

AIRCRAFT SEAT MAP DATABASE OF SELECTED AIRLINES

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Summary. Article introduces the reader to the process of creating a comprehensive database of aircraft seat maps useful for a new DCS (Departure Control System) which is being developed by the Department of Aerodynamics and Simulations of the Faculty of Aeronautics of Technical University in Košice. The database created contains seat schemes of all aircraft type and version regularly departing from Košice Airport.

Keywords: seat map database; seat layout; commercial aircraft; Košice airport; DCS system

1. INTRODUCTION

Most of the airlines are using interactive graphic schemes of the seats on their aircraft for an efficient passenger check-in and to ensure a safe passenger seating by assigning an appropriate seat to every type of passenger. The general seat maps are often published on the airline's web site in order to give passengers a basic information about the seat layout on the particular flight. These public seat maps are usually much simpler than the complex ones used by the airline or the check-in agent, and serve only to provide a brief overview of the aircraft cabin so the passenger can easily choose the right seat for them. There is much more than that beyond the seat maps that are widely used at the airport check-in counters. When preparing for a flight, the whole database of seat maps must be present to allow the airline the flight provider to choose the right seat map with the correct data. Our goal is to create such a database and get it ready to be implemented into the DCS system mentioned above.

2. SEAT MAP AND ITS USING WITHIN A DCS SYSTEM

An aircraft seat map is represented by a scheme of the seats of a particular plane. These seats are either distributed between cabins, each one of which can represent a different travel class, or all of them situated in the main cabin and in case of more than one travel class present on board, divided by a curtain. Each travel class may feature a different type of seat when it comes to the comfort. Besides that, there are different types of seats within one cabin, some of which a passenger can choose for their flight by themselves, e.g. window/aisle seat, others that not anyone is able to choose, e.g. emergency exit seat and last but not least, the seats that may be chosen by anyone but are preferred for one of the special kinds of passengers, e.g. seats preferred for handicapped passengers or an unaccompanied minor.

The key of an efficient counter check-in process is a check-in agent able to quickly scan the seat layout and its current state each time a passenger comes to be checked and extract the most essential information from it in no time. Not only is it important to get the information needed, but also to use it properly when assigning a seat to a passenger. This is when the seat map features come to help in deciding whether or not is a particular seat suitable for a specific passenger. The DCS system should automatically choose the best possible seat available according to already checked passenger's seat preferences and another, even not present passenger's needs. In case the agent picks a wrong seat type for a passenger, the system is programmed to immediately recognize the mistake made and either ask if the passenger is really allowed to take that seat, or just automatically assign a suitable seat instead.

2.1. Special cases and pre-seating

It is no big deal when a regular passenger comes to the counter for getting checked. But irregularities happen and when they accumulate, it may be really difficult to quickly allocate the right seat for everyone without the need of changing people's original seats. This issue is usually prevented by a process called pre-seating. An airline representative or a check-in agent are able to assign a seat to the passenger before he comes to the counter personally, even before he is checked in. The most important thing is to scan the flight before opening it and focus on the passenger list from which it is able to extract all of the information about types of passengers booked on that flight. Then the agent should manually assign the correct type of seat to every special passenger, like a handicapped person with a wheelchair or a family travelling with an infant, and make sure that if there is a group of people travelling together, they are pre-seated next to each other. It is also useful to assign a seat to all of the frequent travellers honourable to the airline and block the seat next to them for a higher comfort level, if this is not done automatically.

When a passenger gets pre-seated, a correspondent icon or letter appears on the seat map at the particular seat, indicating that this seat is considered reserved and will not be assigned to anyone else unless it is the last free seat in the cabin. However, this seat is not blocked and the agent can manually assign it to another person if he needs to do so. To block a seat completely, it is necessary to use some of the hard blocks, depending on circumstances.

