Summary:

The focus on this study is to see how different factors play into aircraft delays specifically in the United States. The focus points are weather delays, departure delays and security delays. Collectively, these visualizations make it easier for the analyst to visualize different delay factors and can filter them by state and time. Questions such as:

- Which months has the most weather delays?
- Which airports seem to have the most departure delays and which airports tend to have earlier departures?
- Which airline is most secure to travel with?

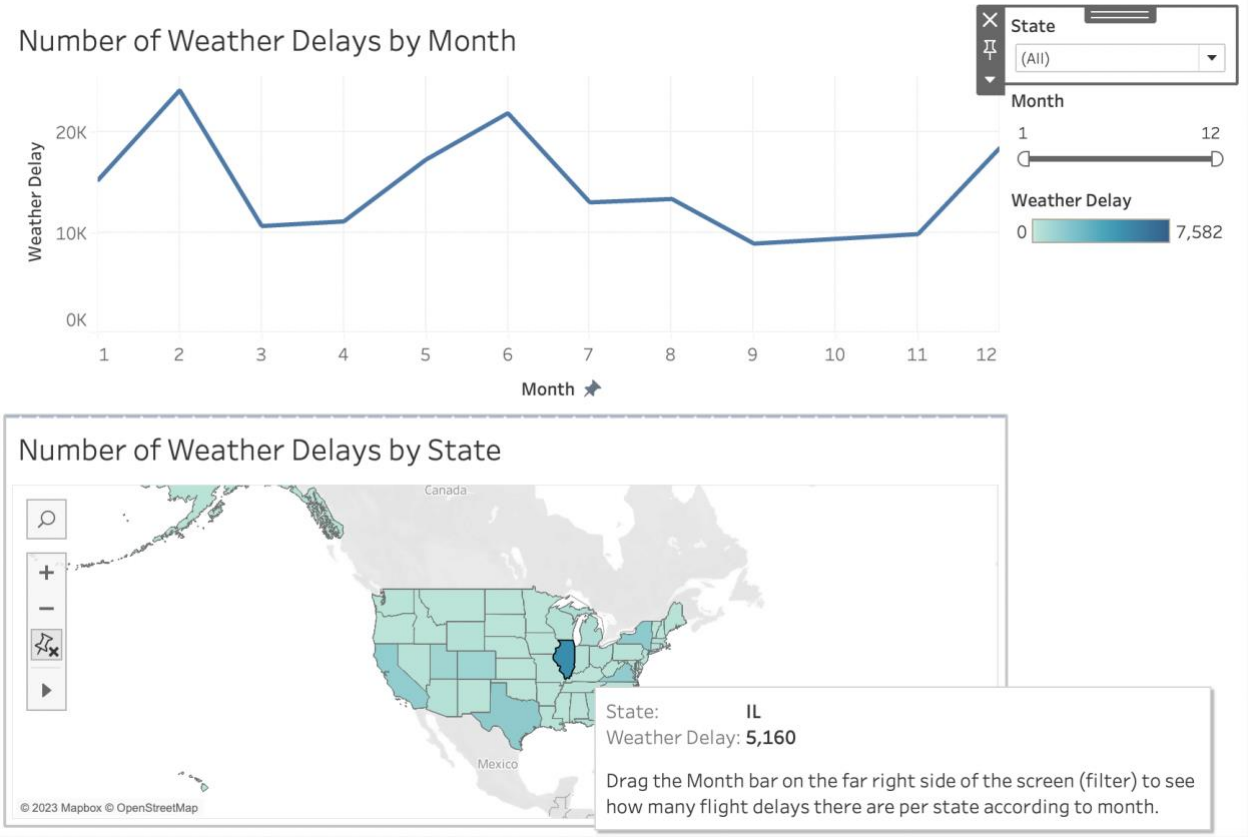
Can be answered, and more detail on these points will be provided below.

Being able to visualize and answer these questions will answer needed questions or prompt the analyst to explore the data further building off of these visuals.

