# ELECTRONIC DATABASE OF AIRLINE AIRCRAFTS

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The article on Electronic database of aircraft airlines deals with the description of the system WordPress for creating internet websites and his application in creating the electronic database of aircrafts. It is engaged in aviation technology of the Airbus Industry in so far as it is processed in the database. It is focused on development, technical description, variants, technical and operational parameters, accidents and comparisons with rivals of the same category.

K e y w o r d s: database, commercial airplanes, wordpress, internet.

## 1 INTRODUCTION

The aviation has a lot of fans around the world. It is fascinating people with his speed of transport, elegancy and safety, which the level is increasing. Except of transport availability many people are interested in another way. They are looking for information, or interesting facts. Encyclopedia was the source of these information in the past. They are available now, but in nowadays in the age of informatization we have a more easily method. The best one is the Internet, or the global system of interconnected computer networks. There are no questions, that this is the fastest and the most convenient way. Everyone needs to be careful about sources of information and they correct. The next problem, which can happened is the language barrier. Not always are available information in Slovak language, therefore I decided to create electronic database of aircraft airlines in our native language. Information should be useful not only for Faculty of Aeronautics students, but for general public, too. It is a unique project, which has no competition in Slovak republic, what was the next reason for creating this database.

## 2 WORDPRESS

WordPress was developed in 2003 as a simple script for more easier everyday writing. The developers team was formed by a few enthusiasts. Since then the system grow and became the largest blogger tool in the world, everyday used by millions of users.

WordPress is an Open Source project, what means, that on the development are working hundreds of enthusiasts from all over the world. The license for using is free of charge for creating any website. For using is necessary to download and install a script called WordPress. The user needs webhosting, or the space, where the script will be saved. Since WordPress needs a minimum requirements, it is possible to get the webhosting for free.

The script was dedicated for blogging purposes on the beginning for users, who wanted to share his posts with the world. It has evolved over time into a fully functional system for creating a complete websites. For this purpose have served thousands of pluggins and design templates. The system is limited only by a users imagination and technical skills. There were 22% WordPress websites from all of the new websites in the world according to statistics from august 2011. Moreover, the system is regularly awarded in the information technologies.

### 2.1 Installation

The publishing system WordPress is for free as it was mentioned. It is necessary to download one of the available versions from the official website on the beginning. There is working on the quality and processing constantly and therefore there are often published new versions. In case of new version has released, user can upgrade his old one without data loss.

After downloading, every version consists of installation files, which have to be installed on some server. Every website is saved on server. This service is served by internet companies, providers for a specified amount, which is paid at certain intervals, usually once per year. There are free services available, too. These have some capacity restrictions, but they are sufficient for project like the electronic database of aircraft airlines. That is why I chose one of these services.

The second issue, which needs to solve is a domain, or the address of the website. This service is not free again. Domains are registered together with the webhosting mentioned above. Users who do not need a domain like .sk, .com or another, there is one free solution available, which I have used for my project. It is domain .tk, which belongs to the Island Tokelau in the Pacific. For these inhabitants, internet is a taboo, but yields from some paid services help to evolve the country and spread the word abroad. I have used the basic service, which is available for free of charge. This domain is the best free solution, that is the closest paid domains. The project is available on dopravnelietadla.tk. Then the website will be included in search engines, what will make a website visible for general public.

### 2.2 Administration

The administration provides access control for many functions. The interface is in Slovak language, which I added after the main installation of the system, but some added modules and pluggins are in English. Each screen is divided into sections:

- toolbar with the header,
- the main menu on the left margin,
- work area,
- footer.

The toolbar offers a wide range of different administration functions and it is shown on the upper section of each screen. It does not take up so much space, because items are shown on hover. There is a main menu with all functions on the left margin, which are important for editing of the content. Menu has a button, which reduce the width only on icons without name. Each main item consists of sub-menu, which is shown after click on it. The largest area of the screen is the work area in the middle. It serves on the amendment of the content. Footer contains thanks for using of the WordPress and information about version.

Although the system offers a wide range of features, created a database of aircrafts are all necessary. Basic menu items have been expanded to features of the template, which I chose as a suitable for this project. The given template was obtained from the internet and then I modified the look to match the project. After installing the new items were added, HP Slides for editing of presentations images on the front page, HP Highlights, which are the three blocks under the mentioned content presentation and the third item Portfolio. It is the most important part, because each aircraft is added just by using this item. When clicked, a list of all aircraft with the capability of adding is shown.

