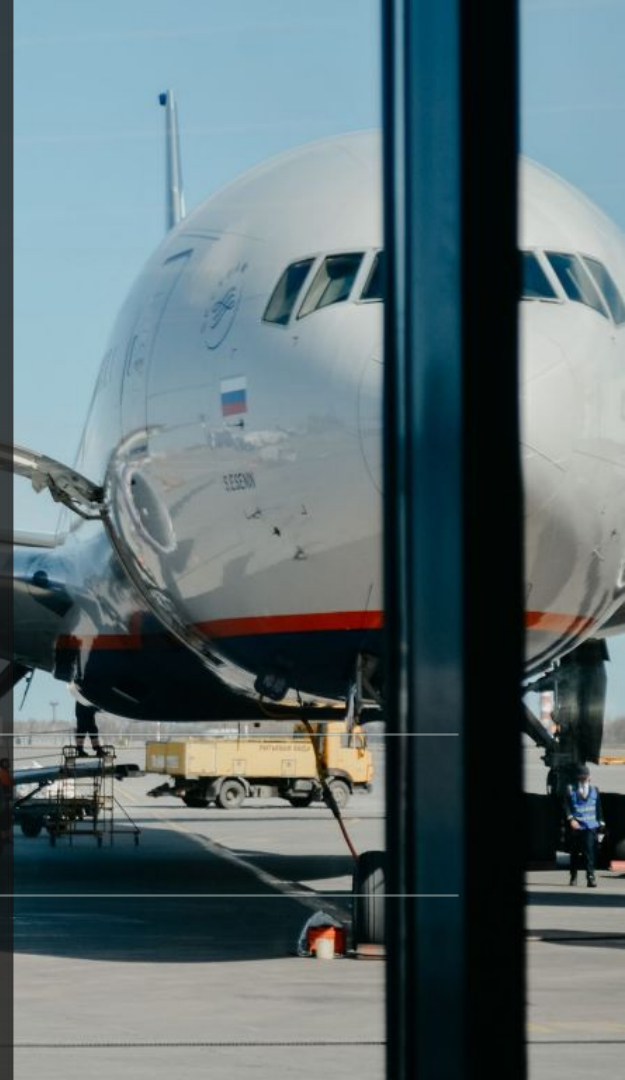


PRESENTED BY: MATT GRACER & ALI HIJAZY

# Analysis of **AVIATION DATA**



# OVERVIEW

This project involves comprehensive tasks: cleansing, analyzing, and visually interpreting insights extracted from the aviation dataset. Our end goal is to provide the company with actionable recommendations, guiding their potential entry into the aviation sector by suggesting specific specifications or brands worthy of investment.



## Business Understanding

By translating our findings into actionable insights, we intend to mitigate risks and pave the way for a successful entry into the aviation market.

