

# AIRPLANE RISK ASSESSMENT

Flatiron DS Flex Phase I Project

Abigail Campbell

# AIRPLANE RISK ASSESSMENT

*We are considering expanding into aircraft transportation, but what are the risks involved?*

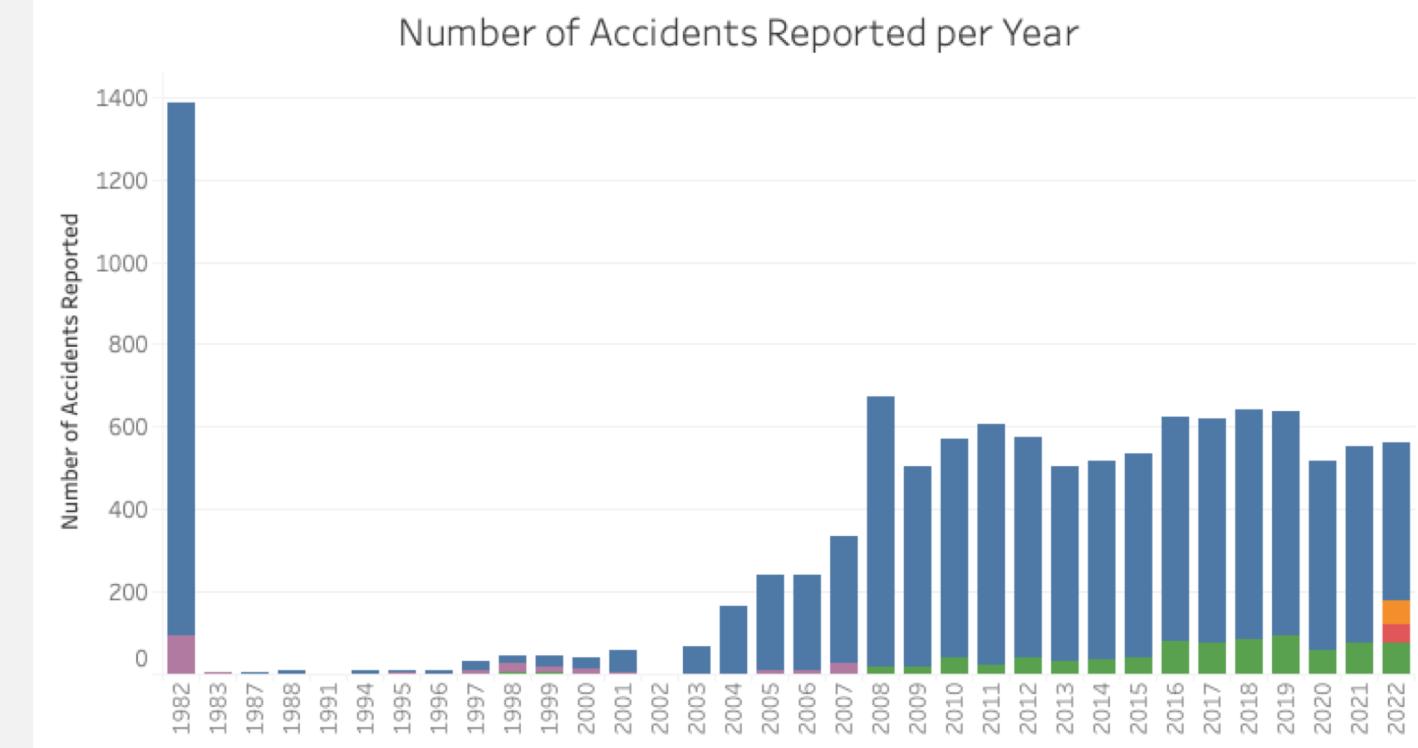
- Which airplane applications are the most dangerous? **Instructional, Aerial**
- Which airplane manufactures have the best safety record? **Boeing, Airbus**
- What size of airplane is the most reliable? **2+ engines**

# DATA SET



## National Transportation Safety Board Accident Data

- Reported aircraft accidents
- Within the US and international waters
- Filtered to only include relevant data
  - 27,580 relevant reports
  - 1982 – 2022



