Assessing Low-Risk Aircrafts for New Business Venture

Phase 1 Project

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Project Objectives

The project aims:

- To evaluate the potential risks associated with aircrafts in order to guide the company's decision in expansion to aviation industry.

- To identify the lowest-risk aircraft for commercial and private operations by analyzing historical data on aircraft accidents.

Data Overview

Data Source: NTSB Aircraft Accident Database
Time Frame: [Specify years, 2005 -2020]
Key Metrics Analyzed:
I.   Number of accidents
II.   Types of injuries
III. Aircraft make and model

Methodology

- Data cleaning: I identified and eliminated duplicate records to ensure that each entry is unique

- Dealing with missing values; I Removed rows or columns with missing values above 70% and then Imputed the values based on statistical methods (mean, median, mode).

- Data inconsistencies; I ensured that data formats were consistent, like date formats and

capitalization in categorical variables by standardizing the string entries. Conversion of date strings to date time.

- Data types validation; Confirming that each column have the correct data type.

- Filtering the data; I removed irrelevant data that doesn't contribute to the analysis, which can help improve model performance. Only considered the data from 2005 due to technological advancement

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Data Analysis

Performed an in-depth analysis by;

- Grouping the data by aircraft category; this allowed for a deeper dive into specific category that the business is interested in, the airplane.

- Considered the 'Make' column to identify the specific aircraft under the aircraft category.
- Grouping the data by the make of the aircraft and then compared the make to the injuries.

- Note: the context of the analysis was to recommend the least risky aircraft, implied least number of accidents, and injuries. Reconsidered that the safest aircraft had to have the highest number of uninjured.

- The trickle down criteria to the least risky aircraft was to select only those aircrafts that had;
i. Lowest number of accidents and
ii. Lowest value of injuries

Key Findings

From the line graph, it is evident that over the time the airplane category have had more accidents than the other categories; balloon, helicopter and glider. The helicopter category have more accidents than the balloon.

In the recent years, the trend of accidents have increased for the airplanes and is reducing for the balloon and helicopter category

For a more precise scope in analysis we check for each make of aircrafts in the airplane category, then plot against the number of injuries.

