



Flying High: Aviation Management

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Group 23

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Introduction

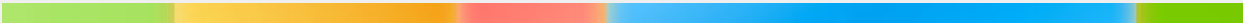
For this project, we will be designing and implementing an airport management system website. Airport management systems are created to store and handle information in order to make better decisions regarding operations. The website will belong to an airport and will consolidate important information relating to airline operations, airport operations, customer information etc. Our goal is to create a centralized database for greater coordination and efficiency.

In this proposal, we will describe the history of airport management and associated problems. In addition, we will generally describe our solution to these problems and the motivation behind it.

Problem Definition

Some important definitions related to airport management (traffic control) include:

1. Visual Meteorological Conditions (VMC):
 - ~"refers to the type of weather conditions" of flights [1]
 - ~defines meteorological conditions "in terms of visibility, distance from cloud, and ceiling equal to or better than specified minima." [2]
2. Visual Flight Rules (VFR):
 - ~"type of flight plan" [1]
 - ~FAA (Federal Aviation Administration) defined rules for flying in VMC.
 - ~During this type of flight, the pilot is responsible for the separation of airplane traffic. Thus, there must be VMC visibility conditions met in order to execute this flight plan. Line of sight is not allowed to be interrupted by cloud cover.
3. Instrument Meteorological Conditions (IMC):
 - ~"refers to the type of weather conditions." [1]
 - ~"weather that is 'below the minimums prescribed for flight under Visual Flight Rules.' " [1]
4. Instrument Flight Rules (IFR):
 - ~type of flight plan which is use when visibility is too low for a VFR flight [1]
 - ~rules for flying in IMC.



~“flying blind” [1] and using on board navigation through the use of radio or satellite based navigation aids such as VORs, NDBs, or GPS.

5. Navigational Aids:

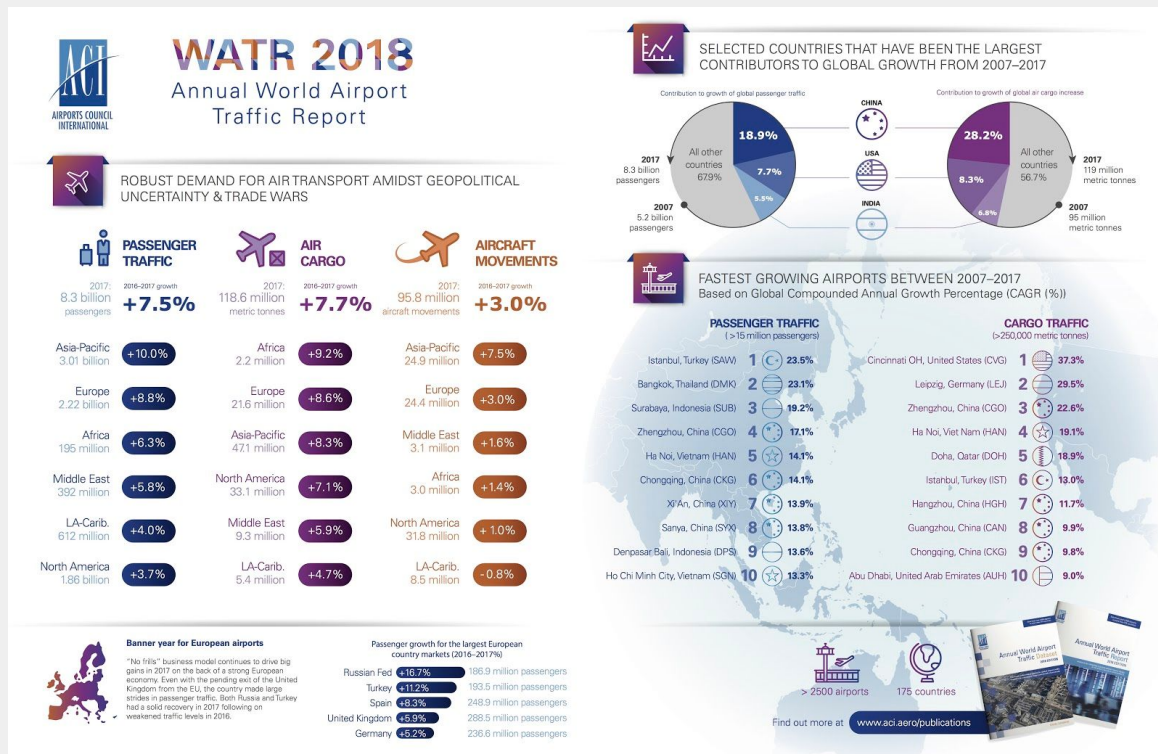
~radio-based guidance which helps a plane get navigate to their destination. These beacons will give information such as heading or distance to reach specific waypoints which are included in flight plans. These are important for IFR flights. [6]

