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# Allocation of Slots at European Union Airports

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**The article focuses on the issue of slot allocation and the related insufficient capacity problem solving at European airports. At the current rate of the fast growth of aviation industry the airports are an important element for maintaining a safe and fluent air traffic. The content of the work involves the allocation of slots based on valid EU rules in co-operation with IATA, provides an overview of airport capacity constraints and proposes solutions to improve the current situation on the European aviation market.**

*Keywords: Operation, service intervals, allocation rules, airports,  
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## Introduction

In history, we can only find very few industries that would evolve and grow as fast as the aviation industry, which is becoming the global mean of mass transport and is available to all levels of the population in economically advanced countries. Over the last two decades, the European Union (EU) has been transforming and integrating fragmented national aviation markets into the single largest and most open regional aviation market in the world by removing different barriers retained from the historical development. Europe has to, however, maintain a strong and competitive aviation sector in the centre of the global network linking the EU with the rest of the world.

## 1. Aviation Transportation System and legislation in the Field of Air Traffic Management

In real aviation operations, the dynamic air transport system is composed of a set of elements in the defined airspace, of aircraft operated by different air carriers using airport services and equipment for navigation along air traffic routes. This system consists of two main elements:

- mean of transport – aircraft;
- air traffic route.

In the system, however, we monitor these four elements of aviation infrastructure:

- airports;
- air traffic service provider, ATS;
- air carriers;
- regulator. (Pruša, 2008)



A continuous interaction has to be ensured among these components for the proper functioning of the entire system. In the event of a failure of such an interaction, the result would be a shortage of airline operations at the airport, unsatisfactory working conditions for all the airline as well as passenger and airport staff, flight delays or inadequate connections between cities. Such non-satisfaction of the user's needs may result in a decreased interest in the use of airport services. (Bina et al., 2008)

### **1.1. Role and Operation of Airports**

Airports play a key role in the aviation chain by interconnecting airlines with passengers and customers using freight transport services. The importance of airports for the European economy increases as they provide a wide range of links within the EU and the connection of Europe with the rest of the world. In the air transport system, airports serve as the starting and ending points of the transport process, allowing air transport operators to ensure the boarding and exit of passengers from aircraft, loading and unloading their luggage, goods and mail. At the same time, however, it is also the point of transfer between land and air transport. Another function of the airports is that they enable stop-overs of air lines (transit) and passenger transfer or transfer of cargo between air lines (transfer).

Air traffic is a set of activities, the main part of which is planning of flight, airplane operations and crew operations, and ensuring the implementation of the airline schedule. In view of the international nature of air transport, the need for international coordination and cooperation has arisen at the very beginning of commercial air transport in

order to establish standard rules applicable to all parties involved in the air transport process. The safety of the flights is ensured by a range of services referred to as air traffic services. It is a set of activities performed and provided for safe, efficient and smooth air traffic.

### **1.2. Legislation in the Field of Management and Coordination**

Current development in the area of airport operations open new insights into the growth of demand for air traffic and the capacity and safety measures at airports taken to ensure safety of the flights. New techniques of operation at airports are being developed, with more advanced ways of operating the flow of passengers, goods and cargo. Securing of continuous operations requires a long-term strategy with efficient planning, where all the causes for delays should be taken into account, including flow management, capacity management and airport flight schedule planning. (Letisko Košice, 2012)

At aerodromes where airline demand for service intervals exceeds airport capacity, slot allocation mechanisms are used with the goal to define the set of rules to be followed for this purpose. Obtaining an operating interval at an airport means for the airline that it can use the entire airport infrastructure needed to operate the flight at a given time. The objective is to ensure that access to congested airports is organized based on fair, non-discriminatory and transparent rules for the allocation of take-off and landing slots, thereby enabling optimal use of airport capacity and fair competition. The main purpose of airport coordination is to arrange an effective use of limited airport resources for the benefit of as many airport users and passenger as possible by the mean of allocating slots. All such activities are operated on the basis of fair, non-

discriminatory and transparent rules and are created by the European Union and organisation IATA by establishing common rules for the slot allocation or by the search for new procedures for addressing airport capacity.