# WHAT INFORMATION IS IN THIS DATA SET?

## Airplane information

- Make
- Model
- Engine type
- Number of engines

## Flight information

- Airport name
- Phase of flight
- Purpose of Flight

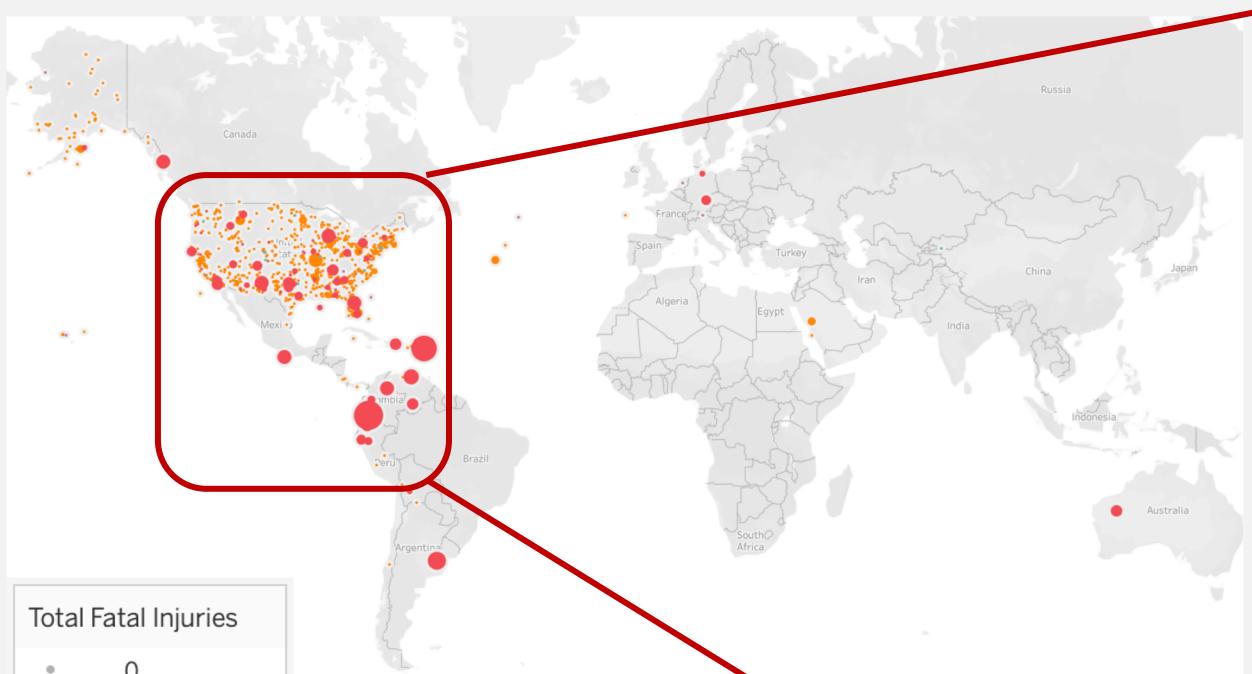
## Location information

- Accident location