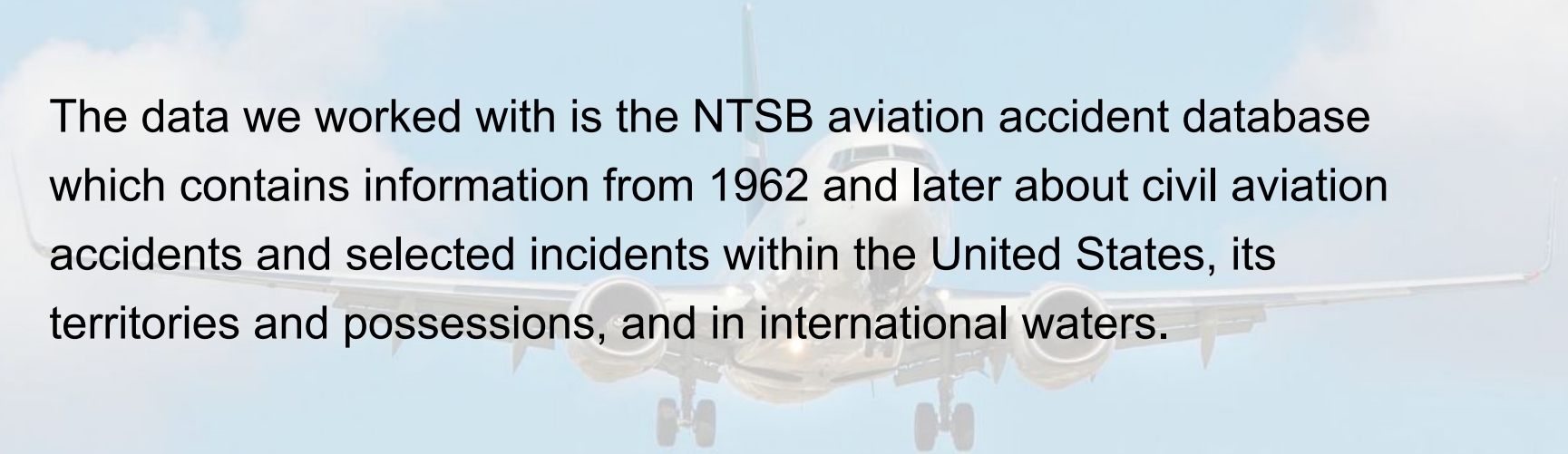
## Business Questions

To guide our approach, below are our key business questions:

- What are the potential risks associated with aircraft ventures, and how can these risks be effectively mitigated?
- Which aircraft options present the lowest inherent risks, considering factors such as safety records?
- How can we translate our findings into tangible recommendations that the head of the new aviation division can utilize to make well-informed decisions on aircraft procurement?

