

# Wings of the Future



## Visit to Airbus' facilities at Broughton, UK

It was that time of the year when over 150 journalists and Airbus PR agencies from around the world would gather together for what is now euphemistically known as Airbus Innovation Days. Last year, the 'epicentre' was Hamburg in Germany and the year earlier at Toulouse in France. In May 2010, it was at Broughton in England, where Airbus manufactures wings for its entire range of models, truly wings into the future.

The true professionals that they are, Airbus executives piloted the visit without turbulence, an overview of the facilities followed by detailed briefings on all the current industrial programmes before a curtain raiser on future design trends and alternative fuels which will dictate the way complex wings are designed and built.

So as not to relegate this acknowledgement towards the end, *Vayu* would highly commend the seamless manner in which Stefan Schaffrath (VP Media Relations), Veronika Meister, Nadia Lezga and the rest of the team organised (as usual) and co-ordinated this visit against all odds such as the volcanic ash and severe flight disruptions as well as individual flights schedules of arrival and departure, hotels, other logistics, etc.

As is well known, Airbus is the leading aircraft manufacturer whose customer focus, commercial know-how, technological leadership and manufacturing efficiency have propelled it to forefront of

the industry. With revenues of over 27 billion euros, Airbus consistently captures about half of all commercial airliner orders. The company also continues to broaden its scope and product range by applying its expertise to the military market. Headquartered in Toulouse, France, Airbus is owned by EADS. It is a truly global enterprise of some 52,000 employees, with fully-owned subsidiaries in the United States, China, Japan and in the Middle East, spare parts centres in Hamburg, Frankfurt, Washington, Beijing and Singapore, training centres in Toulouse, Miami, Hamburg and Beijing and more than 150 field service offices around the world. Airbus also relies on industrial co-operation and partnerships with major companies all over the world, and a network of some 1,500 suppliers in 30 countries.

Airbus draws together the skills and expertise of 16 sites in France, Germany, Spain and the UK. Each site produces a

complete section of the aircraft, which is then transported to the Airbus final assembly lines in Toulouse, Hamburg or Tianjin. Airbus' industrial network has been expanded to include a regional design office in North America, a joint venture engineering centre in Russia and further engineering centres in the People's Republic of China and India.

Airbus' modern and comprehensive product line comprises families of aircraft ranging from 107 to 525 seats: the single-aisle A320 Family (A318/A319/A320/A321), the wide-body long-range A330/A340 and the all-new next generation A350 XWB Family, and the ultra long-range, double-decker A380 Family. Across all its fly-by-wire aircraft families Airbus' ensures that aircraft share the highest possible degree of commonality in airframes, on-board systems, cockpits and handling characteristics, which reduces significantly operating costs for airlines.

Furthermore, in anticipation of market



New plane on the block: A320 with "Sharklets."

growth, Airbus is extending its portfolio of freighter aircraft in the general and express freight market sectors. Airbus' latest addition to its family of freighter aircraft is the A330-200F – a mid-size, long-haul cargo aircraft that benefits from the “excellent economics” and fly-by-wire technology of the A330-200 airliner. In addition to new-build-freighters, Airbus has also launched the A320/A321 Family passenger-to-freighter conversion programme aimed at replacing the many ageing small freighters in service today. As well as bringing new levels of efficiency to freight operations, it will extend the service life of the A320 Family even further and boost the fleet's residual value.

Airbus has sold over 9,200 aircraft to some 400 customers/operators and has delivered over 5,600 aircraft since it first entered service in 1974. Sensitive to its position as an industry leader, Airbus “strives to be a truly eco-efficient enterprise”. To that end Airbus is the first aeronautics company in the world to have earned the ISO 14001 environmental certification for all production sites and products for the entire life cycle. Airbus seeks to ensure that air transport continues to be an eco-efficient means of transport, delivering economic value while minimising its environmental impact.

### Increase in A320 Family production rate

Airbus will increase the monthly production rate for its single-aisle A320 Family from the current rate of 34 to 36, starting December 2010. The production



*Its unimaginable that such large wings can fit inside the A300-600ST Beluga—but then, the Beluga is no mean aircraft!*

rate for the long-range A330/A340 Family will be maintained at the current level of eight per month. Airbus' decision to raise its single-aisle production rate is driven by the continuing demand for its aircraft and a record backlog in excess of some 2,300 A320 Family aircraft. “Leading economic indices and business confidence indicators are showing an upward trend again. We see this reflected in the continuing solid demand for our eco-efficient products and our robust backlog. Thanks to our proactive order book management we have been able to keep production stable during the year of the downturn, but now it is definitely time to think ahead,” states Tom Williams, Executive Vice President, Programmes. “Aviation is a long-term growth industry. With our

prudent decision we will be ready when the market recovers. Airbus delivered a total of 498 aircraft in 2009, including 402 A320 Family aircraft, both new company records for a single year. The company target for deliveries in 2010 is to remain at a similar level to 2009. The A320 Family, which includes the A318, A319, A320 and A321, is recognised as the benchmark single-aisle aircraft family. More than 6,500 Airbus A320 Family aircraft have been sold and nearly 4200 delivered to more than 300 customers and operators worldwide, making it the world's best selling commercial jetliner ever”, he further stated.