  - Latitude
  - Longitude
- Weather conditions

## Injury information

- Fatalities
- Severe injuries
- Minor injuries
- No injuries

# WHERE ARE THESE ACCIDENTS OCCURRING?



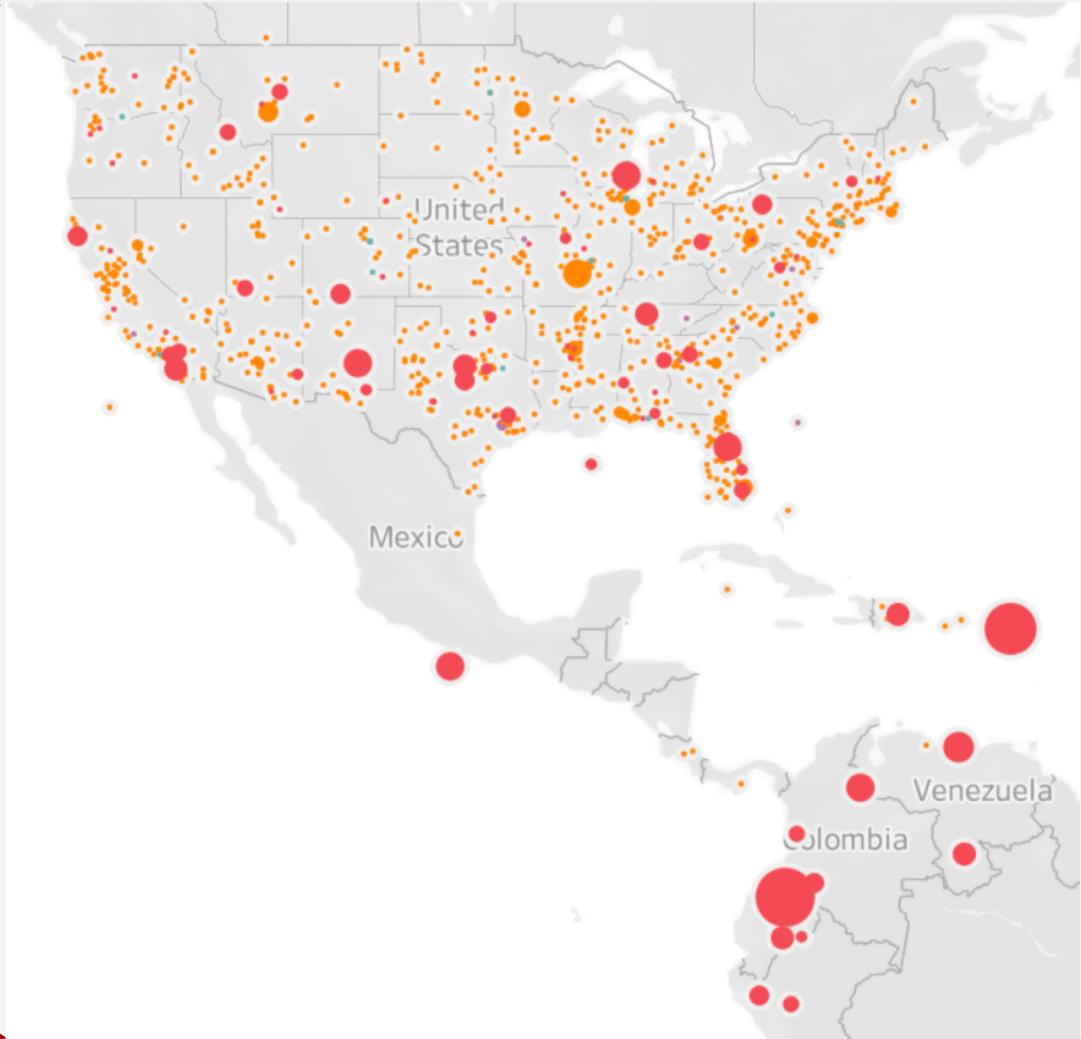
Total Fatal Injuries

- 0
- 10
- 20
- 30
