Bremen Airport

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f public transport

Lowering the barriers to use public transport at regional airports is the aim of the transport association VBN and transport authority ZVBN. Integrated and easily accessible information and innovative ticketing solutions convince passengers to use environmentally friendly transport modes.

The needs of airport passengers differ significantly from the needs of other public transport users. Language is often an obstacle, finding the way to the hotel or getting the right ticket are challenges for air passengers arriving at Bremen airport from other countries. The aim of the partners VBN and ZVBN is to convince people to use environmentally friendly transport on their way from or to the airport and to increase passenger satisfaction.

One component we tackled in the GSA project was improving passenger information. Therefore, the solutions at Bremen Airport focus on integrating data and giving easy access to information.

The new designed station information gives the passenger all necessary information at a glance. Besides the public transport information, passengers will find their way to the terminal and other facilities – especially useful information for disabled persons. The information is integrated in the public transport journey planner including the mobile applications.

Real time arrival/departure tables from Bremen Airport are integrated into the journey planner internet and mobile versions. So passengers can get all the information they need at one point. The mobile application informs passengers actively with push notifications about delays or disturbances in public transport.

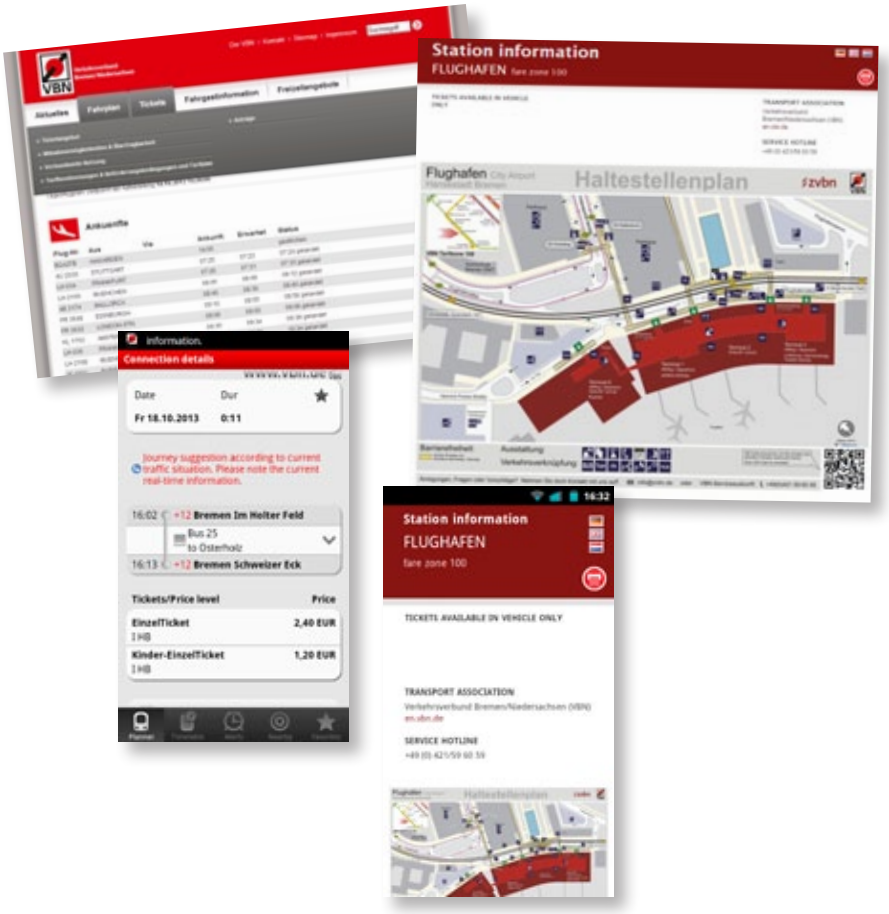
Displays at the airport give an overview of the next departures of the tram and bus lines at the airport but also at Bremen Central station for long-distance trains. For the displays, an easy configurable tool is used. Based on a normal internet connection and a standard web browser, these station boards can be displayed nearly everywhere with a small budget and low maintenance costs. The option to rotate information on these displays is used to give important information, e.g. where to buy a ticket or the telephone number of the service hotline, in a simple way.