~includes Very High-Frequency Omnidirectional Range Radio Beacon (VOR), Non-Directional Beacon (NDB). [6] These radio beacons can be used as waypoints in a flight plan. [7]

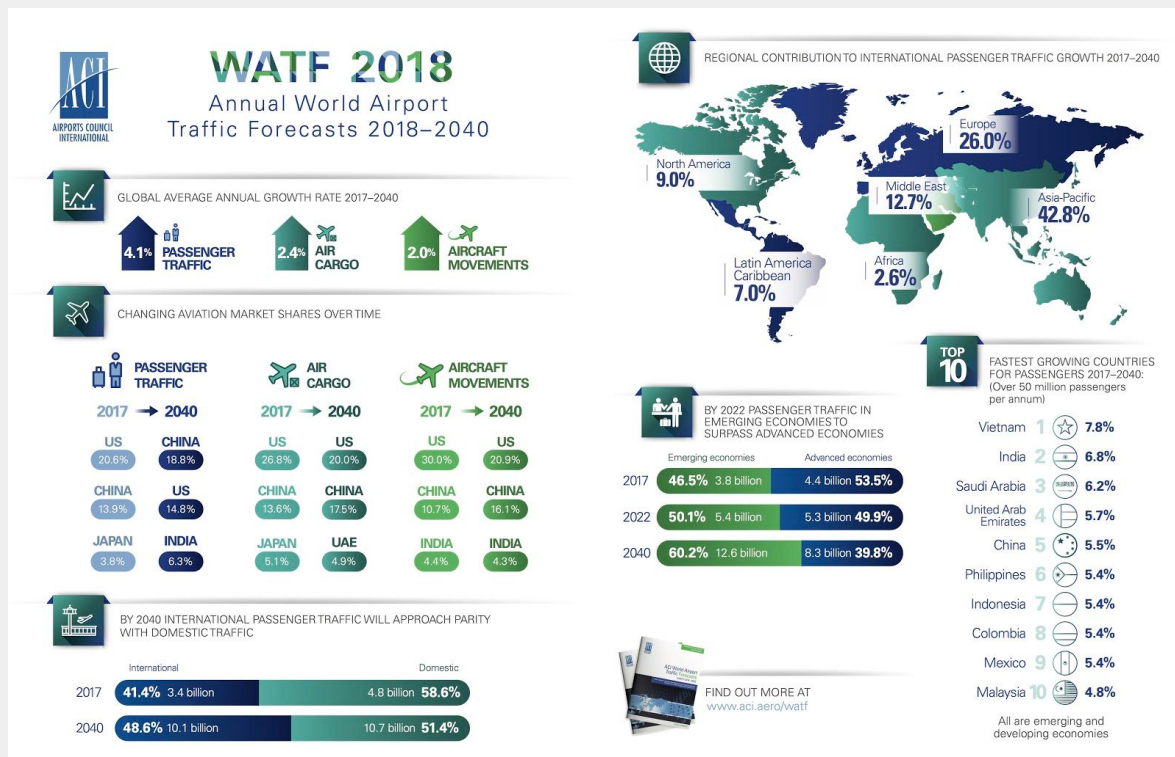
The problem of airport management has become more and more relevant in the past few decades as air travel has become more popular with the movement of people and goods being vital to daily life of many people and institutions around the world. As a consequence, logistical organization has become a more complex task.


Some current air travel statistics and forecasts are provided on the next page, in the WATR/WATF 2018 infographic report. [3]

[3]



[3]





As air travel becomes more popular, the information that is needed to track and organize flights, grows. As a result, better systems to organize this data are needed.

Some airport management systems already in place include Collins Aerospace services. Their services include (verbatim from their website) [4] :

- Flight Information Display Systems: Advanced flexible display and signage technology - ARINC AirVue
- Airport Database: Data storage, network integration and information management - ARINC AirDB
- Airport Operations: Maximize scheduling, ease congestion and reduce costs - ARINC AirPlan
- Turnaround Management: Deliver superb, on-time turnaround results - ARINC AirTQM™
- Airport Border Security: Comprehensive airport security systems - ARINC Electronic Borders
- Automated Security Screening: Optimize passenger flow and verification - ARINC VeriPax™
- Physical Security: Versatile command and control solutions - ARINC AIM®

A possible improvement to current systems of management, is an emphasis on ensuring a low cost for customers, in order to allow developing nations to benefit from these systems while ensuring all essential information is properly maintained. Through this goal, we hope to allow these countries entry into the market.