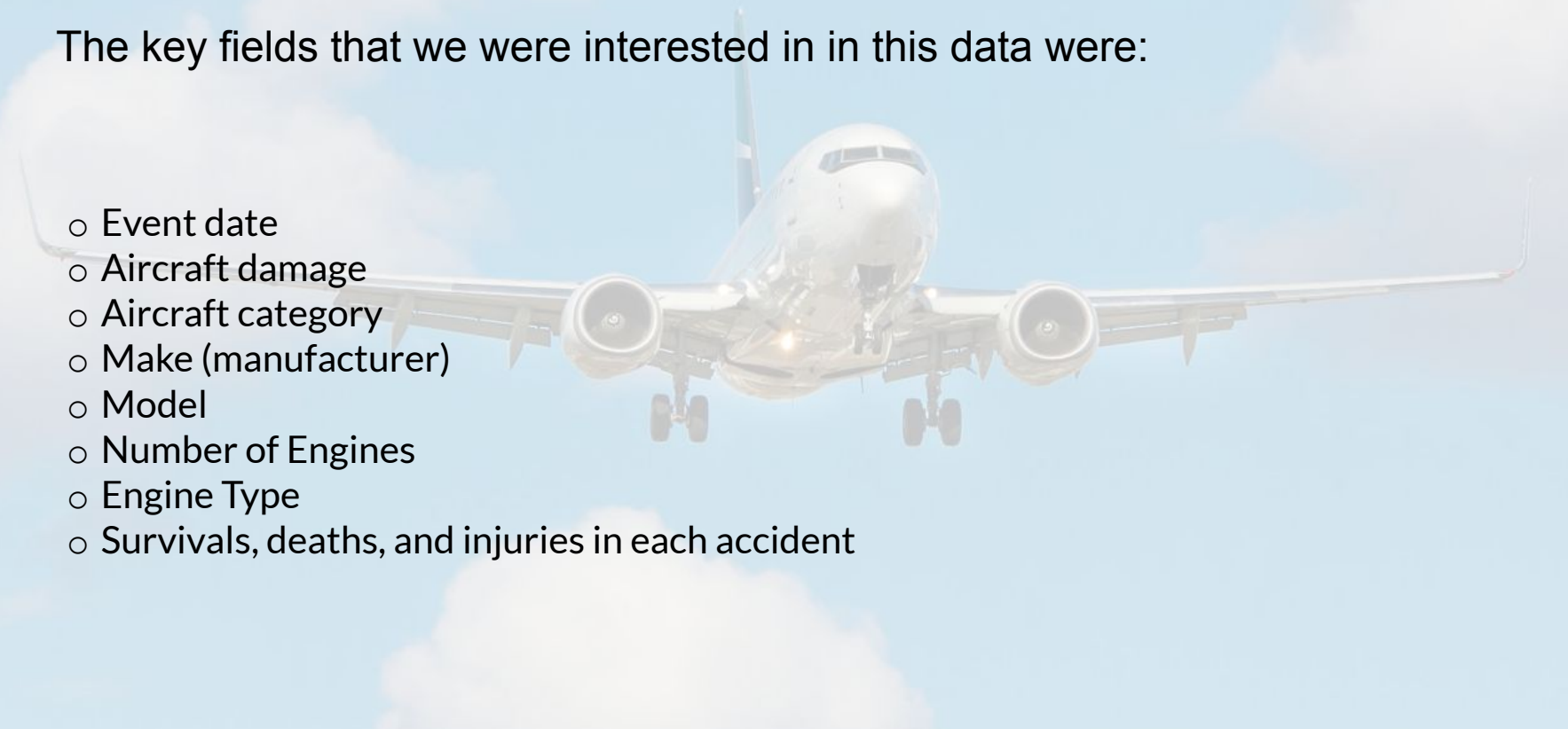
## Aviation Data

The data we worked with is the NTSB aviation accident database which contains information from 1962 and later about civil aviation accidents and selected incidents within the United States, its territories and possessions, and in international waters.



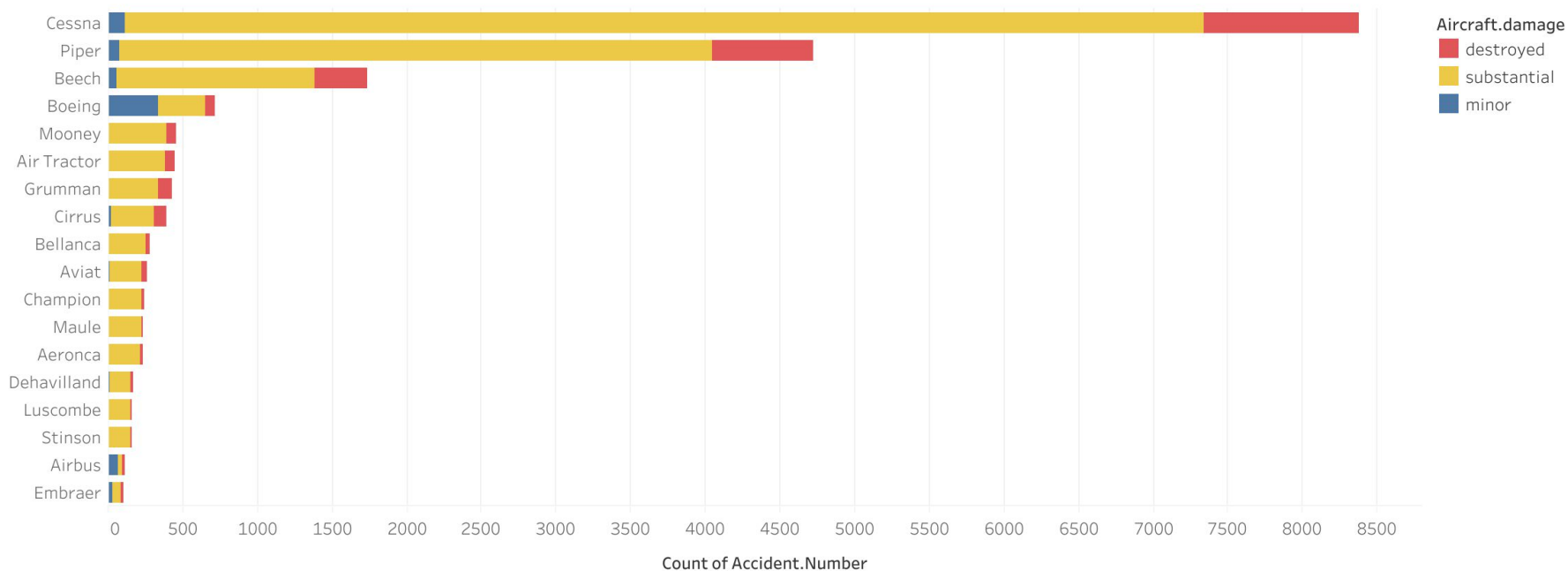
# Aviation Data

The key fields that we were interested in in this data were:

- Event date
  - Aircraft damage
  - Aircraft category
  - Make (manufacturer)
  - Model
  - Number of Engines
  - Engine Type
  - Survivals, deaths, and injuries in each accident
- 
- A large commercial airplane, likely a Boeing 747, is shown from a front-on perspective, flying towards the viewer. The aircraft is white with blue accents on the tail and engines. It is flying through a bright blue sky with scattered white clouds. The image is slightly faded, serving as a background for the text.

# Data Analysis

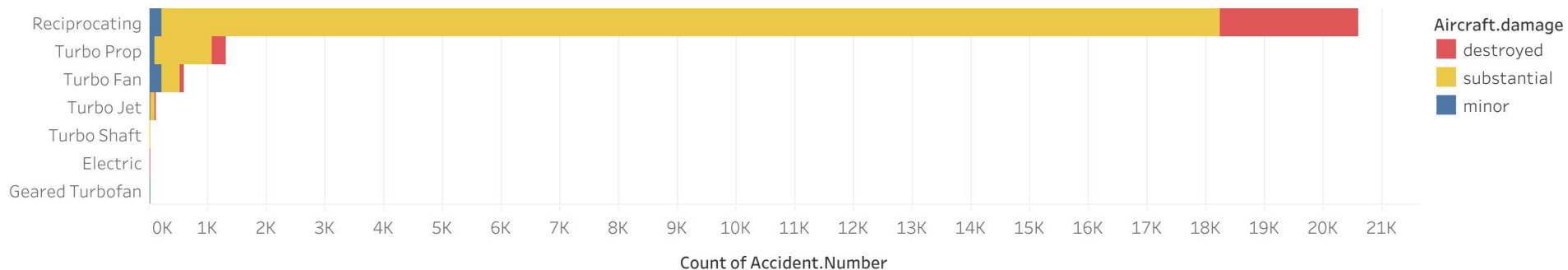
Number of Incidents per Manufacturer



The numbers of accidents in Cessna Piper, and Beech are significantly higher than any other manufacturer