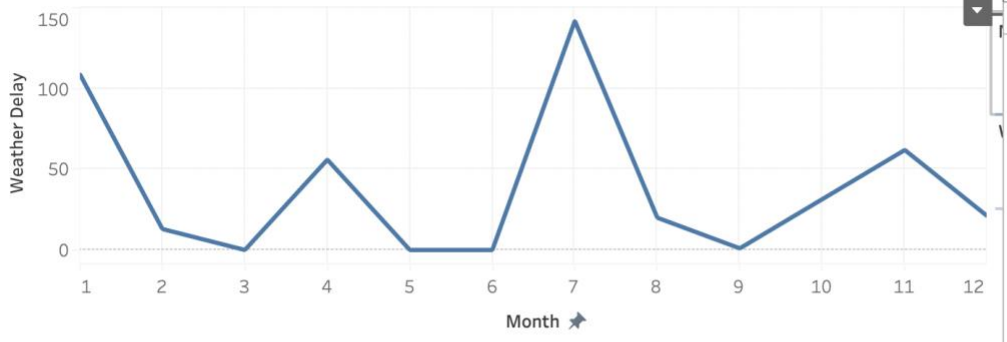
Insight1: Weather Delays (Dashboard)

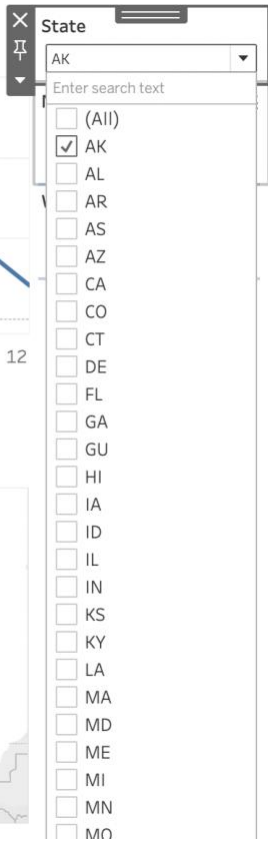
Looking at the Number of Weather Delays by Month, the months of December, January to February have the most flight delays due to weather. This makes sense because in the winter there is most likely bad weather.

December has 18,465 delays; January has 15,193 delays and February has 24,203 delays. We also see a pretty high number of flight delays in May and June, 17,264 flights and 21,913 flights respectively.

