



## Airport Visions 2030 – futuristic aircraft, environment-friendly operations and centralised airport management

27 November 2013

Ideas for the airport of the future arise in Hamburg. On 27 and 28 November 2013, researchers at the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR), together with numerous industrial and university research partners in the Lighthouse Project 'Airport 2030', presented their final results in the Conference Centre at Hamburg Airport. They address the ways in which the airport of the future will become more capable and efficient at the ramp and terminal, how the surrounding transportation network will be more closely integrated, and also which technological innovations will play a beneficial role in the overall aviation system. After all, in the case of short-haul flights, up to 70 percent of the travel time is allotted to airport processes and land-based entry and exit. In the future, flying should become yet more economical, environment-friendly and comfortable, while maintaining the standard high aviation safety standards.

"The Lighthouse Project Airport 2030 has developed a wide range of approaches and concepts on how to improve the different airport interfaces. We are very pleased with the results generated from the intensive exchange between DLR and partners from science and industry," said DLR Executive Board Chairman Johann-Dietrich Wörner. "It is a clear example of DLR strategy – to go from fundamental research to practical innovations with a variety of partnerships," Wörner continued.

### **Centre of excellence 'New Aviation'**

With the leadership of the project, the DLR Institute of Air Transportation Systems is significantly involved in the 'New Aviation' centre of excellence. The funding, which was supplied as part of the Leading-Edge Cluster initiative of the German Federal Ministry of Education and Research (BMBF), is now being discontinued after a period of five years. In September 2008, Hamburg won the cluster competition with a grant totalling approximately 40 million euros. The world's third largest network of civil aviation industry is located in Hamburg.

"Hamburg has emerged as a particularly suitable location for the Airport 2030 project," says Michael Eggenschwiler, CEO of Hamburg Airport. As a city airport, we have a special responsibility towards our neighbourhood. This situation requires great flexibility and innovation, which we must demonstrate as part of our operation. This is visible in the noise regulations as well as in the aims to reduce emissions and energy consumption. The research results will certainly be of use to many other airports."

The joint project 'Efficient Airport 2030' brings together a variety of different research projects in the areas of airport management and flight control. The researchers want to improve ground processes to increase the quality, overall performance and environment friendliness of the air transportation system as a whole. Hamburg Airport serves as an example to optimise individual measures in the process chain. Airport 2030 brings together existing competencies in air traffic management, logistics, aircraft construction, system development and system simulation from large-scale research, academia and industry at a single location in Hamburg.

### **Large aircraft for the long haul**

The goal for all future passenger handling is clear; as many travellers as possible should pass through the airport as quickly as possible and get on their way towards their destinations. For intercontinental long-haul flights, a question arises regarding larger aircraft that efficiently process passengers at the airport. Currently, the Airbus A380 fulfils this task as the largest passenger aircraft in the world. The DLR Institute of Air Transportation Systems, as part of

Airport 2030, is examining how a Blended Wing Body (BWB), whose shape significantly differs in comparison to conventional aircraft, fits into the operations at the airport of the future. With a blended wing body, the wings are smoothly integrated into a broad wing-like fuselage that can accommodate up to 750 passengers. Researchers are interested in the extent to which such a radically different aircraft can continue using the runways, taxiways and stands. Due to the higher positioning of the wings, the dispatch of a BWB aircraft will require some changes during refuelling, de-icing, engine checks and baggage handling. However, extensive use can still be made of the existing infrastructure.

### **Optimised procedures at Hamburg Airport**

A central concern of the Lighthouse Project Airport 2030 is to make control of ground handling services, traffic on the apron and the entire airport operation safer and more efficient. For this, the researchers use a unique test environment: the 'Airport Research and Innovation Facility' – a prototype of an airport control centre, with which the scientists can explore Total Airport Management in direct connection to ongoing operations. In Total Airport Management, the optimal interconnection between airport operators, airlines and air traffic control is investigated. Deutsche Flugsicherung GmbH (DFS; German Air Traffic Control), Hamburg Airport and the DLR Institute of Flight Guidance work hand in hand in the test control room. In addition, the DLR Institute of Air Transportation has, in a passenger simulation, evaluated a smartphone app for air passengers in the terminal area. The app was developed by the Institute of Telematics at the Technical University of Hamburg-Harburg. The digital boarding assistance makes it easier for passengers to find their way from check-in through the security check to the gate. In field tests, the researchers tested the digital navigation of passengers at Hamburg airport, as well as aspects of total airport management, such as a tighter coupling of ground handling and ramp workplaces.

### **Environment-friendly airport processes**

Furthermore, DLR, in collaboration with Siemens, developed a computer model to make a detailed assessment of the environmental impact of operational decisions during flight operations. The researchers, together with the Environmental Centre of Hamburg Airport, are working to further optimise the processes regarding carbon dioxide emissions and noise pollution. The goal is to plan systems that directly incorporate environmental impacts in the decision-making. Regarding the effects on the environment, the DLR researchers also conducted a far-reaching functional and monetary benefit assessment based on three different future scenarios for all developed technology areas in the context of Airport 2030. In it, they followed the guiding theme that innovations at the airport should serve the complete aviation system.