# Data Analysis

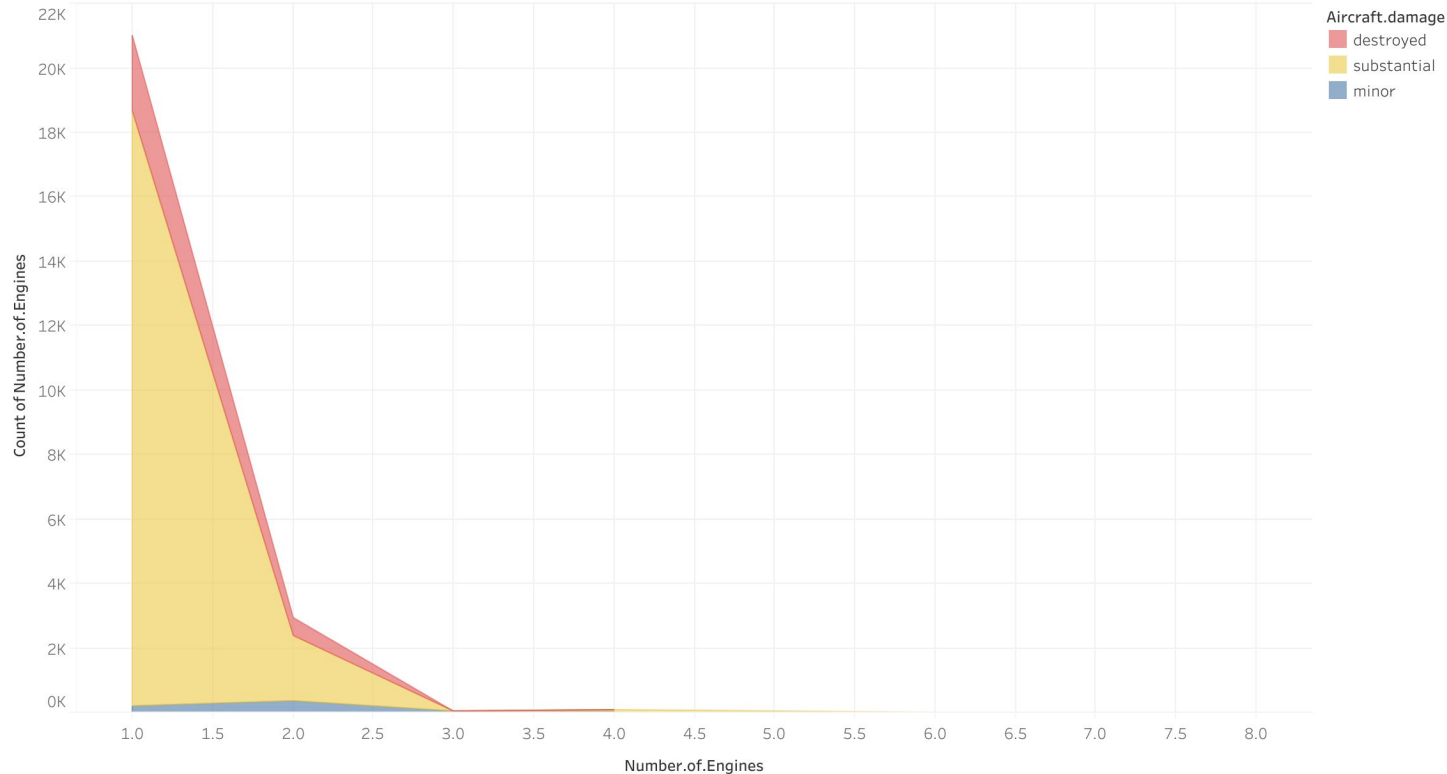
Accidents per Type of Engine



The biggest portion of airplanes that had accidents were equipped with Reciprocating, Turbo Prop, and Turbo fan engines.