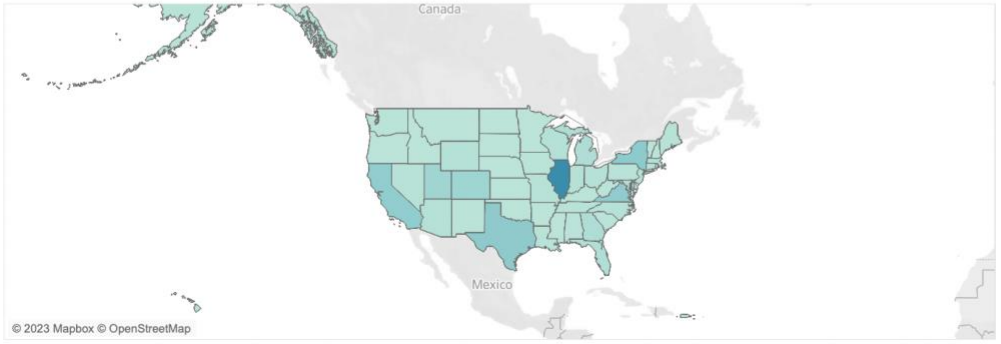


Number of Weather Delays by Month

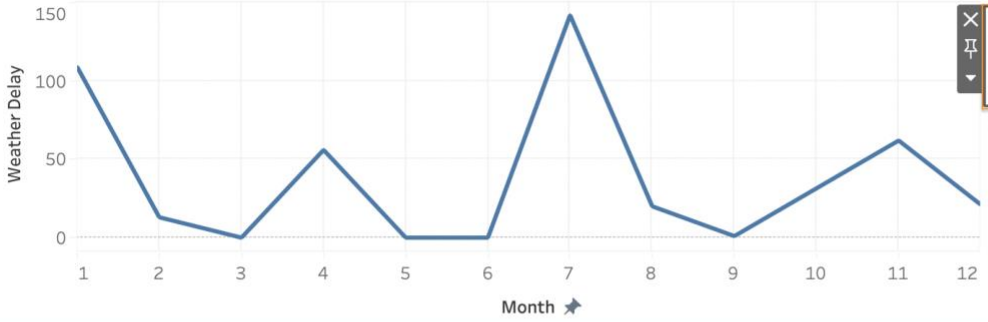


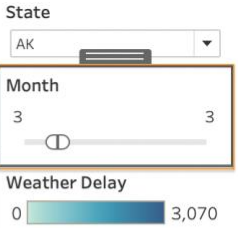


Number of Weather Delays by State



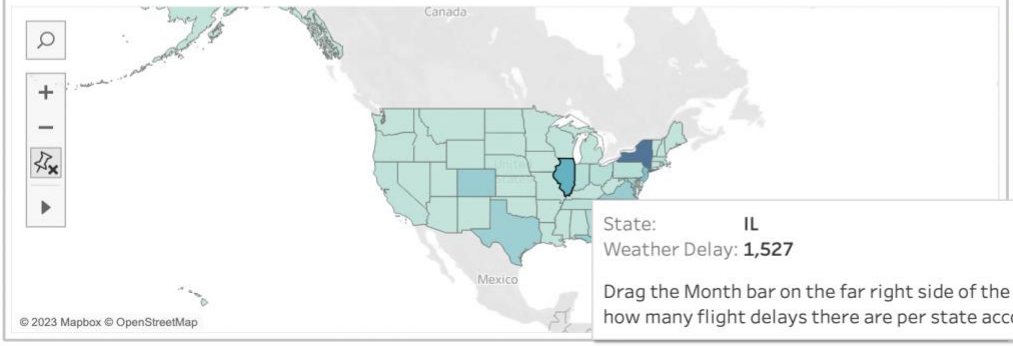
Number of Weather Delays by Month





Notice with the Month filter above we can change the month that the map displays information about weather