- ≥ 40

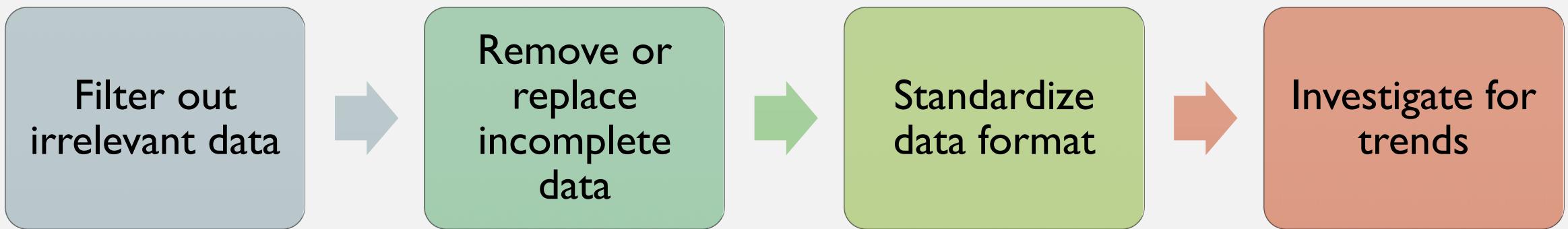
Aircraft Damage

- Destroyed
- Minor
- Substantial
- Unknown

Most Accident Reports  
occurred within the Americas



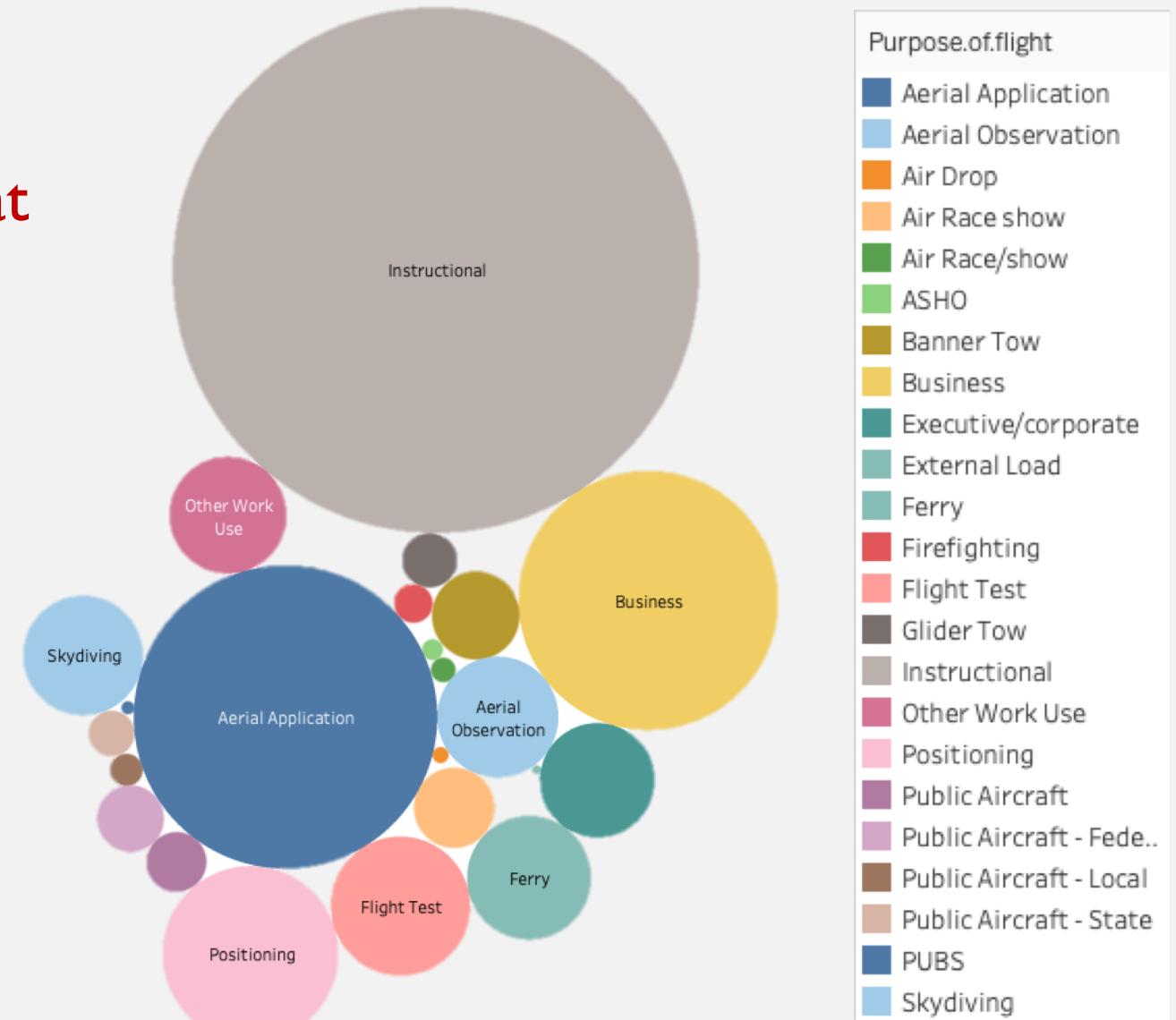
# HOW DO WE ENSURE THIS DATA IS RELEVANT AND ACCURATE?