# Data Analysis

Number of Accidents by Number of Engines

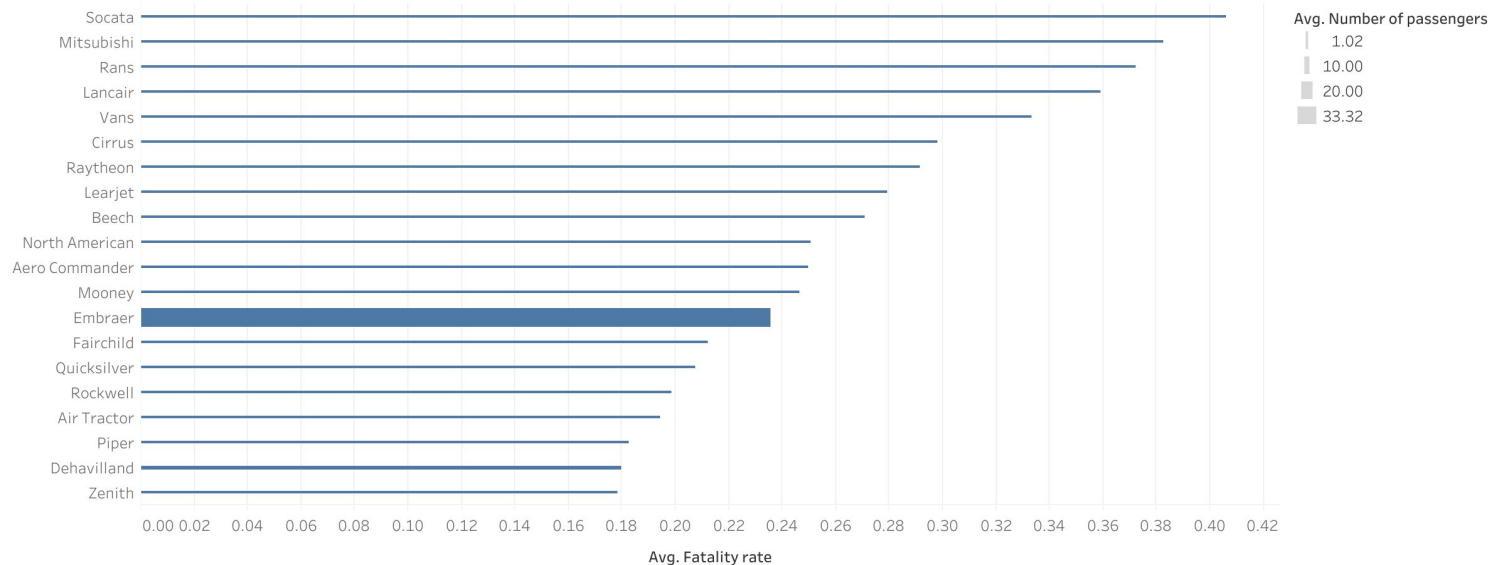


The biggest portion of airplanes that had accidents were equipped only 1 engine



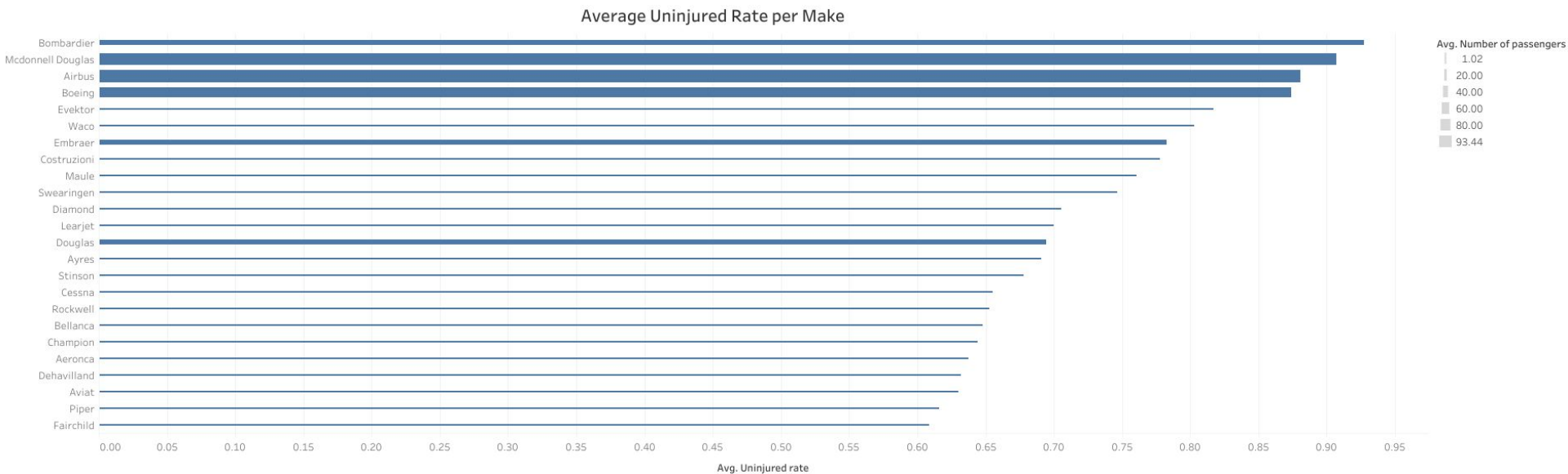
# Data Analysis

Average Fatality Rate per Manufacturer



This is the average ratio of Fatalities in the accidents recorded for each manufacturer