### Airbus Broughton facilities

The Broughton site spans a vast area of 122,000 square metres (equivalent to 98 Olympic swimming pools) consisting of high-tech manufacturing facilities for production of Airbus wings prior to their delivery to the final assembly lines in Toulouse, France and Hamburg or Bremen in Germany. The factory also manufactures and assembles the wings and fuselages for the corporate Raytheon Hawker executive jets. Approximately 6,000 people work at Broughton, the majority in manufacturing, the remainder in engineering and other business functions like finance and procurement.

Airbus in the UK is responsible for the design and manufacture of all wings for the Airbus Family fleet. Each facility manages incoming components delivered from suppliers in the UK and from around the globe. Wings for single-aisle Family are fully equipped with hydraulic, air



*Wing loading in progress.*



*Loaded and ready to go!*

square metres) with a floor area equivalent to 12 football pitches and able to accommodate five Sydney Opera Houses. This high tech building generates its own power through combined energy and heat units with 32 miles of sprinkler systems, 28 fire exits, and walkways designed into the roof structure to allow easy replacement of lights and access to the cranes for maintenance.

Broughton's main site (the East Factory) consists of a number of extensive wing manufacturing facilities. Each centre is responsible for an important stage in the making of a wing starting in the major components centre, where the largest individual section in a wing, the 'skin panel' is created. The skin panel goes through many stages of development moving through various facilities until it is a fully assembled pair of wings ready to be flown to either France or Germany by the Beluga, where it is finally assembled to the rest of the aircraft.

The North Factory will house the composite wing assembly line for the A350 XWB. Work will be completed during the fourth quarter of 2010, with construction costs and associated works representing an overall investment figure in excess of £100 million. When complete, the building will measure 269 metres long, 205 metres wide, with the highest point reaching 24

and electrical systems and flying control surfaces before leaving for the final assembly lines in Toulouse (A320) and Hamburg (A319 and A321).

Twin-aisle and long-range wings are assembled and transported to Bremen for final equipping before being transported to Toulouse for final assembly. A380 wings are assembled at Broughton and equipped with all parts except the moving surfaces.

Over the past 10 years, Broughton has invested more than £2 billion in new machinery, facilities, technologies and training for employees. The majority of recent investment has been made in building and equipping a state-of-the-art facility for assembly of the A380 wings for the world's largest passenger airliner and other manufacturing activities. Investment continues with the new North Factory, which will house A350 XWB wing assembly operations. A number of very advanced techniques are used in

the production of aircraft wings. Major facilities at Broughton house the very latest manufacturing methods, including wing skin milling, stringer manufacturing, full wing equipping, wingbox assembly, and fuel and hydraulic system equipping.

Opened in 2003, the West Factory is a £350 million ultra-modern facility designed and built especially for manufacturing wings for the A380 as also other manufacturing activities. At more than 36 metres long, the wings for A380 are the largest-ever designed and built for commercial aircraft. The West Factory marks an important milestone in the UK's Airbus history. It is one of the largest factories to be built in the UK (83,590



*The Indian touch : Nikhil Khanna and Neha Mehrotra of Avian Media and Vikramjit S. Chopra from Vayu Aerospace and Defence Review.*

metres. The wing manufacturing facility will cover a total area of 5.2 hectares (52,300 sqm.), of which 40,200 sqm will be allocated to manufacturing with the remaining 12,100 sqm being used for supply chain logistics, stores, offices and welfare facilities.

Wings are delivered from Broughton in the Airbus A300-600ST, the special super-transporter aircraft affectionately known as the 'Beluga'. When the Beluga arrives at Broughton the Wing Despatch Team is responsible for all the ground activities, including the loading of wings and unloading of major assemblies. When wings are completed and handed to the wing despatch team, they are loaded on to the Beluga transportation jig which is situated on the cargo loader. This involves the fixture of lifting attachments prior to the wing being lifted. Once the wing has been located to the jig it has to be securely fastened to ensure its safe transit. The jig for each variant is different as is the fixture of the wing to the jig.

On arrival in Broughton, the Beluga is marshalled to the loading position and prepared. This involves the location of two jacking units which will support and level the Beluga during load transfer. If required, the Beluga will be fuelled at this stage of the operation.

Once the jacks are deployed, skilled drivers dock the 90 tonne cargo loaders. On completion of the load, jacks are removed and the aircraft is then marshalled to the holding point ready for air traffic clearance. The Beluga schedule allows a maximum slot of two hours from touchdown to takeoff.

The only exception to this are the wings for the A380. As they are too big for the

## Malaysia Airlines orders 17 A330s

Malaysia Airlines has placed a firm order with Airbus for 17 A330 widebody aircraft. The contract firms up a previously announced Memorandum of Understanding for 15 A330-300 passenger aircraft, plus an additional order for two A330-200F Freighters for operation by the carrier's subsidiary MASKargo. Deliveries of the passenger aircraft will begin in the first half of 2011, with the first freighter joining the MASKargo fleet later the same year.