### 2.3 Users Interface

Home page must engage and attract visitor at first sight. So I was trying to make a clear look, easy for visitor orientation. It contains the main menu, which is prominently displayed at the top right. Below is a slider with the presentation of images that meet the aesthetic, but also information function. At the core and in the middle there are three columns. They include a video presentation, welcome text with the option to add a notice of modifications to the page and the current publication of transport aircraft by the authors of Faculty of Aeronautics for students. Under these columns, visitors can find the latest additions to the website. Page footer contains links to external sites, faculty logo and visitors counter with detailed statistics.

Since the main idea was the database of aircraft airlines, the base is a section titled "Prehľad lietadiel". There are all aircrafts in this section. At first sight, the page looks disorganized, so it is equipped with search filter for better searching of desired aircraft. It consists of the names of manufacturers and after click on a selected manufacturer will show it only made aircraft. Each individual page of the aircraft consists of a thumbnail picture, next to which is a brief description and background information. Below them is placed a text box with content tabs:

- development,
- variants and operators,
- technical description,
- technical and operational parameters,
- accidents,
- comparison.

The "Development" contains historical facts and dates, respectively milestones that stood against the background of the aircraft. The "Variants" contains a short list of produced variants with major operators. Technical description focuses on equipment, machinery and other technical equipment. Technical and operational characteristics include a summary table of figures such as length, height, wingspan, maximum take-off weight and more. For each aircraft visitors will find statistics and the most serious accidents in the history of the aircraft in the same name section the "Accidents". In addition to accidents, there is also a chart with the number of discarded aircraft per each year. Aircrafts of the Airbus Industry has a "Comparison" in which I focused mainly on the economic comparison of aircraft with competitors.

There is a gallery, too, which is located below the text box. In most cases, it consists of four images: an external view of the aircraft during landing or take-off with extended landing gear, photography of the cockpit, passenger compartment and profile views. To comply with copyright laws, all photographs obtained the written consent of their authors. Once We have found a suitable photography, We contacted the author and acquainted him with the idea of the website. The authors names are listed in the "Resources".

Selected types of aircrafts have a video presentation and the Airbus aircrafts in addition, 3D visualization obtained from the official website of the company. As the aircraft would not exist without its producers, the site has an area dedicated just to them. On the right side of the screen is a menu located with all manufacturers for easy reference.

## 3 PREVIEW OF THE A380

### 3.1 General information

Four-engine wide-body jet airliner for mid range and long range routes.

- Start of development: 90th years,
- First flight: 2005,
- Introduction: 2007,
- Number built: 99 (February 2013).

### 3.2 Development

Development work on the high-capacity aircraft with a working name A3XX was launched at the beginning of the nineties when the consortium elaborated

its program UHCA (Ultra High Capacity Airliner) in an attempt to undermine the long-standing dominance of the U.S. Boeing 747. In 1991, Airbus turned to future potential customers to unify their requirements for operating and economic parameters of the aircraft. The result was a requirement for a machine with a capacity of 600 to 800 seats in three classes and a range of about 13 500 km, which could be easily handled on the existing airports.

The final draft in order sixteenth was adopted at the beginning of 1996. The new airplane designated A3XX was officially defined as a double-deck with an oval cross-section fuselage. On a similar investigation and market projections to 2015 that spoke clear: over the next twenty years will be provided to service 14 065 new aircraft from the 1 911 aircraft with a capacity of 70 to 400 people and eventually 1 332 high capacity machines for more than 400 passengers.

At the end of 1996, Airbus Industry has invited representatives of the thirteen major air carriers in meeting the southeastern city of Carcassonne, where they met with the final concept of the airplane and the upcoming proposals. The basic design has been introduced as a version of the A3XX-100 (now A380-800) with a capacity of 555 seats and a range of 14,175 km. After the conclusion of the initial phase, which consists of defining the type design in 2002, began the following year the first assembly of components, which were delivered in May 2004 to the static tests in a new production center in Toulouse. At the end of the same month was to begin the assembly of the first airplane. Completion of the first prototype was completed in late 2004 and 2005. Public presentation ceremony took place 18th January 2005. Shortly after this event was the first A380 passed the test. Tests were conducted on the three other aircraft. The historical moment has come on Wednesday 27th April 2005 when the first prototype ready for first flight. After nearly four hours, the plane returned back to Blagnac airport in Toulouse.

After several years of effort involved numerous technical problems joined Airbus A380 into service routine for the first carrier, Singapore Airlines. The historic event on 25th October 2007, seven years after ordering 25 pieces. The 455 passengers aboard were recruited at a special introductory flight from Singapore to Sydney and return the next day.

