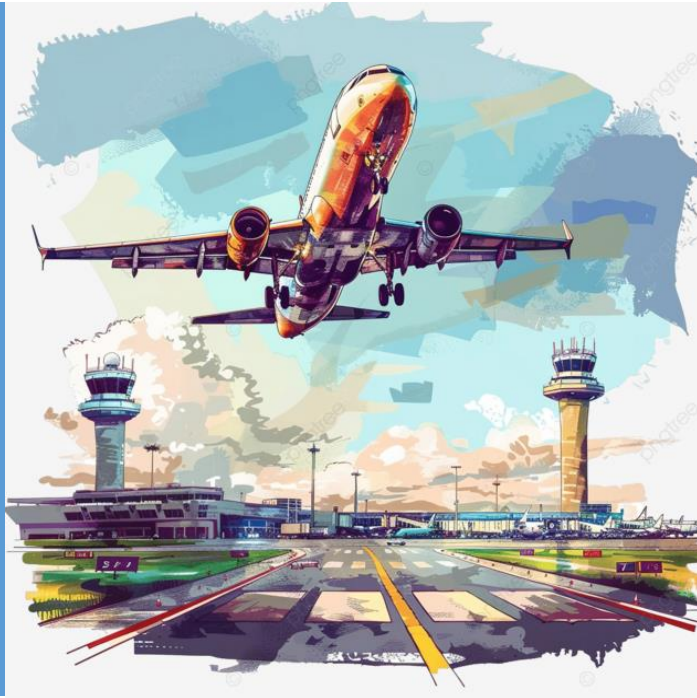


# CLEARED FOR TAKE-OFF: IDENTIFYING LOW-RISK, HIGH-VALUE AIRCRAFT INVESTMENTS



# OVERVIEW

- Introduction – The Business Question
- Business Context
- Data
- Process Steps
- Results and Business application (Recommendations)
- Evaluation
- Conclusion and future steps

# THE BUSINESS QUESTION AND CONTEXT

- Our company was planning to diversify into the aviation business and planned to purchase and operate aircrafts for both commercial and private enterprises.
- However, the industry carries a lot of safety, financial and operational risks.
- We were therefore tasked with identifying which aircraft makes have the lowest risk investment:
  - While balancing safety, reliability and cost-effectiveness.

## THE SOLUTION - DATA

- Was derived by using data from the National Transportation Safety Board.
  - It contains aviation accident data from 1962 to 2023.
  - These accidents occurred in the United States and international waters.
- The data contained several columns that we assessed to determine:
  - The most operational, safe and mechanically suitable Aircraft Make.

# AVIATION DATA AND ITS VARIABLES

- Of the many columns in the data set, we used:
  1. Engine type to determine operational cost effectiveness of an aircraft make.
  2. Injury severity, total fatal injuries, total serious injuries to determine safety risk of an aircraft make.
  3. Aircraft damage to determine mechanical reliability and environmental susceptibility of an aircraft make.

# ANALYTICAL APPROACH – PROCESSES STEPS

- We used several libraries to analyse the dataset:
  1. Pandas - to read, edit and save our python files.
  2. Matplotlib and seaborn - for visualizations.
- We also combined:
  - Descriptive data analysis to determine measures of central tendency and spread.
  - And also cross tabulation to determine how Airplanes Make related to different attributes.
- Findings were presented mostly in bar graphs.

## RESULTS – OBJECTIVE 1: SUMMARY IN MEASURES OF CENTRAL TENDENCY OF NUMERICAL VARIABLES.

- Most aircrafts had 1 engine.
- The mean number of total Fatal injuries was low at 1.7 (+/- 13.6).
- The mean number of total Serious injuries was low at 0.68 (+/- 5.32).
- The mean number of total Minor injuries was low at 0.57 (+/- 7.57).
- The mean number of total Uninjured was 35.5 (+/- 74.7).

