AIRBUS A380 - THE KING OF THE SKY

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The article is describing the history of development of wide-body civilian transport aircraft. The text is focused on the Airbus A 380, a most modern aircraft , from the develoment to its entering service.

Keywords: Airbus Industrie, civil transport aircraft, Airbus A380

1 INTRODUCTION

The high-capacity, four-engine Airbus A380 is the word´s largest transport aircraft designed for passenger transport. Currently, it is the most modern and most efficient long-halul aircraft in the worldbased on latest technology meeting the strictest international certification requirements. The aircraft enterd service in 2007 overcoming the initial problems in the developental stage.

Beginning of the development	2000
Maiden flight	2005
Entering service	2007
Number of aircraft manufactured	18
Number of aircraft in operation	18(9/2009)

2 HISTORICAL FLASH-BACK

As for the beginning, a more deeper view back into the history would remind us on the fact that projects of large aircraft have always been on the agenda. A fairly similar model of the Douglas D-950-30 that failed in the end as the company gave priority to the development of a smaller, three-engine model the DC-10. It was probably in the time when Boeing also revealed its projects, the 707-820 and 747-3, -4 and -5 with double deck and with Lockheed the civil version of a transport monster, the C-5A Galaxy aas well as an older model of the C-141A Star Lifter. In the second half of the 80s, Aerospatiale was involved in the preliminary project, the UHCA (Ultra High Capacity Aircraft) desgnated as the ASX 500/600 (or also as the A350) and the Deutsche Aerospace with a similar name, the A2000. Boeing launched a study of a 7 meter extension on the modernized model of the Boeing 747-400 and even contemplating the elongation of the upper deck as back as to the vertical tail unit. The working version given to the project was designated as the Boeing 747-500. McDonnell Douglas already in the time of completion of the MD-11 project was involved in the study of a four-engine, double-deck monster carrying the working designation the MD-12X. At he beginnings of the 90s further projects were made public, with the so-called „Super Jumbo“ among them, enjoying the greatest attention. The entire study, including technical parameters, potentials of current airports, ecological impact and other issues was the product of a joint cooperation between Boieng and Airbus Industrie. The course of events following 1995 eventuallyp prevented the cooperation from going deeper, so the consortium of Airbus Industrie gave priority to its own projext namely the A3XX demonstrated in Toulouse oj 7 July of 1994. Boing also gave green to its own project, to the extended model of B747-400.

The Airbus Industrie consortium made gradual fine-tuning to the project, overcoming a whole range of difficulties and with government assistance, offering it to some important customers. By the end of 2000, contracts with the first six customers were signed for future purchase of 50 aircraft and with preemtion for the rest of them. Thus the condition for a definite launching of the manufacturing project for the project A3XX was met. Its realization attained firm outlines in the time of Christmas 2000 when both partners, EADS and BAE Systems, decided to start the manufacturing stage of development renaming the project to A380, or the A3XX-100 to A380-800.

Why A380? So far, the airplanes were named in their order like -300, 310...as much as 340, and now a sudden jump! The designation of 360 was not in use for English pronounciation that might prompt association with the 360 degrees, whereas 370 was denied for the reason of maximally distinguishing it from the product of marking used by the greatest competitor. As the number of „seven“ is theses days is indisputably

associated with the transport aircraft of Boeing. Consequently, using number „8“ is most appropriate and ambigiously symbolizing that i tis behind number „7“ and also proving the fact that the new super aircraft, unlike the A-340, is a double-decker..

The beginning of 2002 proved the fact that the maiden flihgt of the first prototype, the A380-800, is planned for the year of 2004. The period of 2005 was the one of testing programmes and certification. The first flight of the A380 took place on 27 April 2005 and it entered commercial service on 17 October 2007 with the Singapore Airlines.

3 DEVELOPMENT AND MANUFACTURING BACKGROUND

In October 2000 remarkable changes in the capital structure of the Airbus Industrie consortium took place in that EADS become owner of 80% and BAE Systems 20% of shares in the holding.

Costs of development of the A380 were distributed among companies making up the Airbus Industrie consortium. The A380 is the product of cooperation of four main partners, the Airbus Industrie, French Aerospatiale Matra and German DASA manufacturing the fuselage. The aircraft is completed in Toulouse, France, where all the components are shipped in via a „RoRo“ (Roll-on/Roll-off) system. Some parts of the body and wing area are transported by the A300-600ST, a special-purpose transport aircraft. The biggest parts of the fuselage are manufactured by the Dasa, Hamburg, Germany and Aerospatiale Matra, France. Wings are products of the BAE Systems manufacturing started in Broughtone, UK. CASAis responsible for the stabilizer. Further components are suipplied by companiessuch as the Dutch Fokker, Belgian Belairbus, Italian Alenia, Swedish SAAB and the Finaviatec from Finnland. To satisfy DASA, each plane, however, is to be flown over to Hamburg for final assembly, completion of cabin area and external paint application. It is in Hamburg that the aircraft are beint sold to cudstomer from Europe and the Middle-East, whereas the aircraft for the rest of the world are handed over in Toulouse. For the intiaial stage, the manufacturer asssummmed to produce four A380-800 per month and the the break-even point by the business plan was envisaged by manufacturing 250 pieces. Estimates made by the Airbus Industrie expected to see some 200 of A380 in operation in 2009 and by the year of 2019 as much as 500 of the type. However, the end of summer in 2009 saw only 17 aircraft in operation and some 200 on order.

