# Air traffic visualization in Europe

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Fig. 1. Air Traffic in Europe.

**Index Terms**—Data Visualization, Flight, Europe

## 1 Introduction

European airspace is one of the busiest and most complex airspaces in the world. Every day thousands of air traffic controllers guide millions of passengers safely to their destinations.
Yet to most people, the choreography going on above them is entirely unnoticed it quite literally goes over their heads. Some might say that it is how it should be. Why do I need to know about air traffic as long as it gets me where I need to go? could be the argument.
But, this ignores one very important point. Airspace might be an invisible infrastructure, but it is every bit as important as the road, rail and utility networks we all rely on everyday. It is the lifeblood of our european economy.
Getting it right matters and we all have a stake in it !
This is why we want to create a data visualization showing the european air traffic for the last few years. The visualization will show, for a selected country, the most frequent destinations from that country and/or the most frequent flights coming in. We will also try to visualize the evolution through time of the most common destinations for a particular country.

## 2 Related Work

With the developpement of visualization tools today, we have many ways to see the importance of flight traffic all over the globe nowadays. One of these tools was developpd by NATS (National Air Traffic Services) which has the ability to feed a live stream in cinematic quality making a near real time air traffic visualization (figure 2). Here each currently flying plane is shown by a small plane accordingly to its position and direction.
Figure 3 is another type of visualization which can be encountered. It is a bit different as it aggregates the flights over a year and shows the entire planes' routes.
Both these examples help to locate visually the most busy air spaces and routes. However it is much harder to find visual information about the flow of people and especially about where the people of a specific country travel. Which routes carry the more people, and which countries interact the most ?
To get a more precise and visual answer, we have to make our own visualization.

Fig. 2. Real time air traffic

## 3 Conception ideas

From several different datasets containing airport by airport European air traffic details over the last two decades, we formed a unique dataset centred on European air traffic passenger flow, by country and by year. As the more we get back in time, the more data were missing in the original datasets, we will only keep those covering the last five, six or

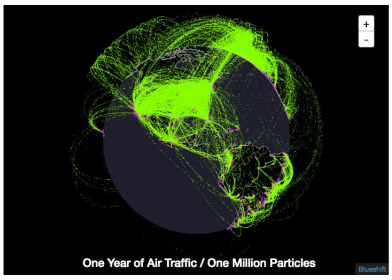


Fig. 3. Yearly air traffic

seven years, a point still to debate.
The visualization will take form of an interactive map of Europe covering the most part of the web page as can be seen in Figure 4.. The different countries will be shown separated by their borders.
First, we want to define a colour coding illustrating the density of flight for each country compared to all flights within Europe. The higher the ratio of the number of passengers who travelled from/to the country divided by the total of European who travelled, the deeper its colour would be.
To illustrate the passenger flow from one country to another, we chose to use an arrow of which width comes accordingly to the percentage of flights this route reprensents among all of the country's flights. These arrows would show up for a country when passing the mouse over or cliking the country on the map. The clicking should hold the arrows whereas passing the mouse over a country would show them only temporarily, but enlighten or swell the country's borders to make it more noticeable.
A segment of the page would be dedicated to different option. One would allow to switch the visualization from "departure" to "arrival". The "departure" mode would show the outgoing flow of the country, while "arrival" could show the incoming flow.
Among them, we want to be able to use different cursors :

- a first cursor to select the year we want to visualize
- a second one to select the proportion of the flights we want to represent (for example selecting 50% would show only enough arrows to represent half of the flights from/to the country)

A space in this segment will be reserved to show figures when the mouse goes over a country or an arrow like the number of total passengers for a country, or the percentage a selected route represents among all routes... Another idea is to offer a scrolling field, where any of the European country could be selected and then play an animation of the evolution of its flow over the available years.

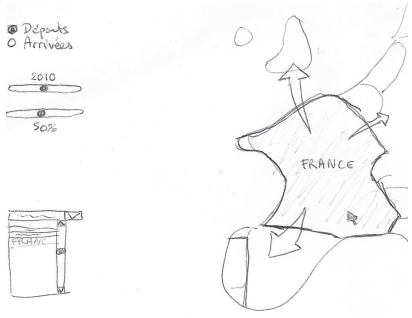


Fig. 4. Conception Scheme 1

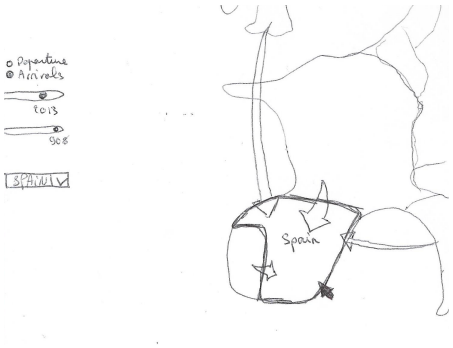


Fig. 5. Conception Scheme 2

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