## United signs firm order for 25 A350 XWBs



United has formalised a commitment originally announced in December 2009, signing a firm order for 25 A350-900 XWB aircraft, the newest twin-engine widebody from Airbus. The aircraft will be powered

by Rolls-Royce Trent XWB engines. Deliveries of the aircraft will begin in 2016 and run through 2019.

"This is the latest chapter in a very strong relationship that has spanned two decades," said John Leahy, Airbus Chief Operating Officer - Customers. "From the delivery of the first United A320 in November 1993 to today, Airbus and United have worked together successfully to weather challenging market periods. It's a true testament to what the A350 XWB has to offer that one of the largest airlines in the world has selected it to be an instrumental part of their future."



John Leahy.

Beluga, A380 wings are despatched along the River Dee on a river craft to Port of Mostyn. From there they travel to France by ship, then by river again and finally by road, to arrive at the Final Assembly Line in Toulouse. On each flight into Broughton the Beluga delivers an empty transportation jig which is off-loaded and replaced with a set of Airbus wings for delivery to Toulouse in France, or Hamburg or Bremen in Germany.

The construction of Airbus Broughton's West Factory, where the wings for the A380 are produced, started in 2001 and was officially opened in 2003 by then Prime Minister Tony Blair. The impressive U-shape building is 160m wide and 450m long (the equivalent size of 12 football pitches). It has a building area of 83.590 square metres and is 37.5m tall at its highest point – all prerequisites for creating the world's largest airliner wings.

When the wing is ready for dispatch, a 96-wheel multi-purpose vehicle collects the loaded wing jig and transports it via a specially constructed half-mile long road to the River Dee loading facility. The wing is then taken by barge to Mostyn Docks where a wing set is then loaded onto a sea vessel for onward transportation to the Final Assembly Line (FAL). The sea vessel sails to the port of St Nazaire in France, where Fuse sections are loaded, and departs to the Port of Bordeaux. There, the jig is loaded into another barge and transported to Langon, unloaded and driven to Toulouse in three nights on a trailer. Such was the sequence:

Broughton to River Dee (1.5km)	- By specialist vehicle
River Dee to Mostyn (25km)	- By purpose-built barge
Mostyn to Bordeaux (1400km)	- By Roll-on Roll-off ship
Bordeaux to Langon (70km)	- By purpose-built barge
Langon to Toulouse (250km)	- By specialist road transport

Total distance travelled is approximately 3,250km!

## A330-200 Freighter receives Type Certification from EASA

The A330-200F has been granted Type Certification by the European Aviation Safety Agency (EASA) following a successful 200-hour flight-test campaign. The trials were performed by two aircraft, covering both engine types on offer: the Pratt and Whitney PW4000 and the Rolls-Royce Trent 700. This dedicated freighter aircraft, which is a derivative of the A330-200 passenger model, has been certified through an amendment to the existing A330-200 EASA Type Certificate granted to Airbus in 1998. This EASA award will be followed by Federal Aviation Administration (FAA) Type Certification.



The A330-200F features an optimised fuselage cross-section, offering flexibility to carry a wide variety of pallet and container sizes. The aircraft offers 30 per cent more volume than any freighter in its class, and is based on the “proven and technologically-advanced A330 platform”, for which Airbus has over 1,000 orders and already more than 650 aircraft in service.

## Cebu Pacific orders more A320s

Cebu Pacific (CEB) of the Philippines has placed a firm order with Airbus for seven more A320 aircraft. The latest contract increases the carrier’s A320 Family order backlog to 22 aircraft, scheduled for delivery between the last quarter of 2010 and 2014.

Powered by CFM56 engines, the new aircraft will join an existing A320 Family fleet flying on the low cost carrier’s extensive domestic and regional route network.

## Airbus delivers the first A380 to Lufthansa



On 19 May Lufthansa took delivery of the first of 15 Airbus A380s ordered, with three more to join the fleet in 2010. Lufthansa will deploy its new flagship aircraft on routes to Tokyo, Beijing and Johannesburg. During the handover ceremony in Hamburg, Lufthansa unveiled its new First Class cabin with eight generous seats on the upper deck. The upper deck is also equipped with 98

Business seats while the spacious main deck hosts 420 Economy Class seats offering a unique feeling of comfort and space. Lufthansa’s A380s are powered by Rolls-Royce Trent 900 engines.

“With the A380, Lufthansa receives its new flagship. The A380 is the most modern and environmentally friendly airliner today. It’s also exceptionally quiet, and that will make the A380 the preferred aircraft at metropolises such

as London, New York, Tokyo and of course Frankfurt airport. While Lufthansa passengers will enjoy more space in all classes and the unique cabin comfort, the airline will profit from the unprecedented efficiency of the A380,” said Airbus President and CEO Tom Enders.

Lufthansa becomes the fifth airline to introduce the A380 into service.



This delivery marks the 28th Airbus A380 to be operating with the global route network of leading airlines. The current A380 fleet now connects 21 important international routes on five continents. 17 major international airports are already regular A380 destinations. The A380 fleet has today achieved a total of more than 130,000 flight hours on over 14,000 commercial flights.