3. LOCAL CARRIER'S SEAT MAPS

There are two types of carriers departing their flights from Slovak airports: classic and low-cost. Slovakia also had its own regional carrier named Danube Wings, but it stopped its activities in 2013. Danube Wings used to fly across the republic connecting its capital, Bratislava, with the next largest Slovak city, Košice. Nowadays, this route is operated by Czech Airlines, one of the oldest carriers on European market. We focus on the four airlines that perform their scheduled flights from Košice Airport. A big airline, Austrian, flies from Košice to its basement, Vienna Schwechat Airport. Another classic carrier flying regularly from Košice, named LOT, is connecting Košice with Polish capital, Warsaw. When it comes to low-cost carriers, there is only one of them departing regularly from Košice Airport and it is the Hungarian airline Wizz Air [1].

While almost the entire fleet of Wizz Air consists of one aircraft type, Airbus A320, not taking into account five A321s, the classic carriers mentioned above use a wide range of different aircraft in different versions and configurations, which naturally means a wide range of different seat maps. As almost all of the scheduled flights from Košice are short-haul flights, each carrier uses the smallest aircraft of their fleet. Despite these planes often feature only standard economy seats, the cabin may be divided into more travel classes and this division may be easily changed by moving the dividing curtain elsewhere, depending on the amount of tickets sold to each class. This fact is making the seat map situation worse, because it is next to impossible to create a complex seat map database including each and every possible configuration of the aircraft given. The result of our work is then a comprehensive collection of seat maps imported into a database system giving its user an option to adjust the final form of the seat map.

3.1. Seat map preview

There is a huge difference between a seat map presented to a passenger and a seat map being used at the check-in counter or by the airline representative. When a passenger is in the process of an online check-in, the airlines usually show him only the seat map of the travel class he bought the ticket for. Rarely there is an information about another passenger's seat choices.

A passenger can also look up a universal seat map for his flight, which is usually available on the web and he gets a neat scheme of the airplane cabin providing basic information about emergency exits, windows, aisles, wings and travel classes, with main points like galley and lavatories highlighted on it:

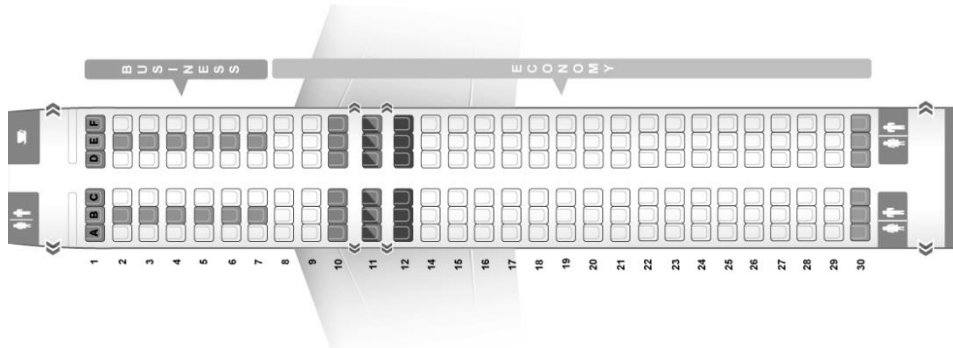


Figure 1 Lufthansa A320 seat map available on the web

A seat map for check-in purposes displays the cabin in much more detail and provides the latest information about the flight, the aircraft, its version and current configuration, capacity, seats assigned, seats reserved, blocked seats and every other type of seat present on that flight. This seat map is being constantly updated throughout the check-in process, giving its user the most recent data each time they check another passenger in. The example below comes from a former DCS developed by Lufthansa, LH Guide, which is no longer supported:



Figure 2 Austrian Airlines A320 seatmap in LH Guide DCS

4. SEAT MAP CREATION AND ITS IMPORT INTO A DATABASE SYSTEM

The DCS being developed by The Department of Aerodynamics and Simulations is using a database with the predefined structure. Because of its compatibility we took on this structure, as shown on the entity-relationship diagram below:

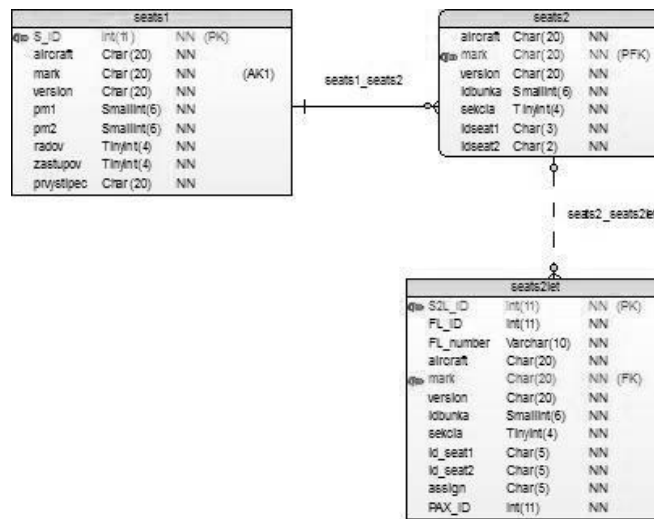


Figure 3 Entity-relationship diagram for the seat map database

The structure designed allows preparing the basic configuration of a particular aircraft. Unique identifiers, like aircraft type, its version and the registration mark, are used to create relations between the entities. The entity named seats2let is designed the way it allows adjusting the prearranged aircraft cabin configuration.

An entity-relationship database system MySQL was used for the storage of seat map data created using specific PHP scripts that helped with the visualization of the data creation process and with the following import of the created data into the database. The imported data were saved into the table seats1 and seats2. The table seats2let then uses those two tables as a template for a seat map of an aircraft with a particular registration mark. Such structure allows the flight provider to quickly create a seat map for a specific flight using a copy of a seat map defined by the first two entities (seats1 and seats2) and then adjusting details according to the aircraft configuration given. Final seat map visualization of Fokker 70 you can see in Fig. 4.

Fokker70 OE-LFR CY80

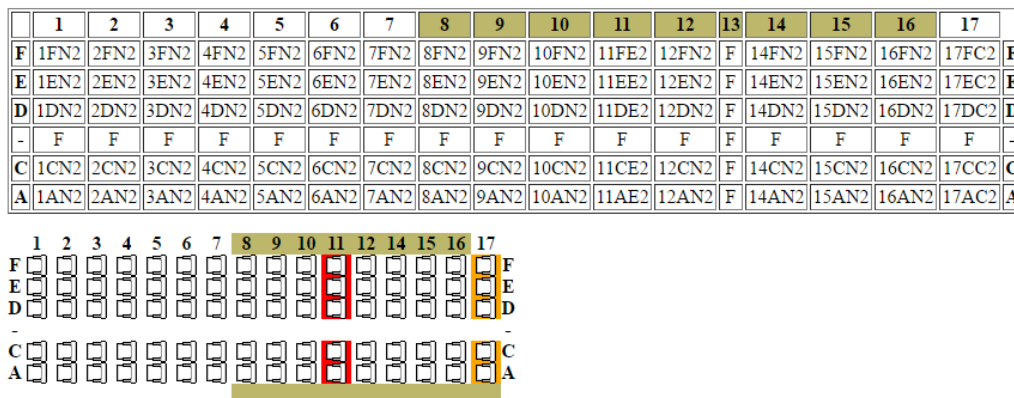


Figure 1 Fokker 70 OE-LFR CY80 seat map visualization

5. CONCLUSION

The aim of this work was to create a database of seat maps in aircraft of carriers operating scheduled departures from Kosice Airport. Database has been completed for using in local DCS (Departure Control System) which is developed at the Faculty of Aeronautics in order to design and create new highly

effective dispatching system that will eliminate the drawbacks of competing systems in the field. The primary users of the resulting L-DCS system will be local carriers, airports and airlines operating in Europe with a special focus on regional low-cost companies and companies providing charter flights.

We needed to process an overview of the seating layout of all aircraft seat maps, which we planned to include to the database. By exploration we found that these aircraft can be operated in different configurations which are determined by their version. Based on this finding, we finally created so called default seat maps for each type and version of the aircraft. Individual seat map can be easily modified according to the desired seating layout in real aircraft of actual flight.

ACKNOWLEDGMENT

This work was supported by the Slovak Research and Development Agency under the contract No. APVV-15-0527 “New generation of departure control system for an airports”.

6. LITERATURE LIST

[1]. Regular departure flights. Košice Airport [online]. Košice: Letisko Košice, a.s., 2016. Available on the web: <http://www.airportkosice.sk/en/for-passengers/flights/departures/>