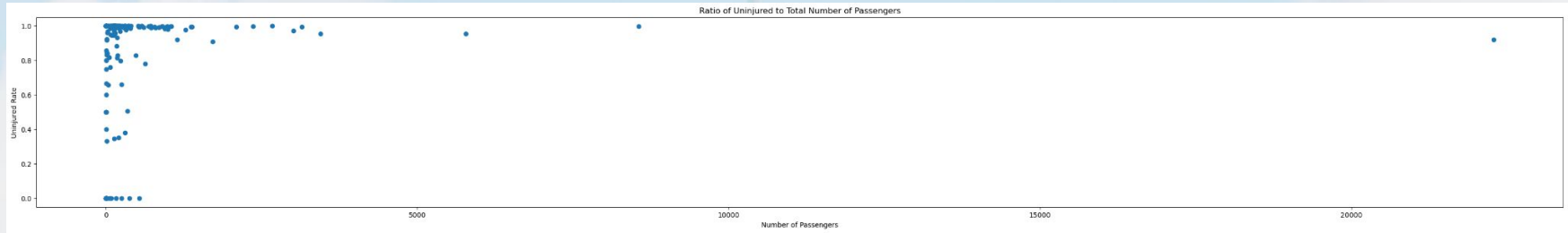
# Data Analysis



This is the average ratio of Uninjured passengers in the accidents recorded for each manufacturer

# Data Analysis

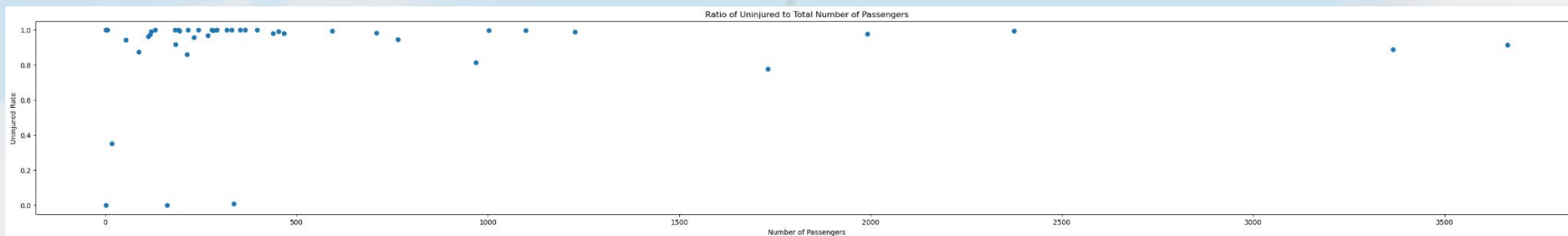
## Scatter Plot for Boeing: Rate of Uninjured to Total Number of Passengers



- 254 Models
- X-Axis: Number of Passengers
- Y-Axis: Ratio of Uninjured Passengers (scale of 0-1.0)
- Passengers: Total Number of Passengers for each Make
- Results: A high number of boeing models have a sum of passengers between 100-200 and are hovering around a 1.0 ratio for uninjured
- This indicates that Boeing makes several planes that are safe when accidents occur

# Data Analysis

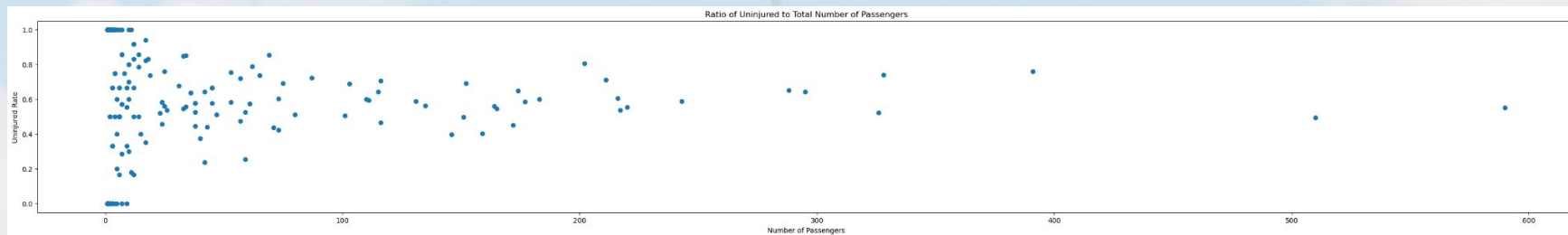
## Scatterplot for Airbus: Rate of Uninjured to Total Number of Passengers