The European community adopted European Council Regulation No 95/96 of 18th January 1993 on common rules for the allocation of slots at the airports of the European Union. In Europe, the slot allocation rule is based on the global guidelines laid down by the International Air Transport Association, which issued a document entitled Worldwide Slot Guidelines in the context of airport coordination in 1974.

The need for operation and coordination of air transport to ensure the proper functioning of the system and processes emerged in the very beginning of air transport and air traffic management system development. At all major EU airports, which have tens of millions of passengers on average per year, it is very important to focus on the safety and fluency of air traffic, thus avoiding a large number of delays. (EHS č. 95/93)

## **2. Slot Allocation Process and Airport Capacity**

The foundation for slots allocation and airport capacity management is build upon certain rules enabling the creation and coordination of processes needed.

### **2.1 Basics of allocation**

The current slot allocation system works on the basis of the following key features:

- The Member State is obliged to designate the airport as coordinated is case, that an in-depth capacity analysis demonstrates that the

capacity of the airport is clearly insufficient.

- Operating intervals are allocated for the summer and winter aviation season. If the carrier has used the series of slots for at least 80% of the time during the season, they will be entitled to be allocated the same series of slots in the next relevant period. However, if this value has not been reached, the slots will be added to the pool of slots for assignment purposes for the next season.

### **2.2 Conditions of Allocation**

A Member State may designate any airport as a coordinated airport, in compliance with the principles of transparency, neutrality and non-discrimination. Certain conditions may force the airport operator to promptly conduct a thorough analysis of airport capacity in accordance with commonly accepted methods. These conditions could be:

- if air carriers account for more than half of the operations at the airport and the airport capacity is insufficient for actual or planned operations at certain times,
- if new subjects encounter a serious problem in securing slots,
- if the Member State considers it necessary.

There are currently 89 fully coordinated airports in European Economic Area and Switzerland, with 62 of these airports coordinated throughout the year and 27 airports coordinated on a seasonal basis. (Žihla et al., 2010)



### ***2.3 Importance of IATA in the slot allocation process***

The operations intervals called slots are a solution to unbalanced airport loads. According to ICAO and IATA, the slot is defined as the exact time for the arrival or departure of the aircraft from that airport. However, the slots do not affect only the aircraft, but also the processes of passenger transport, ground handling, fuelling and other activities. Slots also vary depending on the nature of the flight, whether it is a national or international flight, general aviation flight or military flight, scheduled or non-scheduled flight, but also whether it is a flight of an established company or a new entrant. We talk about airport with restricted capacity if the demand for slots is bigger than their supply. The document IATA Worldwide Slot Guidelines contains procedures for coordination and management of slots, and this document is a comprehensive set of procedures for allocating and managing airport capacity. This document is used in connection with the IATA Standard Schedules Information Manual. It is a primary IATA information guide containing all standards for the exchange of information for the coordinating airports using standard format messages. IATA also holds a Slot Conference twice a year where the necessary information is available to all airlines and coordinators. Due to the size of capacity limitations for coordination purposes IATA classifies airports to three main levels of congestion, namely:

- Level 1 – Coordinated Airport;
- Level 2 – Partially coordinated airports with planned traffic;
- Level 3 – Coordinated Airports.

The entire slot allocation process for each season runs according to the same procedure. Within a certain, fixed deadline, airlines will send to the coordinator requests

for the slots they plan to operate in the season. Depending on the deadline, the coordinator assigns a priority to the individual requirements. The coordinator will then assess and compile a preliminary flight plan for slot coordination within the set deadline. When coordinating flights and allocating slots, the following factors must be taken into account:

- operational capacity of airports;
  - capacity of runways;
  - capacity of the aprons and the stands;
  - capacity of the terminal building.
- (Žihla et. al., 2010)

Several airports in Europe, but also in the world, are chronically congested and operate at the upper limit of their capacity. Adequate airport capacity, efficient ground handling and capacity utilization are essential for the European economy and must be secured. Since the slot allocation system is already used to manage and utilize airport capacities, it is now necessary to develop airport capacity improvement plans in order to ensure air transport fluency and speed in the future as aviation development continues to advance.