Trend of Aircraft Accidents by Category (2005 - Present)
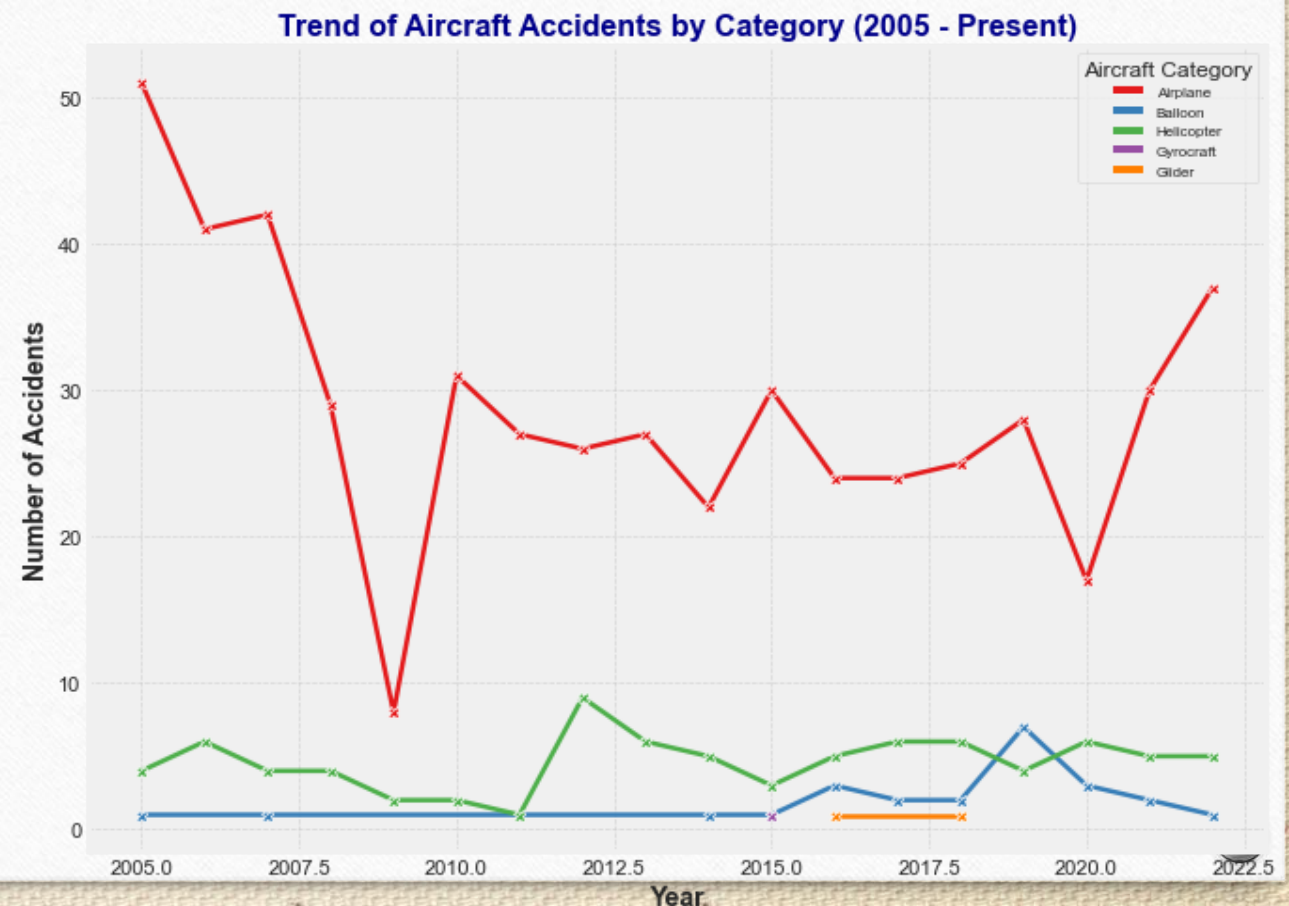
Graph for total serious injuries
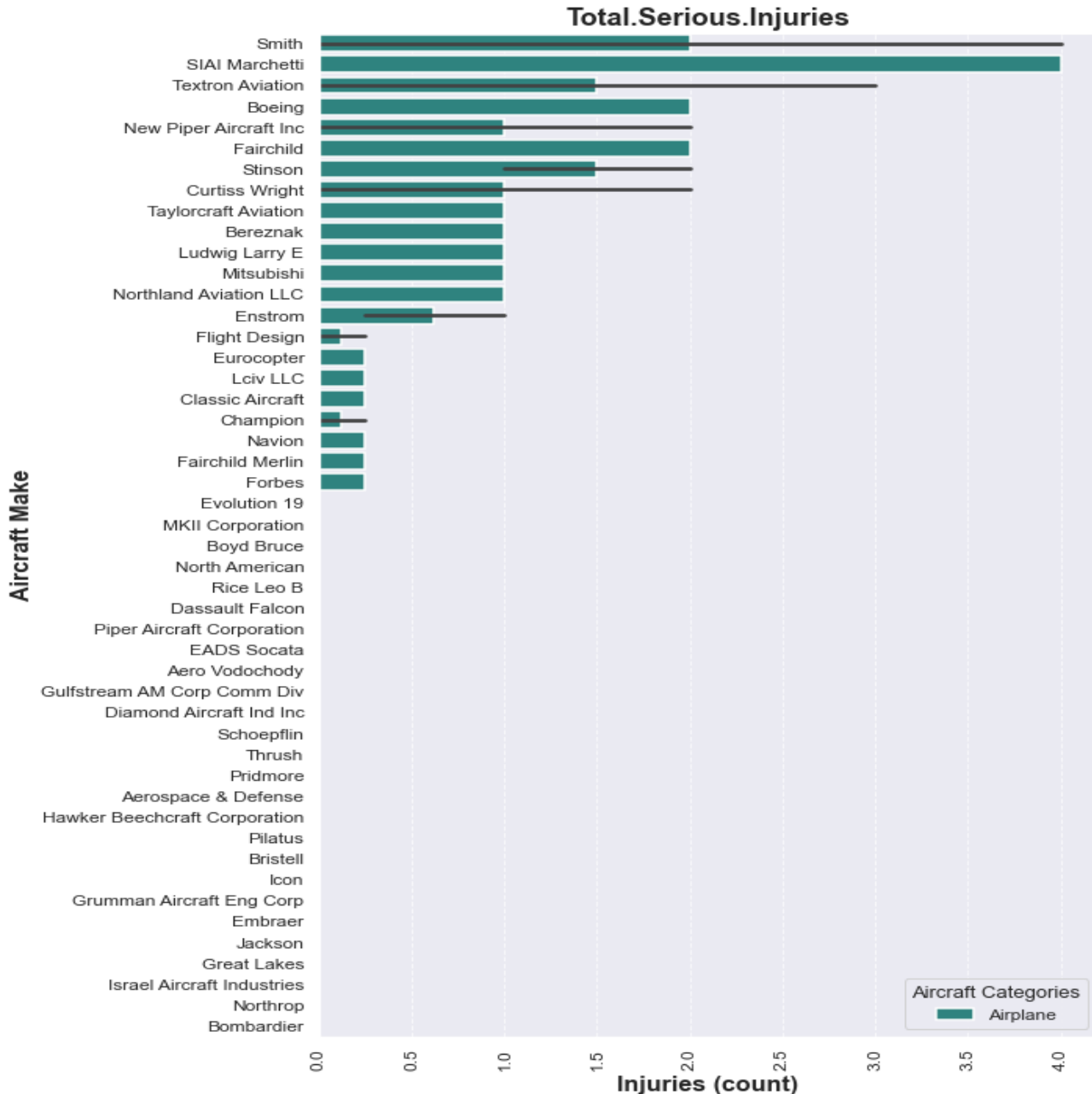
Graphical interpretations:

For this plot, aircrafts that have the least number of injuries are considered to be safe and least risky. Now our selection list will comprise only those aircrafts that the least number of injuries.

Below are the other two graphs for total fatal injuries and total minor injuries and total uninjured.

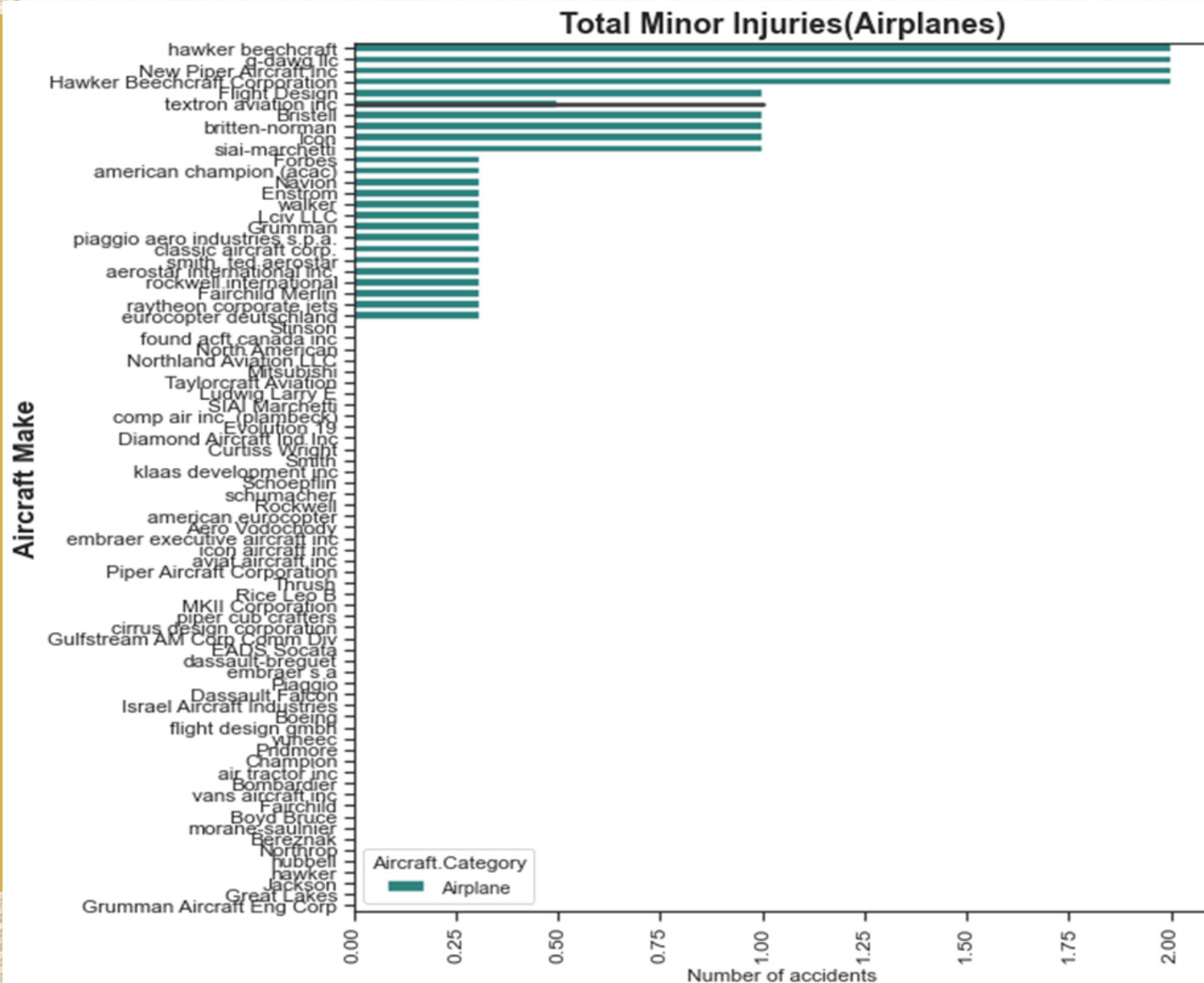# Graph of Total Fatal Injury counts

Total Fatal Injuries; 2005 - 2022
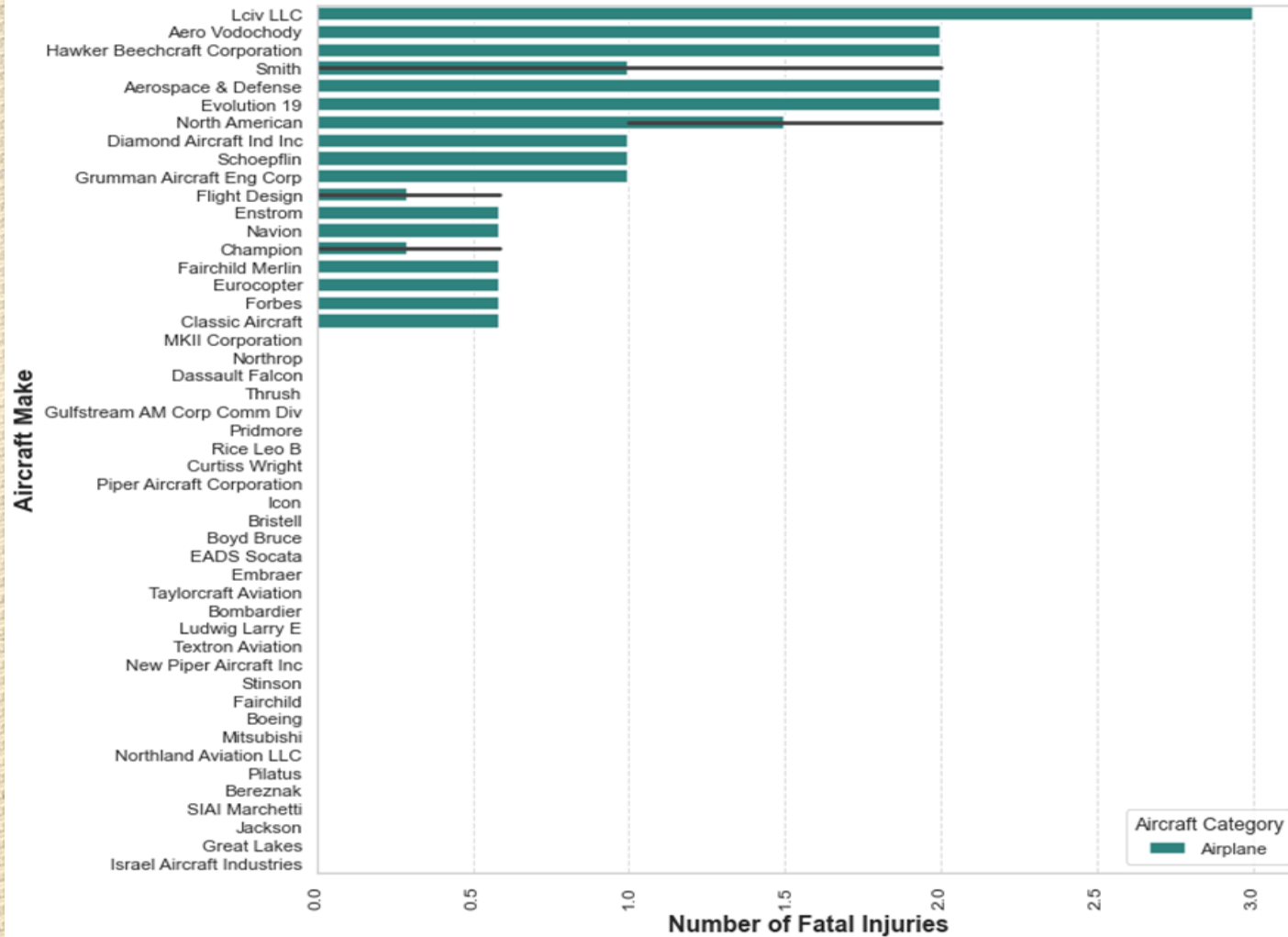
For this graph, aircrafts with the least count of fatal injuries are considered.