The study has shown that integrated passenger information is based on a simple and standardised data exchange. Open and standardised data would facilitate the development of (mobile) solutions for integrated and advanced passenger information in the North Sea region.

The other component of the project is the study to show solutions for integrated ticketing systems.
The study shows the shortcomings for passengers trying to get a ticket. Public transport tariff schemes tend to be very complicated and differ from country to country and region to region, so arriving passengers normally do not know what the best ticket options for their trip are and where to buy a ticket. Getting the right ticket can be a challenge for visitors. This lack of information is also a

“Open and standardised data would facilitate the development of (mobile) solutions for integrated and advanced passenger information.”

Source– Flughafen Bremen



"All solutions need an intensive cooperation between public transport operators, airlines, airport and public authorities."

problem for public transport operators because of the considerable effort required to inform passengers and the consequent loss of revenues. For this reason, the integrated ticketing study aims to improve the information and the distribution channels for tickets at airports. Best practise examples from other European airports show solutions for integration such as:

- cooperation between airlines and public transport operators to sell combined tickets
- giving free tickets to arriving passengers
- demand-oriented systems which also improve the connection from peripheral/ rural areas and during different times of the day (i.e. in the early morning or late evening hours).

All solutions need an intensive cooperation between public transport operators, airlines, airport and public authorities. New technical solutions, like selling tickets online or via mobile devices, can be an easier way to integrate tickets. Other solutions, for example offering free tickets, require new ways of financing such as integrating public transport fares into landing fees.

Transportation Association Bremen – Niedersachsen

VBN (Verkehrsverbund Bremen/Niedersachsen) is a public transport association of 39 municipal and private carriers, covering the independent cities of Bremen, Bremerhaven, Delmenhorst and Oldenburg as well as the counties of Ammerland, Diepholz, Oldenburg, Osterholz, Verden, and Wesermarsch plus individual communities in the districts of Cuxhaven, Rotenburg/Wümme and Nienburg in Northern Germany. The VBN's field of activity is public service transport within the VBN region. Its core activities are based on a number of contracts with associated carriers and the ZVBN (Zweckverband Verkehrsverbund Bremen/Niedersachsen), an association of six counties and four cities in the region. ZVBN is the regional authority for public service transport.

We have formed work groups for close cooperation with our partners. The central decision-making bodies are the supervisory board and the general assembly. In collaboration with ZVBN, we work towards the reinforcement, further improvement and expansion of a premium-quality and economical public transport service by road and rail within the network area.

Our core tasks include:

- Level and structure, further development of VBN tariffs
- Coordination and optimisation of the transport offers
- Creation of the network area timetable
- Unified marketing, PR and media work within the network area
- Passenger information, timetable information, service information
- Public transport surveys

Contact

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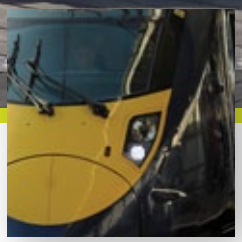
Connecting with International Organizatio



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During the course of the Green Sustainable Airports project the partners have broadened and intensified connections with numerous international organizations. By pooling knowledge, experience and visions for the future, the group has focussed on finding integral solutions for greener airport operations and public transport connections to regional airports.

In May 2011 the GSA partnership approached Eurocontrol, and Alan Melrose of the organization's environmental unit was more than happy to share his broad industry know-how at the GSA seminar on noise abatement in Bremen; this set the foundation for future cooperation. A small delegation of the GSA partners visited the Eurocontrol centre in Brussels in mid-September of the same year – a very worthwhile trip. In its role as an independent European civil organization, Eurocontrol maintains close relationships with national authorities, air navigation service providers, airports and other organizations.

The experience and knowledge resulting from diverse projects and business affairs, as well as the organization's third-party character, makes the cooperation a valuable goldmine of information. Whatever the topic, helpful hints and on-site support are always available. This applies in particular to the online tool SOPHOS, designed for sharing information and enabling Collaborative Environmental Management. In response to requests from stakeholders and industry addressing challenges, EUROCONTROL has developed the Collaborative Environmental Management (CEM) concept. This has been done with the active participation of airport and aircraft operators, air traffic service providers and trade associations. www.eurocontrol.int

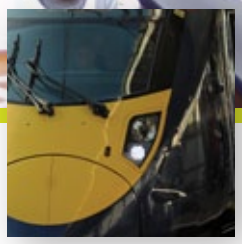
The Airport Regions Conference (ARC) is an association of regional and local authorities across Europe with an international airport situated within or near its territory. It gathers 33 member regions, representing more than 70 million people living close to an airport. Some 600 million passengers are using an ARC airport every year. The ARC members are committed to the reduction of noise and CO_2 emissions – maximizing the economic benefits of the airport, and minimizing the nuisance.