### **3. Algorithmic Methods and the Use of Information Technologies**

The process by which individual operations are performed can also be called as an embracement of the aerodrome processes, where the solution to a given task and a problem is formulated in to a sequence of certain operations. Such a process that uses and processes information in airport information systems is called algorithmisation.

To solve individual tasks, it is necessary to find a uniform procedure, i.e. algorithm, by which a sequence of activities is understood



that have to be performed in order to solve the problem and to obtain the sought result of the airport operation process from the input data. Each algorithm is a precise and unambiguous system of rules that determines the process of solution seeking and can be depicted using flowcharts. (Jezný, 2010)

#### **2.4 ICT Systems Used at EU Airports**

It is not possible to effectively manage airport operations without adequate amount of quality information. Such management at airports is conditioned by the processing of a huge amount of diverse information. Therefore, information systems based on computer data processing acquire on increasing importance.

At airports, information systems are defined as systems for the collection, maintenance, processing and provision of information to ensure the operation, security and safety of civil aviation. Systems installed at EU international airports are used in all the management workplaces necessary for conducting operations associated with continuous air traffic control. In the following subchapters, however, only systems will be described that are connected with the tasks of flight planning and therefore are necessary to manage the allocation of service intervals, the so called slots. (Jezný, 2010)

#### **AFTN**

AFTN is the global aeronautical fixed telecommunication network. Worldwide AFTN coupling centres are established to ensure transmit of information among different fixed telecommunication circuits. This network is global and consists of direct circuits. It's a telex network that uses the international telegraph alphabet. The station is installed at

the airport dispatcher workplace and provides the ability to receive and send standard AFTN messages.

Received messages:

- flight schedules;
- changes to flight schedules;
- slots.

Messages sent:

- NOTAM;
- SNOWTAM.

#### **KLIS - Planning client**

A comprehensive aerodrome information system, which we can define as a logic and control unit, that provides system database administration, displays flight information to passengers, inserts flight plans for further processing, processes data for ground traffic management and also data for development of statistical indicators. Planning Client serves for air traffic planning. (KLIS, 2013)

#### **SITATEX**

This aviation communication system serves as a mean of dissemination of information between airports and airlines and allows for the reception and transmission of traffic reports that serve to ensure the provision of handling services. SITATEX is a specialized form of secure electronic mail that replaces the previously used telecopier network and enables communication between aviation industry stakeholders.

In practice, slot allocation issues and associated airport capacity issues can also be seen through flowcharts. We include all activities that need to be done in order to find suitable alternatives and the final solution of the task in to the airport operation processes.



Without the use of appropriate information technology it would not be possible to manage the air traffic continuously, create flight plans and, most importantly, share the necessary information among all stakeholders and bodies involved in such a complex process characterized by the main feature of security.

## Conclusion

Nowadays we are witnessing a competitive struggle due to the increase in air traffic. For reaching the objectives of the European aviation it is very important to continue developing and searching for new solutions for the proper functioning not only of airports but also of airlines. Air traffic in the near future is expected to change significantly by 2020, when passenger volume and flight density is expected to increase. The aim of the industry is to minimize the time needed for passengers to move around the airport from their arrival to boarding the aircraft and to avoid flight delays.

From the available information, it is possible to confirm that the current practice is

the maximum use of airport capacity, which means that the allocation of slots is of great value to airlines and its importance is keep growing. In view of the insufficient capacity of central airports and their impact on the mobility of European citizens, new solutions need to be adopted, which to call for new airport runways and airport infrastructure construction. It is very important to search for more efficient and cost-effective solutions to overcome the congestion of European airports.

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