Graph of Total Minor Injury counts


Total Minor Injuries(Airplanes)

Consider those aircrafts with least number of minor injuries. For my case, those with zero counts.

Graphs for total uninjured

In the total uninjured bar graph, the least risky aircraft is one with the highest Total uninjured.

The best recommendation of aircraft in the airplane category will be the one with relatively high total uninjured and be with the least number of total fatalities, total injuries and least minor injuries.

Total Uninjured (Airplanes)
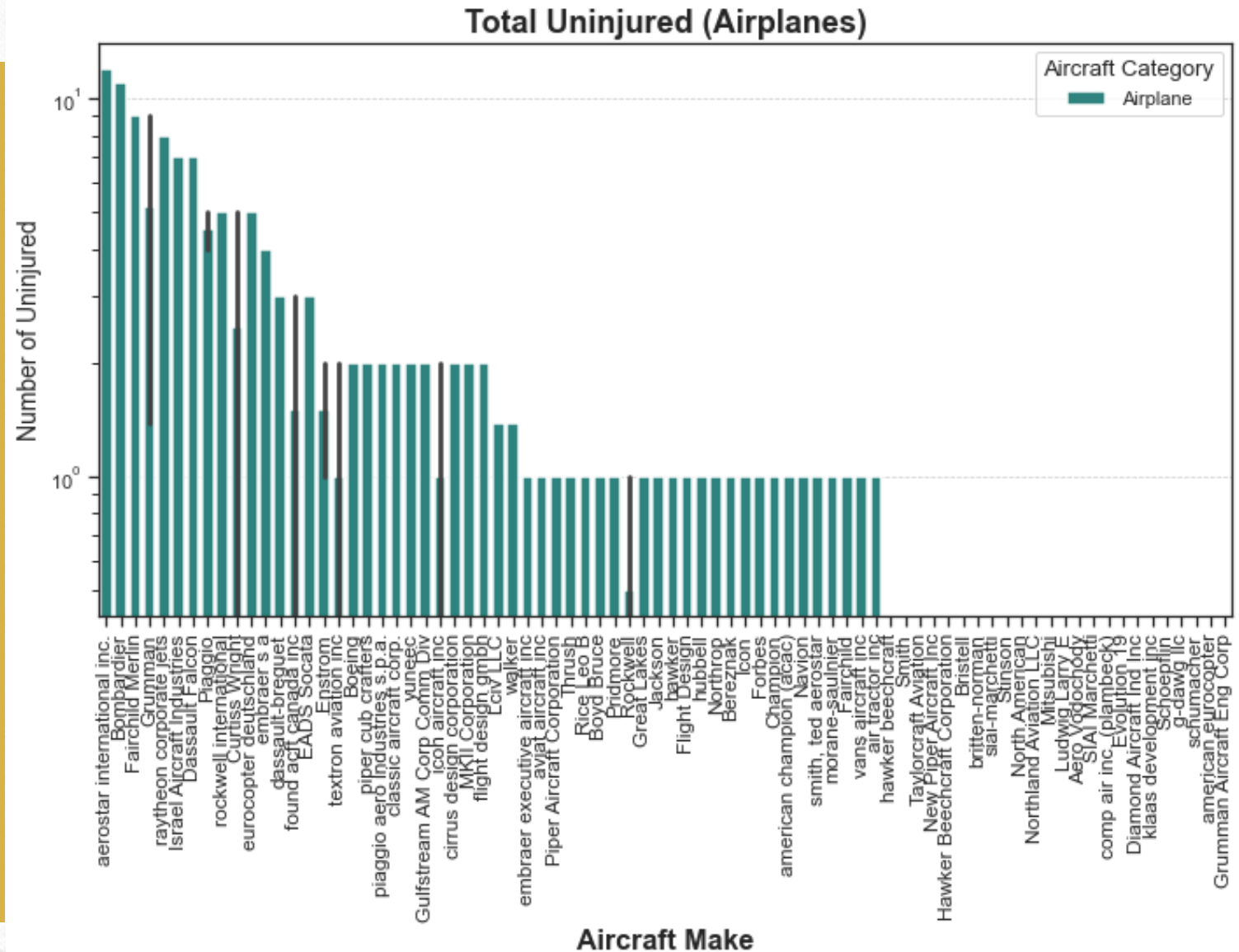
Recommendation for Safest Aircraft