- 54 Models
- X-Axis: Number of Passengers
- Y-Axis: Ratio of Uninjured Passengers (scale of 0-1.0)
- Passengers: Total Number of Passengers for each Make
- Results: A more distributed number of passengers and the ratios remain high near the 1.0 scale indicating that most of the passengers across the Injury columns were Uninjured
- This indicates that Boeing makes several planes that are safe when accidents occur

# Data Analysis

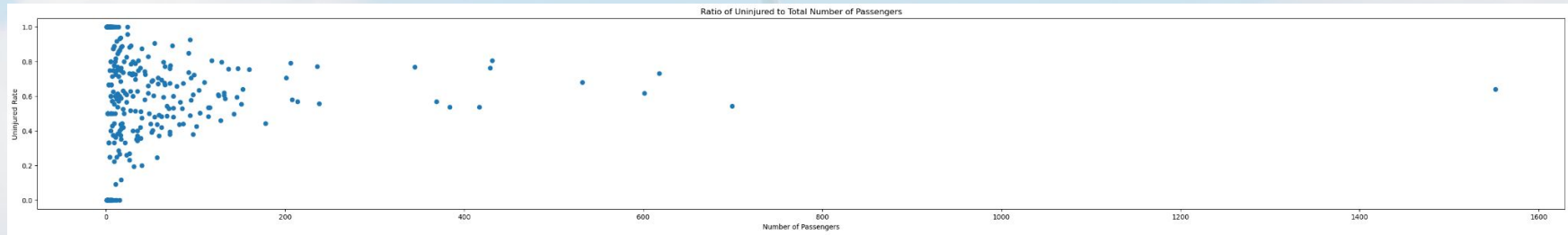
## Scatterplot for Piper: Rate of Uninjured to Total Number of Passengers



- 
- X-Axis: Number of Passengers
- Y-Axis: Ratio of Uninjured Passengers (scale of 0-1.0)
- Passengers: Total Number of Passengers for each Make
- Results: A more distributed number of passengers and the ratios are also more distributed between 0-1.0
- This indicates that Piper planes vary in their level of safety when accidents occur

# Data Analysis

## Scatterplot for Cessna: Rate of Uninjured to Total Number of Passengers



- X-Axis: Number of Passengers
- Y-Axis: Ratio of Uninjured Passengers (scale of 0-1.0)
- Passengers: Total Number of Passengers for each Make
- Results: A less distributed number of passengers and the ratios are more distributed between 0-1.0 similar to Piper
- This indicates that Piper planes vary in their level of safety when accidents occur

# Recommendations

- Airplanes with more than one engine have less risk of accidents. 2 engines is good, but three or more is ideal
- The safest engine types and Geared Turbofan, then Electric, turbo shaft and turbo jet. other types like reciprocating, turbo prop, or turbo fans and jet have a much higher risk
- Bombardier, McDonnell Douglas, Airbus, and Boeing have the highest average of uninjury rate so passengers are likely to be uninjured in case of an accident. these makes are to be considered.
- Socata, Mitsubishi, Rans, and Lancair have the highest averages of fatality rates so passengers are more likely to die in case of an accident. these makes are to be avoided.
- Boeing and Airbus have the highest uninjured to number of passenger ratios with most values being above 0.75 on a scale of 0.0-1.0.
- The results for Piper and Cessna are more distributed for their ratios with values varying between 0.0 and 1.0. The Sum of the Number of passengers is also lower.
- I would recommend that the Aviation Company focus on Boeing and Airbus. These Airline makes have the highest uninjured per number of passenger ratio.