delay. Dragging the cursor on the bar allows us to do so, in this example we are looking at the map for the month of march (3rd month)

Number of Weather Delays by State



State: **IL**
Weather Delay: **1,527**

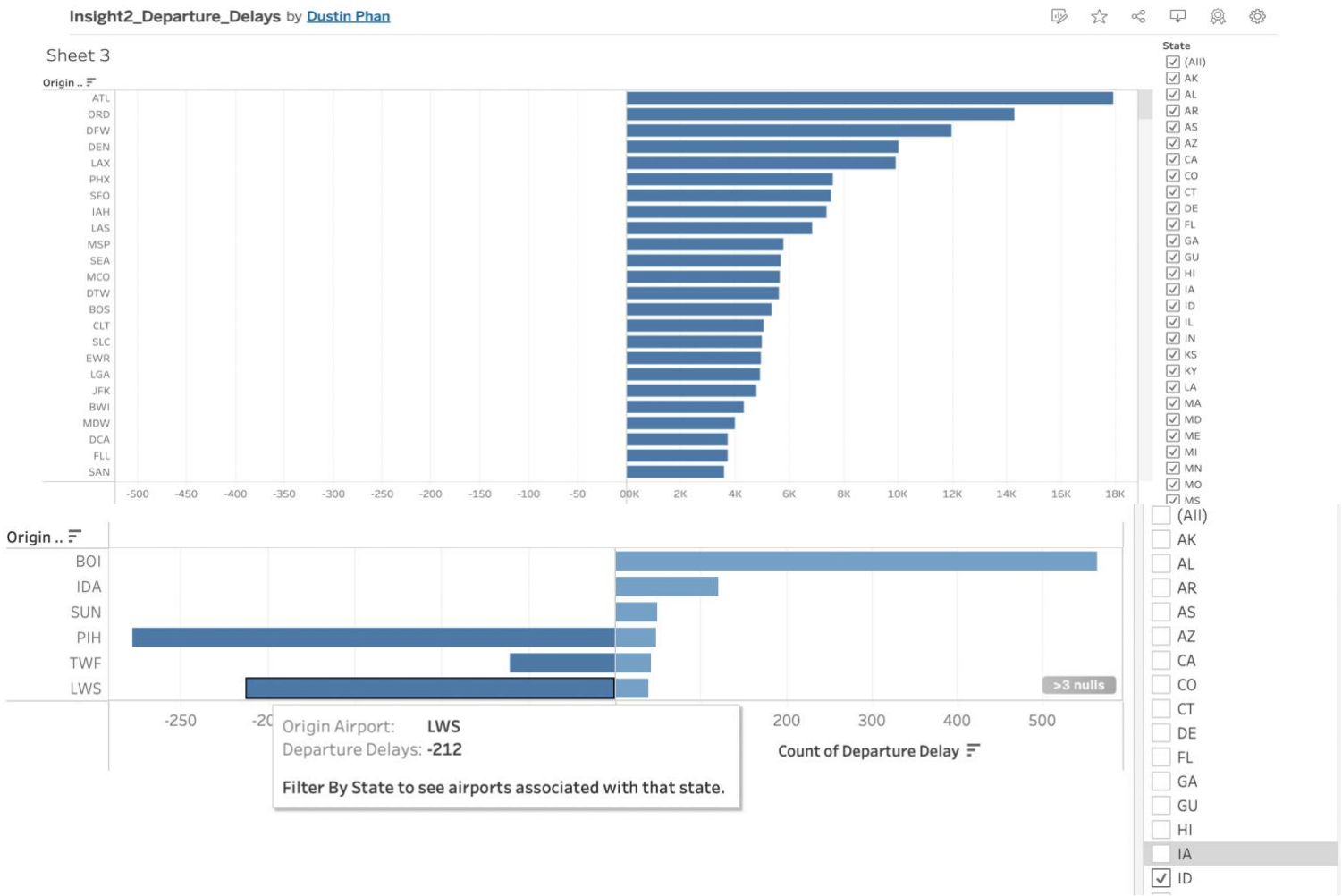
Drag the Month bar on the far right side of the screen (filter) to see how many flight delays there are per state according to month.