By considering the highest five, from the total uninjured plot, and checking them through the other plots,

1. Investment focus: Consider the models for aircrafts with best safety records; They include; Bombadier

Dassault Falcon

Israel Aircraft Industries

Embraer

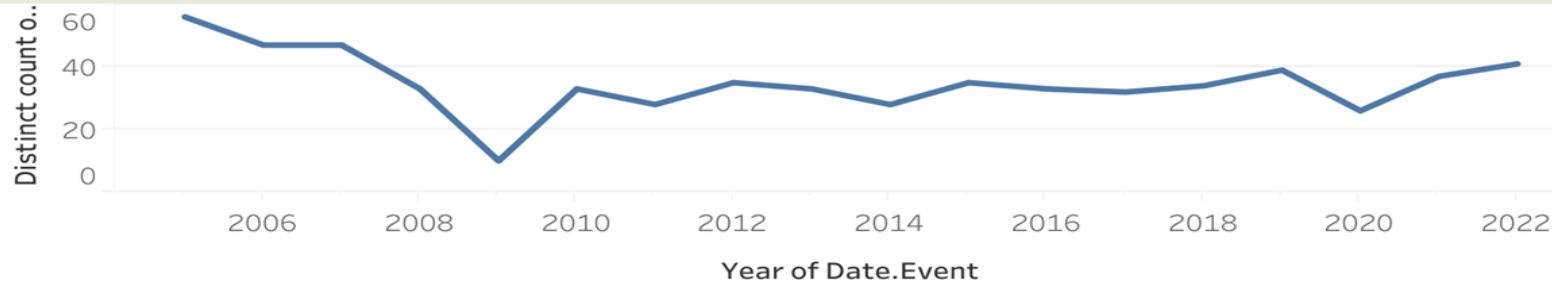2.Training program: Ensure a comprehensive training for pilots.

Next step: Consideration for the above aircrafts should be in the scope of their models, number of engines, fuel efficiency and the required rate of maintenance or the overall cost of maintenance.