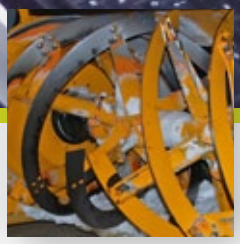
ARC representative Léa Bodossian was one of the expert speakers to join GSA partners and delegates at the international seminar on Public Transport Concepts & Regional Airports, hosted by Kent County Council in October 2011. Both she and Guiseppe Rizzo of DG MOVE gave inspiring talks on intermodality and the reduction of carbon emmissions.
www.airportregions.org

GSA partners have presented the project and highlighted goals and achievements to international audiences on numerous occasions during the past years. For example, Anders Nielssen (Billund Airport) showcased the project at the Passenger Terminal Conference 2012 in Vienna, while Onno de Jong (Groningen Airport Eelde) presented at the same conference in 2013 in Geneva. Onno also had an extensive audience at the Smart Airport Conference 2013 in Munich.

During the final phase of the project a number of GSA partners made a short but intensive trip, visiting the European Aviation Safety Agency (EASA) in Cologne and DG Move in Brussels, to communicate policy recommendations as a result of knowledge and experience gained during the course of the project.

Aviation Policies





Being substantial nodes in public transportation systems regional airports play a significant role as accessibility gateways, shaping the economic, social and environmental landscape of the local communities they serve. Corresponding to tightening public budgets stakeholders are facing an increasing economic pressure while overall expectations are steadily growing. Rising concerns on climate change and negative environmental side effects raise public awareness and reduce acceptance of cross-regional transportation systems.

Green Sustainable Airports (GSA) is the EU-funded INTERREG project which brings together airport- and public transport operators as well as regional authorities from the North Sea Region (NSR) to jointly develop response strategies and solutions for a more sustainable and eco-efficient accessibility and operation of regional airports. GSA is considered by all participating partners as a platform for safeguarding the role of regional airports as nodes in public transportation systems for regional accessibility, while making the NSR a better place to live and to invest in.

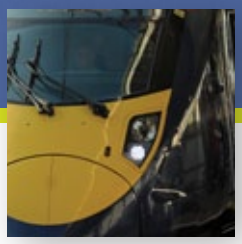
Focusing on more sustainable surface accessibility and operations of regional airports, GSA greatly contributes to manifold European and national top policies and initiatives, addressing climate change, greening transport and logistics, future aviation in relation to environmental protection and sustainability. With a deep understanding of the strategic challenges facing regional airports the project partners adress clear feedback and messages to European insitutions to support improved and more effective policies.

GSA policy recommendations were introduced and handed-over to European policy institutions as DG Move and EASA in the course of bilateral exchanges and discussions in the autumn of 2013.

These recommendations include the following:

- Develop a universal definition of regional airports in the EU
- Apply a universal definition of regional airports in the EU for legislation and rulemaking
- Consider when rulemaking that regional airports differ significantly from medium-sized and hub airports in Europe
- Ensure that European aviation legislation and rulemaking is also realizable at regional airports
- Incorporate and thoroughly consult regional airports within legislation and rulemaking processes
- Treat regional airports as equal to other modes of transport in terms of state-aid requirements and funding opportunities
- Establish a link between provided funding and the determined economic impact of regional airports
- Consider in EASA rulemaking processes the specifics of regional airports be respected - the one-size does NOT fit all approach must prevail.


GSA



provincie Drenthe

GRONINGEN AIRPORT EELDE

BUSINESS AIRPORT KORTRIJK-WEVELGEM

Der Senator für Umwelt, Bau und Verkehr

Freie Hansestadt Bremen

Billund Airport

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Many thanks to the GSA partners for their contributions to this magazine.
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