

# Data Visualization Report

Team Aviation Development

Younghun Rhee s2198665  
Vincent Diks s2112175  
Willem van Dijk s2366940  
Duncan Bosman s2389398  
Mark Ziegelhöfers s2382326  
Anouchka Hertoghe s2192497  
Gies den Broeder s2161168

All Visualizations are available on: <https://dataviz.apetail.nl/>

## Flight Routes in the world in 2014

This visualization shows all flight routes in the world in 2014, 5624 airports are connected by 37596 flight routes globally. Color segment shows the number of flights. The size of the circle shows how many routes are connected with those airports. Bigger the circle, the more routes are connected.

Data source : <https://openflights.org>

## Air Transport Passengers from 1970 to 2019

This lollipop chart shows the air transport passengers over the years from 1970 to 2019. The default value is world, but specific countries can be selected by changing the country name parameter. Size of the circle and color is based on the number of passengers.

Data source : <https://data.worldbank.org/indicator/IS.AIR.PSGR?end=2019&start=2019&view=map>

## Fatality Rate in Flight Phase

In the first visualisation you can see the amount of deaths per year (these are the numbers in black). The visualisation is an area graph where you can see the amount of accidents that occurred in which stages of the flight. You can see a decrease of fatalities over the years.

In the second slide you can see the percentage of the chance that a fatality happens in aviation. As can be seen in the graph, the percentage is very low and has also decreased over the years.

Data source : [https://ourworldindata.org/grapher/aviation-fatalities-by-flight-phase?country=~OWID\\_WRL](https://ourworldindata.org/grapher/aviation-fatalities-by-flight-phase?country=~OWID_WRL)  
<https://data.worldbank.org/indicator/IS.AIR.PSGR>

## Plane Crashes per Year and Location

In this map you can see the plane crashes over the years in a world map. You can see where the plane crashed at what moment in time and the more people died in that plane crash, the bigger the dot appears.

Data source:

[https://www.kaggle.com/saurograndi/airplane-crashes-since-1908?select=Airplane\\_Crashes\\_and\\_Fatalities\\_Since\\_1908.csv](https://www.kaggle.com/saurograndi/airplane-crashes-since-1908?select=Airplane_Crashes_and_Fatalities_Since_1908.csv)

## Airline Seat Occupation

These two pie charts represent the share of total seats each of the listed companies had in 2010 and 2017, respectively. The share of seats represents the total number of seats that were booked on flights within Europe in that year for that airline as a percentage of the total number of seats booked within Europe in that year.

Data source: <https://www.cheaptickets.nl/> (AMS - LON/ROM/BER, 30/06/2021, 1P, economy, rounded to nearest integer) <https://www.tripadvisor.com/>

## Ticket Prices

This graph visualises the ticket prices from 7 major airlines on 3 different flights (one way flight from Amsterdam to London, Rome, and Berlin, 1 person in economy on 30/06/2021) and the average rating these companies have received on TripAdvisor. As we can see there is no clear connection between higher priced airlines and better review scores, indicating that paying more does not necessarily mean a more comfortable flight.

Data source: <https://tinyurl.com/bpz2ysyk>

<https://www.anna.aero/2010/07/07/aegean-and-tarom-latest-european-carriers-to-join-alliances/>

## Air Cargo Capacity versus Flight Frequency and Airplane Type

Air freight has become a key source of our consumer products (especially fresh produce). Of course it is to be expected that the richer more developed countries make more use of this fast but expensive way of transport. This sunburst is made using JavaScript and HTML, the data is formatted with a python script.

[https://data.4tu.nl/articles/dataset/Air\\_Cargo\\_Transport\\_Network\\_ACTN\\_Dataset/12694730](https://data.4tu.nl/articles/dataset/Air_Cargo_Transport_Network_ACTN_Dataset/12694730)

## Estimated yearly AFT (for air transport) to countries. (measured in tons)

This visualization is made using google sheets, the data is formatted using excels Power Query Editor. For this visualization we used the same dataset as we used for the sunburst.