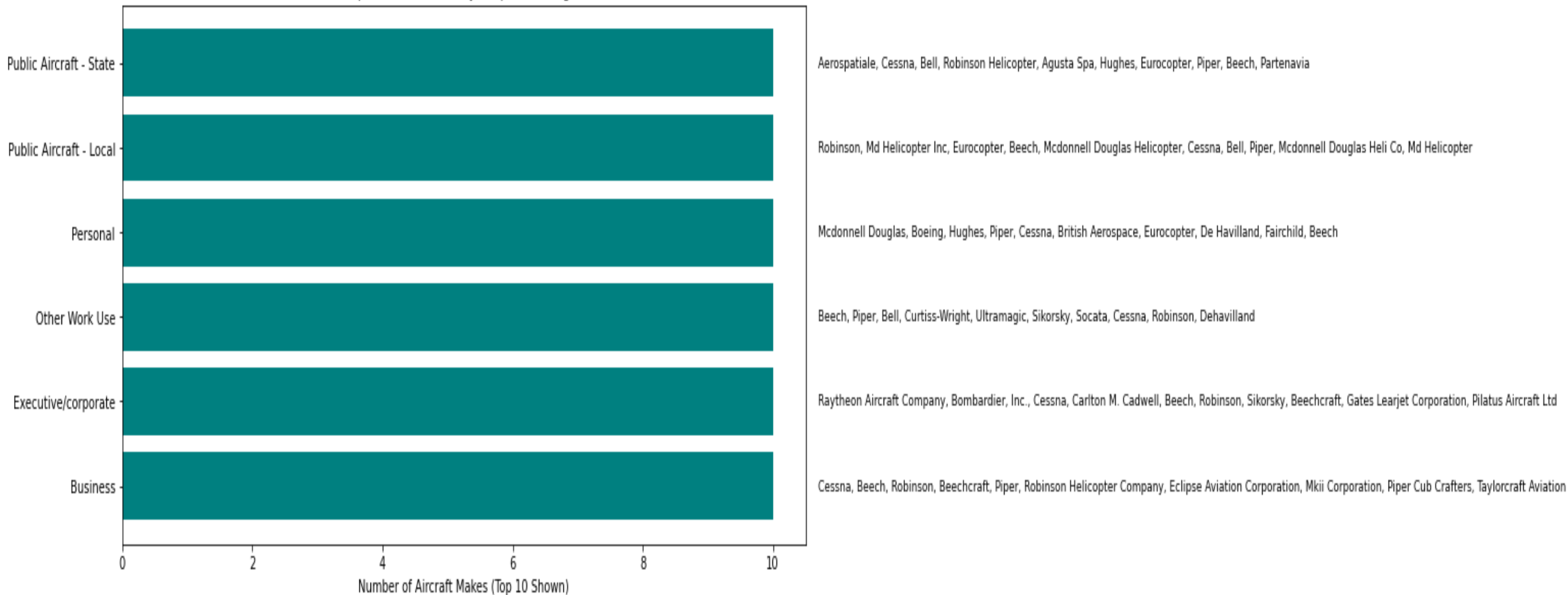
## RESULTS – OBJECTIVE 1: SUMMARY IN MEASURES OF CENTRAL TENDENCY OF CATEGORICAL VARIABLES

- Most crashes were non-fatal (2700) while 500 were fatal.
- Most injury severity to the aircraft was substantial (2449), destroyed (517) or minor (514).
- Most aircrafts were airplanes (2987), followed by helicopter (475) and balloon (11).
- Most aircraft make involved in accidents were: Boeing (834), Cessna (538), Piper (249) then Airbus (207). Many other aircrafts had less than 2 crashes.
- The most common engine type was reciprocating (1961), turbo fan (686), turbo prop (318), turbo shaft (298).
- The purpose for majority of the flights was unknown (2864) but of the known, they were for personal (211), aerial application (193) and business (61)