Looking at the dashboard (Weather Delays) in the previous page, I've included tool tips and filters to see the relationship between states and months with flight delays. To go into further detail, there are two tool tips. One for the line chart to inform the user about using the state filter to view how many delays there are per month by state, and the other for the map which informs the user about selecting the month and watching how the number of delays looks for each state on the map. These two visualizations provide the user more options on how to view the data.

Insight2: Departure Delays

Looking at the data in the "Departure_Delays" Bar chart: ATL (Atlanta) and ORD (Orlando) has the most departure delays. Atlanta coming in at 17,925 and Orlando at 14,297 departure delays. On the other end of the spectrum, some airports such as a couple in Idaho had negative departure delays, meaning they left earlier than intended. Airports such as PIH (Pocatello regional airport) and LWS (Lewiston Pearce County) airport had -278 and -212 departure delays respectively.

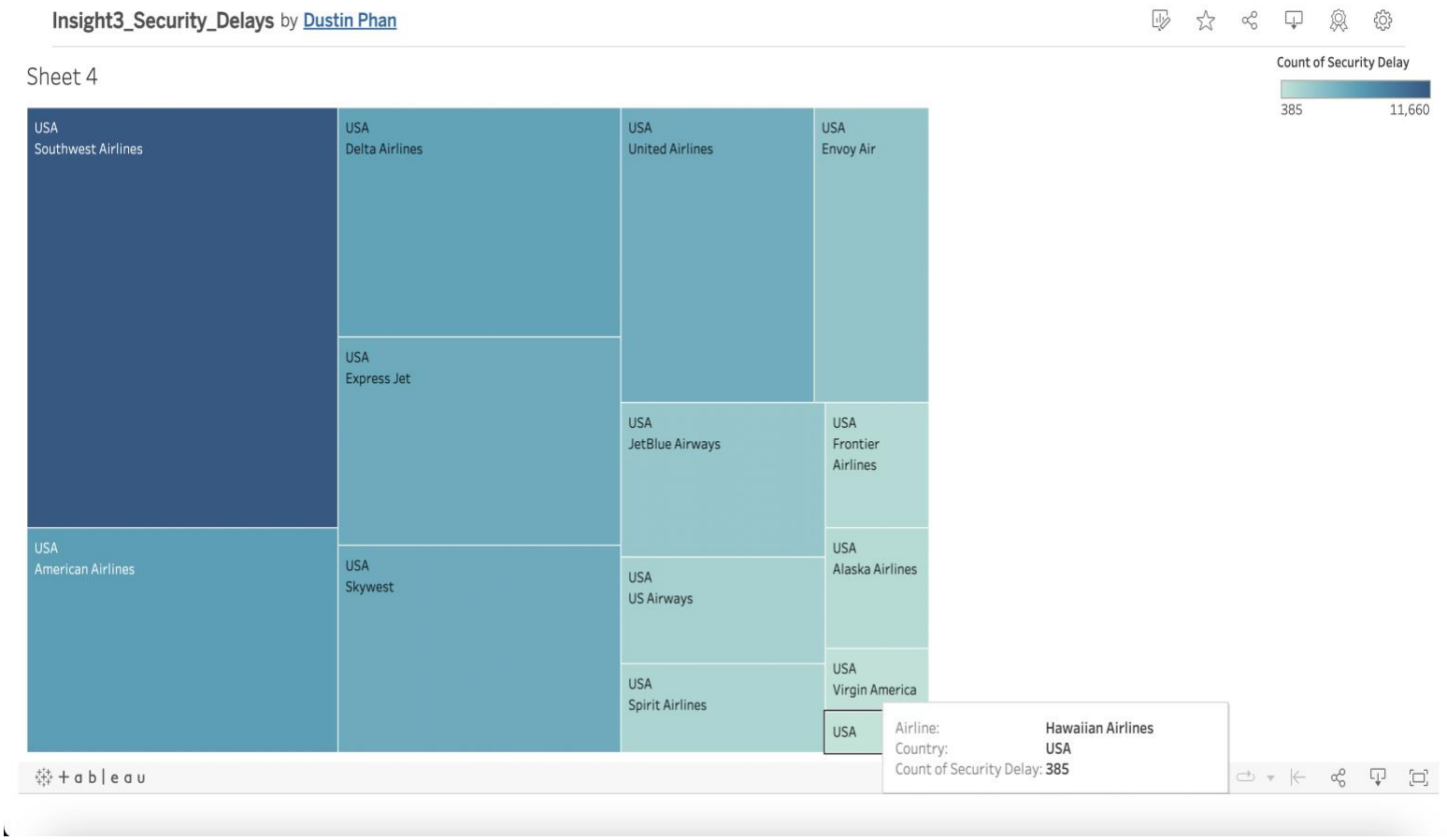
The bar chart can be filtered by state to show which airport come out of that state, also to display departure delay information according to airport (IATA code). It was filtered this way because a state can have multiple airports.



Insight3: Security Delays

Looking into the heat map, Southwest is what stands out the most to me. Southwest had 11,660 delays due to security reasons. While Hawaiian had the least security delays, coming in at 385 delays. People that take security delays into account when choosing airlines should avoid Southwest Airlines according to this dataset.

Usually, we associate high security alerts with the color red, but I chose not to do this because when visualizing data, we have to consider people that are color blind. With that said going with blue was the better option. The darker shades of blue has more security delays while the lighter shades are opposite. When hovering above sections above the heatmap, the information provides the number of security delays and airline name.



All in all, the findings are:

- Delays are caused by a multitude of factors.
- The second insight can be compiled by a mixture of types of delays such as the weather or security delays.
- Within each type of delay, the delay can be caused by different factors such as month of the year traveled or the security of the airline. (These are shown above in insight1 and insight3).
- Visit the links to the visuals provided to see specifics. (the extremes are stated in each insight section of this paper).

Resources:

https://www.kaggle.com/usdot/flight-delays/data

https://public.tableau.com/app/profile/dustin.phan/viz/Insight1_Weather_Delays/Dashboard1
https://public.tableau.com/app/profile/dustin.phan/viz/Insight2_Departure_Delays/Sheet3
https://public.tableau.com/app/profile/dustin.phan/viz/Insight3_Security_Delays/Sheet4