Tableau Visualizations
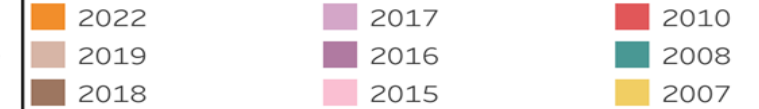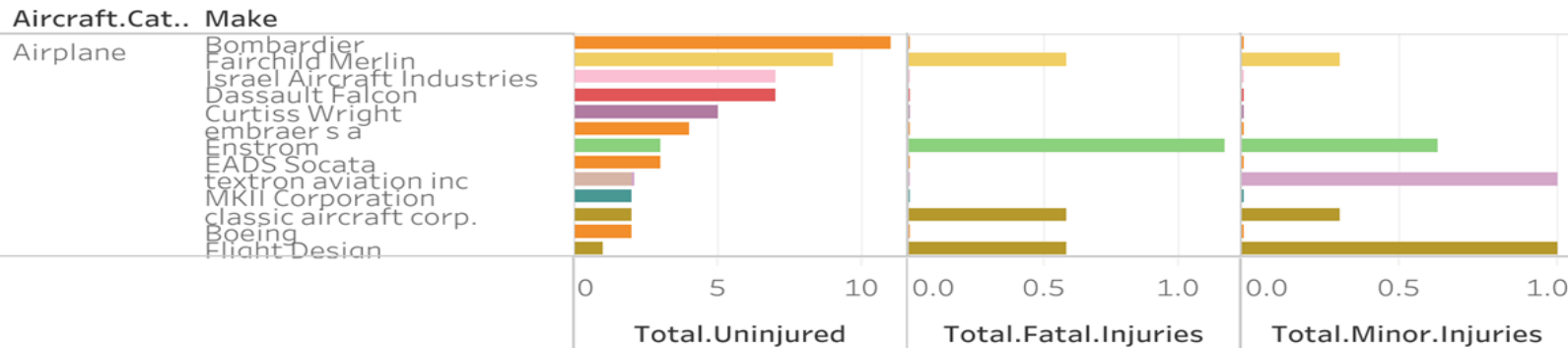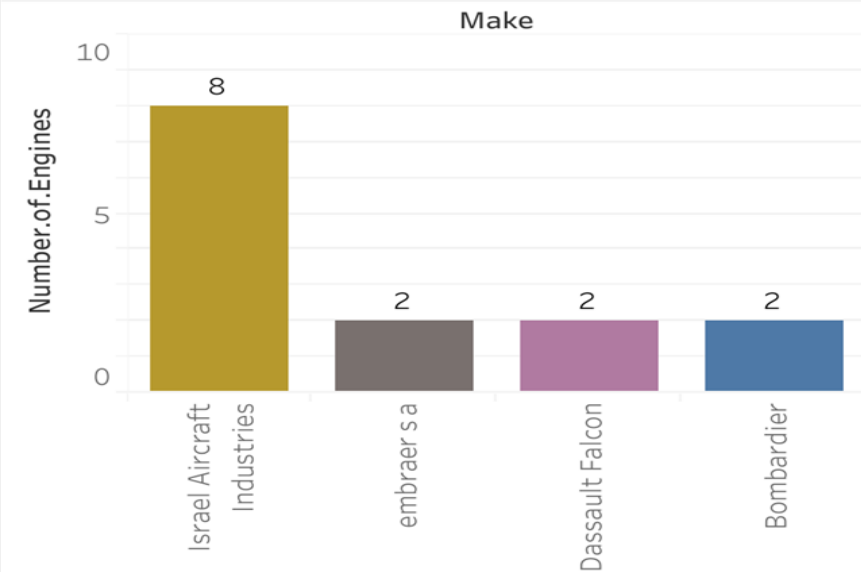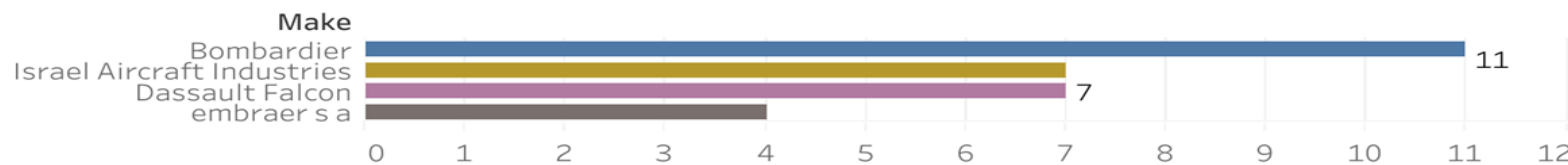
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