[https://data.4tu.nl/articles/dataset/Air\\_Cargo\\_Transport\\_Network\\_ACTN\\_Dataset/12694730](https://data.4tu.nl/articles/dataset/Air_Cargo_Transport_Network_ACTN_Dataset/12694730)

## CO2 Emissions Map

In 2018 a total of 747 Million Megatons of CO2 was emitted into the atmosphere by the aviation sector, through passenger transport. In the map we can see a breakdown of the route groups in which this happened. The circles represent the CO2 emissions of flights within the region and the lines represent emissions of flights between regions. Together, the flights within Asia, Europe and North America make up more than half of all aviation CO2 emissions.

Source: <https://www.easa.europa.eu/domains/environment/icao-aircraft-engine-emissions-databank>

## Aircraft Engine Emissions

In the figure, 4 of the largest engine manufacturers can be selected to see the emission characteristics of their produced engines over time. Some decline can be seen in the Hydrocarbon emissions of the engines over time. A similar decline is true for the CO emissions of most engines. This can be attributed to the focus on lowering CO2 emissions to help stop climate change. Smoke Number is getting lower through some manufacturers recently, though not through all 4. But the Nitrogen emissions are not showing a downward trend in the slightest, due to lacking regulations for them.

Source: <https://www.easa.europa.eu/domains/environment/icao-aircraft-engine-emissions-databank>

## Airline Stock & Share Prices

The first infographic is a line diagram which shows the price of the share on the y-axis and the years 2018 to 2021 are currently plotted on the x-axis 5 airlines from different regions of the world (Germany, China, USA and Saudi Arabia).

The second infographic shows the various airlines on the y-axis and the price of the shares of the respective airline on the x-axis. A bar is used per year. Destock price is given in dollars.

Sources:

<https://news.google.com/covid19/map?hl=en-US&gl=US&ceid=US%3Aen>

<https://www.statista.com/statistics/1103040/cumulative-coronavirus-covid19-cases-number-worldwide-by-day/>

<https://www.investing.com/equities/>

[https://www.who.int/emergencies/diseases/novel-coronavirus-2019?adgroupsurvey={adgroupsurvey}&gclid=Cj0KCQjwweyFBhDvARIsAA67M708ZUmJ9L4tq1DccWllCnJ0\\_XoYjO88JwWRcuHxpy0ct487VynK6WwaAqtKEALw\\_wcB](https://www.who.int/emergencies/diseases/novel-coronavirus-2019?adgroupsurvey={adgroupsurvey}&gclid=Cj0KCQjwweyFBhDvARIsAA67M708ZUmJ9L4tq1DccWllCnJ0_XoYjO88JwWRcuHxpy0ct487VynK6WwaAqtKEALw_wcB)

## Governmental Aid per Passenger pre-COVID-19

This visualization shows governmental aid with respect to air passengers pre-COVID-19. Air passengers carried include both domestic and international aircraft passengers of air carriers registered in the country over 2019 in total. This data is represented through flight tickets, scaled relatively to the amount of aid per previously normal passenger.

Ranking excludes airports lacking aid or flight data and selects from top 24 only.

Sources:

[https://data.worldbank.org/indicator/IS.AIR.PSGR?end=2018&most\\_recent\\_year\\_desc=true&start=2018](https://data.worldbank.org/indicator/IS.AIR.PSGR?end=2018&most_recent_year_desc=true&start=2018)

<https://www.oecd.org/coronavirus/policy-responses/covid-19-and-the-aviation-industry-impact-and-policy-responses-26d521c1/#figure-d1e325>

## Forecast for Restoring IFR Movements Compared to 2019

Aircraft fly in two main categories, of which one is with Visual Flight Rules and the other with Instrument flight rules. Both categories are indicative for the total amount of traffic. With planned IFR movement, a forecast can be computed for the recovery of the COVID-19 pandemic.

Source:

<https://www.eurocontrol.int/publication/eurocontrol-five-year-forecast-2020-2024>