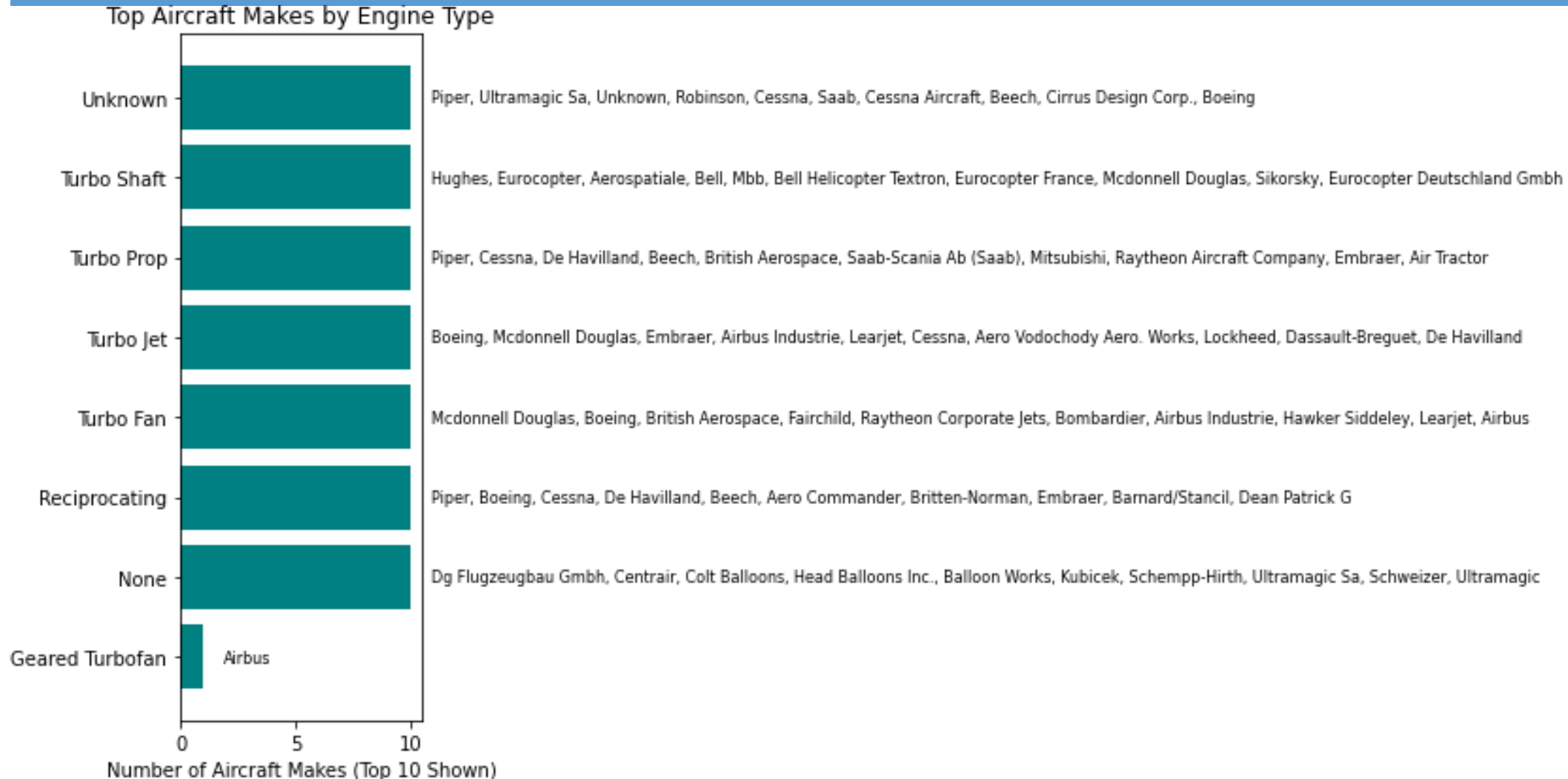


# RESULTS: OBJECTIVE 2.1: RELATION BETWEEN DIFFERENT AIRCRAFT MAKE AND PURPOSE OF FLIGHT

Top Aircraft Makes by Purpose of Flight



# RESULTS: OBJECTIVE 2.2: RELATION BETWEEN AIRCRAFT MAKE AND OPERATIONAL COST EFFECTIVENESS: ENGINE TYPE



# RESULTS: OBJECTIVE 2.3: RELATION BETWEEN AIRCRAFT MAKE AND SAFETY RISK OF THE AIRCRAFT (INJURY SEVERITY)

Aircraft Makes by Injury Severity

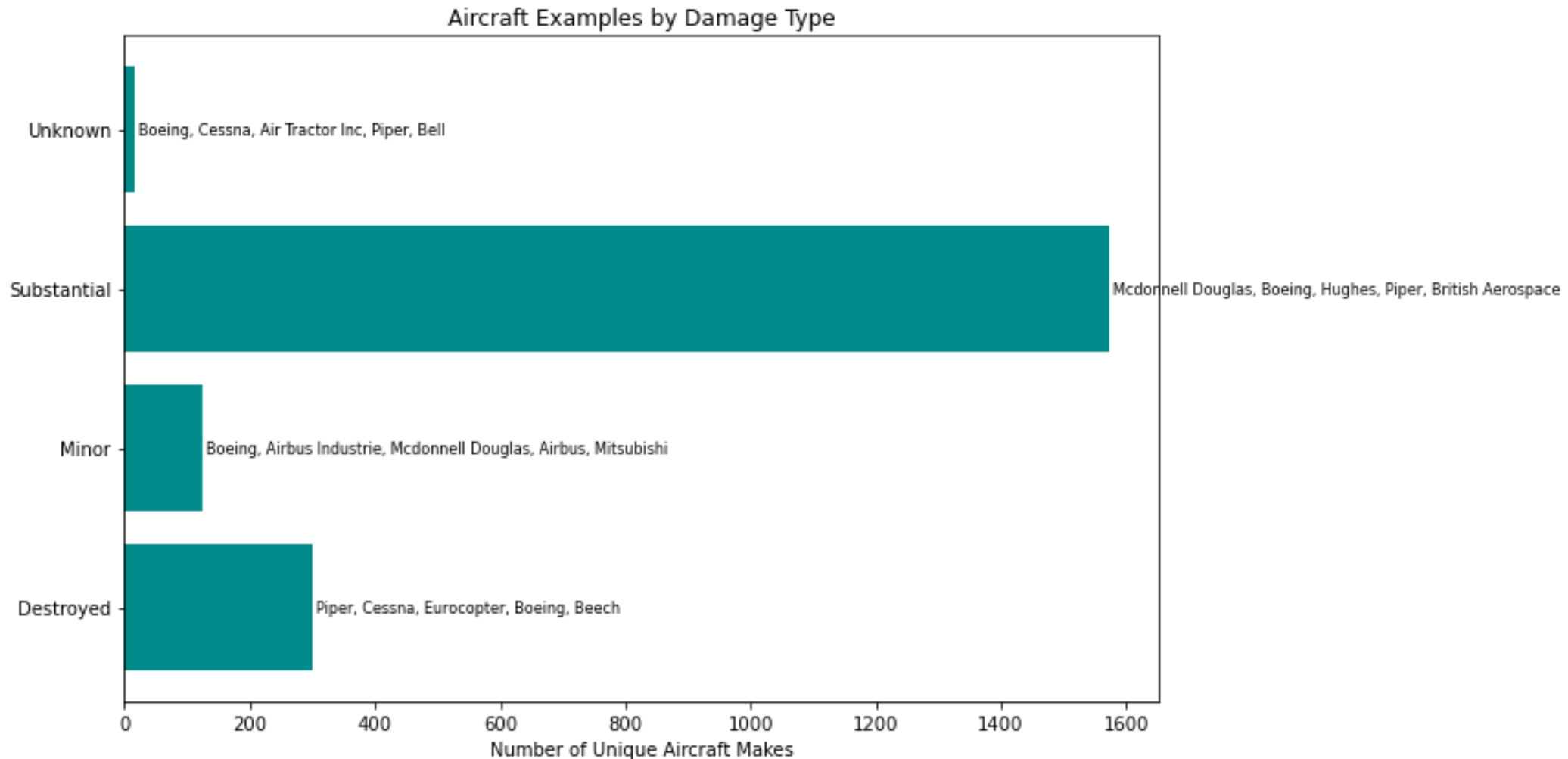


Number of Aircraft Makes (Top 10 shown)

## RESULTS: OBJECTIVE 2.3: RELATION BETWEEN AIRCRAFT MAKE AND SAFETY RISK OF THE AIRCRAFT (TOTAL FATAL INJURIES AND TOTAL SERIOUS INJURIES)

- More than 70% of the aircraft had less than 10 Total Fatal Injuries and 10 Total Serious Injuries.

## RESULTS: OBJECTIVE 2.4: RELATION BETWEEN AIRCRAFT MAKE AND MECHANICAL RELIABILITY AND ENVIRONMENTAL SUSCEPTIBILITY OF THE AIRCRAFT (AIRCRAFT DAMAGE)



## RELATION OF FINDINGS TO BUSINESS PROBLEM AND IMPACT

- From our dataset, the safest plane were purposefully used for personal flights.
  1. They had the least fatal injuries, serious injuries and non-fatal injury severity.
  2. If the company wishes to procure a plane:
    - For long range flights, the 'Gulf Stream American Corp'. is the best.
    - For medium range flights, the 'Evo I 3 Llc', 'Short Brothers' & 'Harland Ltd' are the best options.
    - For short range flights, the 'T Bird', 'Rolladen-Schneider Ohg', 'Univar', 'Krusmark David Homer', 'Starduster li', 'Mueller Michael Walter', 'Schleicher Alexander', 'Boeing 777-306Er', 'Consolidated Vultee', 'Dji', 'Honda' are the best options.

## CONCLUSION AND FUTURE STEPS

- In this notebook, we were able to suggest the most operational, safe and mechanically reliable plane for procurement for our company.
- Despite having analysed this accident dataset to suggest which aircrafts Makes had the least air crashes while still being most operational, safe and mechanically sound, we propose to use a dataset of commonly used aircrafts in the future for better prediction.

Thank you