Proposed Solution

Due to the separation of information and roles between the actors at an airport, it can be difficult to coordinate all activities. Airports must be able to comply with government standards, offer effective quality service to potential customers, and ensure the quick and efficient turnaround of aircraft. These goals must be considered as well as the importance of Air Traffic Control which is responsible for ground activity such as Taxing and Takeoff Clearance while also ensuring the safe arrival of inbound aircraft. The goal of this database will be create a cost-effective interface to share vital information between these different actors to allow better coordination, to decrease delays, and create a more streamlined process. A strong emphasis will be on making Air Traffic Control data and operations more transparent which will allow for access to more accurate timelines for crews to work around.

Product

We will be producing a website for an airport. Users will be able to login and access relevant information to them.

The different types of users will include:

~Clients: people buying flight tickets.

Functions:

1. Search for Flights
2. Submit information about passport and visas
3. Book Flights
4. Access records of their upcoming flights

~Guest Users: people who wish to know estimated/ real time flight information.

Functions:

5. Search for Flights
6. Access information on flights, such as arrival/departure times and current status.

~Private Aircraft Owners (airlines): commercial or cargo companies.

Functions:

7. Access airport times/ days to form their registration
8. Submit flight registration plans
9. Input cost for plane tickets

~Airport Authority: central entity which is in charge of administration and management of the airport

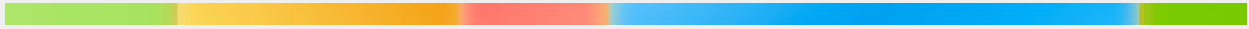
Functions:

10. Allocate runways to specific flights for different times
11. Access to the government's no fly lists
12. Access to airport personnel information
13. Access to in- flight data
14. Access to airplane location and status at the airport (gates, refueling, taxiways, parking, de-icing)

~Government:

Functions:

15. Access to information about passengers and goods passing through customs
16. Access to personnel (like TSA agents)



~Suppliers/ servicers of airport: caters, venders, de-icers, fuel supplier, cleaning, ground handlers. (functions will vary based on nature of each company).

Motivation

With the advent of privatization and many operations within an airport being outsourced to different companies, a wide variety of sectors of business can now be seen operating side by side in many modern airports. These airports are often funded by their own revenue streams which are important to their performance and ability to ensure future expansion. In order to maximize revenue, these autonomous groups must coordinate their activities. [5]

It should be noted that, while our design may not be the first of its kind, it does however hold benefits. For example, it is a relatively simple design with a low cost software solution. This allows for developing nations to much more easily access our solution, which will benefit them by providing a more efficient system to store information, rather than keeping physical records. Our project will offer a low-priced software solution that will be extensive enough for recording and using the essential information while still being intuitive enough for airport staff to use. With this product, developing nations could be offered a solution for safer and more efficient airport layouts while maintaining a stable budget.

Conclusion

In conclusion, we wish to create an airport management system to help solve the issues associated with the large amount of information required to effectively run the operation of airports. This will be done with a website that allows different types of users to access the relevant information they need.

Timeline

February 14, 2019	Detailed ERD of database
March 7, 2019	Initial (logical) relational model
March 28, 2019	Initial draft design of programming
April 11, 2019	Demonstration of product

References

- [1] Martin, E. (2019). *Difference between VFR and IFR* / Phoenix East Aviation. [online] Phoenix East Aviation. Available at: <https://www.pea.com/blog/posts/vfr-ifr-mean/> [Accessed 6 Feb. 2019].
- [2] *Visual Meteorological Conditions (VMC)*. [online] August 2, 2017. Available at: [https://www.skybrary.aero/index.php/Visual_Meteorological_Conditions_\(VMC\)](https://www.skybrary.aero/index.php/Visual_Meteorological_Conditions_(VMC)). [Accessed 6 Feb. 2019]
- [3] (chrome-extension://oemmndcbldboiebfnladdacbfmadadm/https://aci.aero/wp-content/uploads/2018/11/WATR_WATF_Infographic_Web.pdf)
- [4] *Airport Operations*. [online] Available at: <https://www.rockwellcollins.com/Products-and-Services/Airports/Airport-Operations.aspx>. [Accessed 7 Feb. 2019]
- [5] *History of Airports*. [online] Avjobs. Available at: <https://www.avjobs.com/history/airports.asp> [Accessed 6 Feb. 2019].
- [6] sites.google.com. (2019). Radio Navigational Aids - Charles De Gaulle International Airport. [online] Available at: <https://sites.google.com/site/atsys2ay1516te02team2/technical-specification/systems/radio-navigational-aids> [Accessed 6 Feb. 2019].
- [7] Skybrary.aero. (2019). VHF Omnidirectional Radio Range (VOR) - SKYbrary Aviation Safety. [online] Available at: [https://www.skybrary.aero/index.php/VHF_Omnidirectional_Radio_Range_\(VOR\)](https://www.skybrary.aero/index.php/VHF_Omnidirectional_Radio_Range_(VOR)) [Accessed 7 Feb. 2019].