4 FUNDAMENTAL INFORMATION ON THE AIRCRAFT

The most visible feature of the A380 is the double-deck body. The pictures showing a wide entry and spacy cabins are widely known along with the manufacturers´ assurance on the uniqueness of the type in this respect supported by a whole range of amenities of real luxury level offering rest-zones, bars, shops and fitness centress, conference halls and bedrooms. Indeed, the project is almoust monstrous and everything together with the equipment and on-board services havve been designed in line with the slogan: “We fulfill anything passengers might think of“.

Cabin design emphasizes the feeling of spaciousness also with providing free space in aisles. The seats are quite spacious and commfortable with a minimum spacing of 81cm. Considerable attention was paid to minimization of health risk during long-haul flights in the economy class. The front section of the fuselage features a wide stariway, wheras the aft section is fitted with a standard, narrow one. Theire is a kitchen on each deck, too. Even though the modular cabins of the A380 are similar to those of the other Airbuses, this type is offering airline companies variants in arrangements of kitchens, toilets and other amenities. The basic version of the A380-800 with cabins arranged in three classes is capable of carrying 525 passengers on long-haul flights. Configuration of seats in the first- and buisness-class is maintaining the standard of Airbus 2-2-2. In the economy class, seats are arranged in the 3-4-3 pattern. Further version to be manufactured will adopt similar

arrangements: A380-800R also by 525, maximum of 700, A380-900 then 656 and maximum of 1.000. Realization of these project are still in question. As for power plants, airline companies have the choice between Alliance GP7200 (General Electric and Pratt & Whitney), or the Rolls-Royce Trent 900.

An A 380 may transport 35% in excess of the amount of thath of the direct competition, the Boeing 747-400 while offering its passengers much more room. Operational costs per passenger-kilometer are less by 15-20% with flight range also extended by 10%.

The A 380 is the first long-range aircraft with fuel consumption košer than 3 litres per 100 passenger-km (a value comparable to cars).The aircraft is also emmitting less noise when taking off as its competittors whereby producing less pollutors. less

The A 380 can also make use of the current runways and pref-.light-prepraration time is also comparable to that of its wide-body competitiors.

Similar cockpit arrangement and flight characteristics of the Airbus Industry aircraft family enables pilot to acquire type-rating within a short-time conversion course when transferring to the A380.

Fig.1 Airbus A380 **of the** SINGAPORE AIRLINES.

Fig. 2 Controls inn the Airbusu A380 cockpit.

Fig. 3 Business class cabin of the Airbus A380.

Fig. 4 First-class cabin of the Airbusu A380

Airbus A380-800	
Length	73,00 m
Height	24,10 m
Wing span	79,80 m
Body diameter	7,14 m
Cabin length	50,68 m
Max. takeoff weight	560 t
Typical cargo transferred prepravovaný náklad	66,4 t
Max. amount of fuel	310 000 l
Ceiling	13.100 m
Cruising speed Cestovná rýchlosť	0,89 M
Range	15.200 km
Number of passengers	525-853 853 (economy class)

Cockpit crew	2
Entering service	10/2007
Engines – 4x turbojet	RR Trent 900 374 kN EA GP-7200 363 kN

5 COMMENTS, ASSUMPTIONS AND PLANS

Representatives of the Airbus Inudstrie n 2002 have announced an expected demand for *1.235* aircraft of the A380 size for the coming twenty years. The view of Boeing was different right from the beginning. More amphasis is laid on the development of „point-to-point" transportation using smaller aircraft and their latest prognosis estimated the need for only *330* aircraft with capacity exceeding 500 seats. Consequently, Boeing has concentrated on the development of two new types of long-haul versions, namely the Boeing 777-200LR (Long Range) and -300ER (Extended Range), while further modifications of the Boeing 747-400 model were cancelled.

Airbus Industrie estimated that with a 5 % increase in avition transport, in 20 year, A 380 aircraft will be flying cca 3 400 flights from 200 airports on a daily basis, whereas roughly 70 % of those flights will be concentrated on 25 largest airports.

There are experts asserting that the declared costs of the A380 project at the volume of 10,7 billion USD are too low and, by their estimates, the true costs exceeded 20 thousand million. The Airbus Industrie representatives themselves admitted development cost of the aircraft amountin to 12 thousand milllion USD. According to the manufacturing consortium, stock-holders may expect a 20% revenue of their investment, should a sale of *768 pieces (of* A380s) amounting to the sum of 175 billion USD comes true. The price of a single A380 was determined at 230 million USD.

6 CONCLUSION

A 380 is introducing new standards into economics, ecology and travel comfort. Flying on the A 380 is a socially justifiable, as a means of economically and ecologically acceptable way of dominy to terms with the rise aviation transport and airport congestion. The transfer of a larger numer of passengers on a single aircraft enables reduction of overload both on the airports and air traffic controll bodies. A 380 makes it possible better matching aircraft capacity to the number of passengers and maintatining profitability of aviation companies under the condition of rising competition in air transport.

Prognoses related to Airbus and Boeing made public still before 11 September 2001 were almost identical, in predicting higher growth of passenger air transport by cca a 5% per year (Airbus 4,9% a Boeing 4,8%).

All these positive prognoses were substantially changed by the world-wide financial crisis that broke out in 2008, with consequences still in force. The concrete result of it, „only" Airbus A380 operating in 2009. The success of the aircraft will depend on the strategies of individual airliners, which, however, are still failing to attract new customers, especially in the business class where numbers are dropping.As a result, deliveries of A380 to airline companies like Qantas, Air France, China Southern Airlines and Lufthansa have been depostponed to 2010.

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