### 3.3 Technical description

For the outer dimensions of the A380 is a characteristic sign of the number 80, which also appears in later identified types. Given in meters the maximum overall length of the wingspan, respectively, in the footsteps the height of airplanes. After the entrance to the aircraft there is a spacious hall in the front and rear of the main deck with hotel style receptions. In them, each passenger is finally registered and directed to his seat while receiving basic information about commercial, recreational, and sports areas. The mezzanine forward fuselage cabin is located two-man crew cockpit with two additional folding seats. The concept of a cockpit based on the same philosophy as in the type A320, respectively larger A330/340. The use of digital avionics with eight basic well-read screens, two keyboards and cursors, devices to indicate thrust and acceleration during take-off and other equipment. The rest are spacious cabin crew for the flight crew compartment, or above it. In front of the upper deck, accessible from the reception wide stairs are kitchen, toilets, washrooms and the cabin of the first class, or business class seats with six-abreast with two aisles, department completes a small closet. The following is an economy class cabin with eight seats in a row. Above the windows and in the middle of two spacious cabins are located easily accessible shelves for storing baggage.

Airbus cargo space can be used for several possible ways. In addition to transport freight in containers or on pallets can be placed as spatial room, fitness centre, cab services (hairdresser, shops), but also separate conference rooms, or other rooms for the rest of the crew.

When viewed from the outside an airplane except their size and very well mechanized wing, is hiding a fuel tank with a maximum capacity of 320 000 l. Worth mentioning is the robust landing gear with 22 wheels, combined with the landing facility type identical with A340 and MD-11, respectively 747. Steerable front landing gear is fitted with two wheels that can be mistaken as a quartet at Lockheed C-5B Galaxy.

The A380 wing design was used widely used new Alcoa alloys. Glass fibers are about 25% lighter than traditional aluminum and exhibit a higher resistance to fatigue. In addition, compared with the now expanded carbon, they cost around 8% lower. The longest wing skin plate has the unique length of 35 m. Using new rivets from titanium alloy to save almost 3 000 kg.

### 3.4 Variants and operators

- A380-800 – the basic and only variant for passengers,
- A380-800F – the freighter (the development has been suspended).

Airbus A380 is currently in the fleet of nine airlines: Emirates (31 pieces), Singapore Airlines (19 pieces), Qantas (12 pieces), Lufthansa (10 pieces), Air France (8 pieces), Malaysia Airlines (6 pieces), Korean Air (6 pieces), China Southern Airlines (5 pieces), Thai Airways International (3 pieces).

### 3.5 Technical and operational parameters

**Table 1 Basic parameters of Airbus A380-800**

| Parameter | Airbus A380-800 |
|---|---|
| **Length** | **72,72 m** |
| **Height** | **24,09 m** |
| **Wingspan** | **79,75 m** |
| **MTOW** | **560 000 kg** |
| **Max. payload** | **64 500 kg** |
| **Max. Cruise speed** | **0,89 M** |
| **Fuel capacity** | **320 000 l** |
| **Range** | **15 700 km** |
| **Passengers** | **525** |
| **Engines** | **GP 7200 (311 kN)**<br>**RR Trent 900 (311 kN)** |

### 3.6 Comparison

It is now possible to compare the A380 with Boeing 747. The studies resulted in 58% profitability of the A380-800 by 323 passengers occupation (with 747 290 people are necessary, therefore 70% saturation), 17% lower cost incurred per passenger/kilometer, 10% lower fuel consumption, the time required for handling is not more than 90 minutes at 525 passenger occupancy, thus consistent with the "Jumbo" etc.. Net payload space A380 is 49% more than the 747-400, and offers 35% more seats. A380 operators can also offer their additional income in the form of services offered, or stores on board (hairdressing, sales of selected goods, fitness centre, etc.).

In 2012 came a new competitor on the market, more advanced Boeing 747-8I. New "Jumbo" after startup has become the longest plane in the world. The cost is lower for "jumbo", but when you take into account the capacity, which is higher in the case of A380, costs are similar. 747-8I has 26% cost advantage for consumption. This means, that the carrier can operate 747-8I on the route length of approximately 11 000 km, plus six 737-800 for 700 km long route with costs like for one A380 on 11 000 km long route. 747-8 carries 30% more cargo. Only three "Jumbos" are needed to transport the same volume of cargo over four A380.

## 4 CONCLUSION

We have started working on this project in June 2012. We relied on our own experience, when We was looking for material for homework projects. Since then created something unique for what will work in the future. It is a project that does not end. Engaged in the development is not only me, but also students who will contribute their work to other students. The aim will improve full teaching aid for students and interesting source of information for the general public.

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