### **Extensive partnership**

Other organisations which participated in the Airport 2030 project include the Institute for Telematics and Transport Planning and Logistics at the Technical University of Hamburg-Harburg, the Aircraft Design and Systems Group (AERO) at the Hamburg University of Applied Sciences, the Institute of Computer Engineering at the University of Hamburg, Flughafen Hamburg GmbH, Airbus Operations GmbH, Siemens AG and the start-up company mb+Partner. The effective networking between partners and management by the Hamburg Centre of Excellence was an essential goal of leading-edge cluster support, in addition to the substantive research.

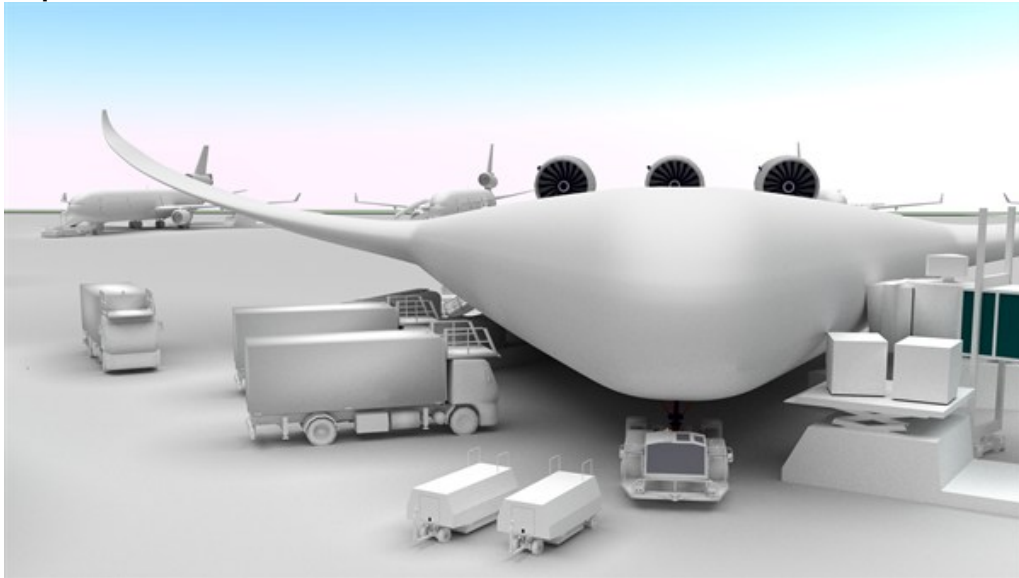
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## Airport 2030



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Credit: DLR (CC-BY 3.0).

## Airport Research and Innovation Facility



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Credit: MPenner.

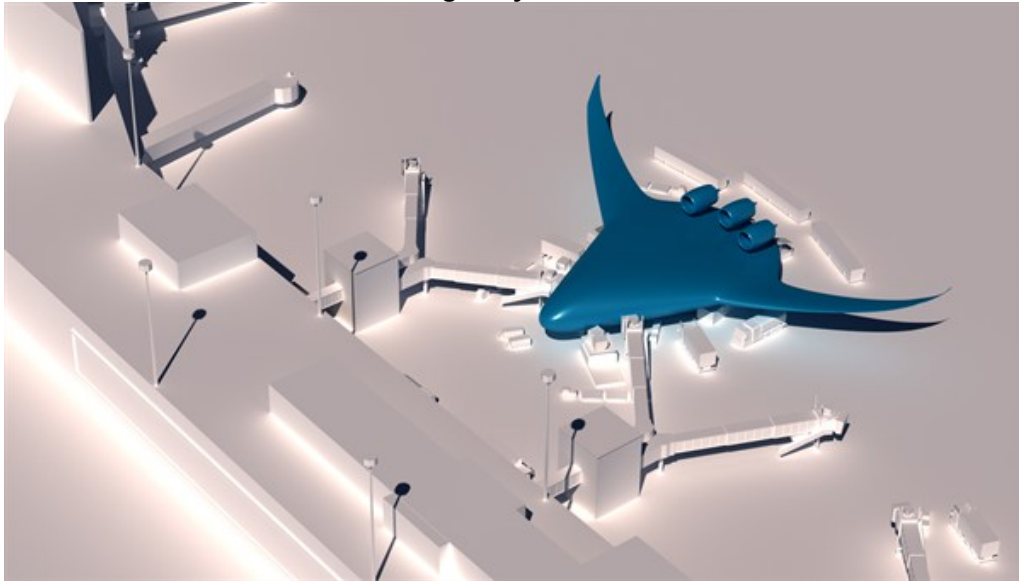
## Research at Hamburg Airport



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## Aircraft of the future – blended wing body



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