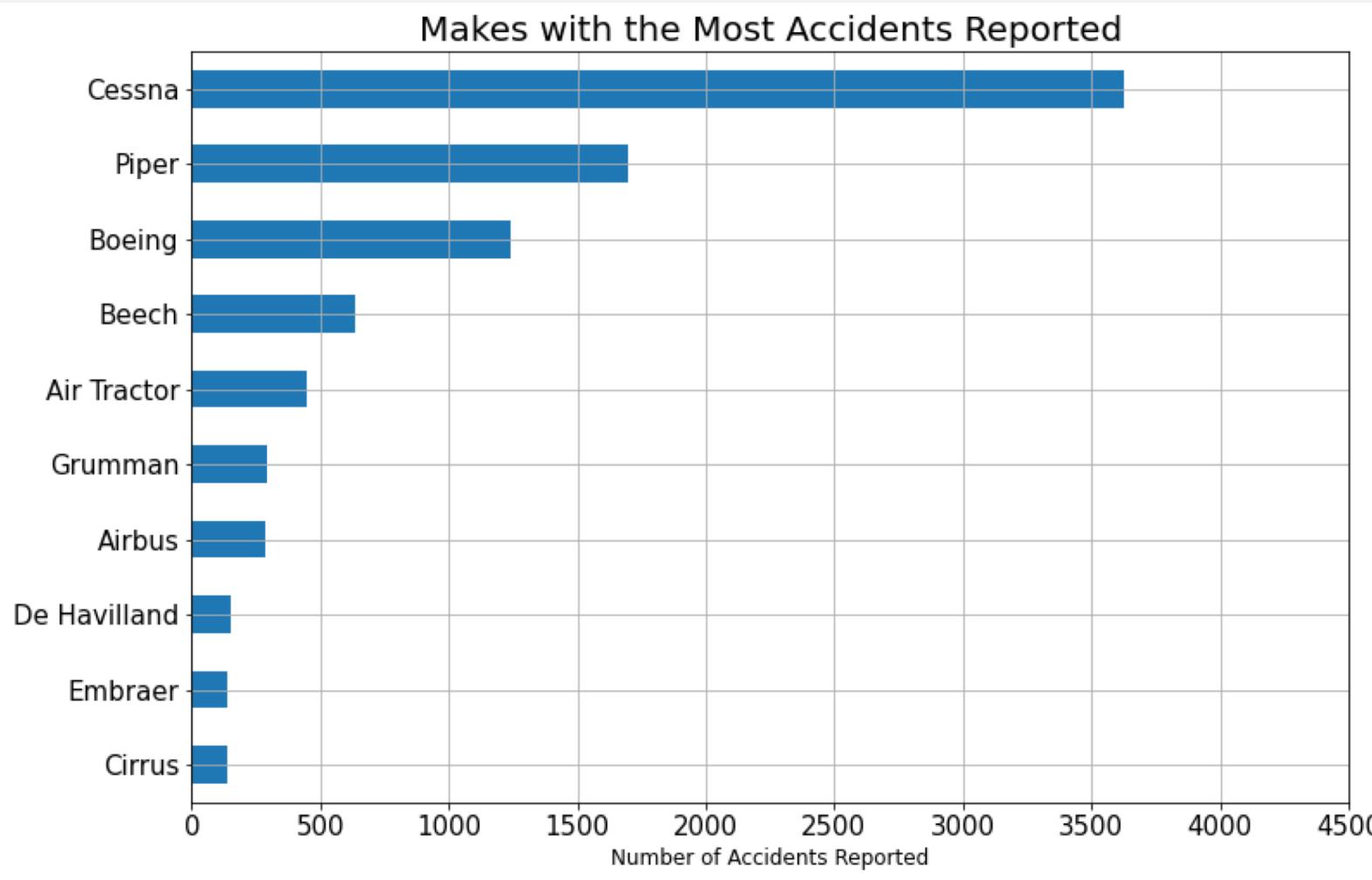
# WHAT WERE THE AIRPLANES DOING?

Most common flight purposes that resulted in accidents:

1. Flight Instruction
2. Aerial Application (Crop Dusting)
3. Business



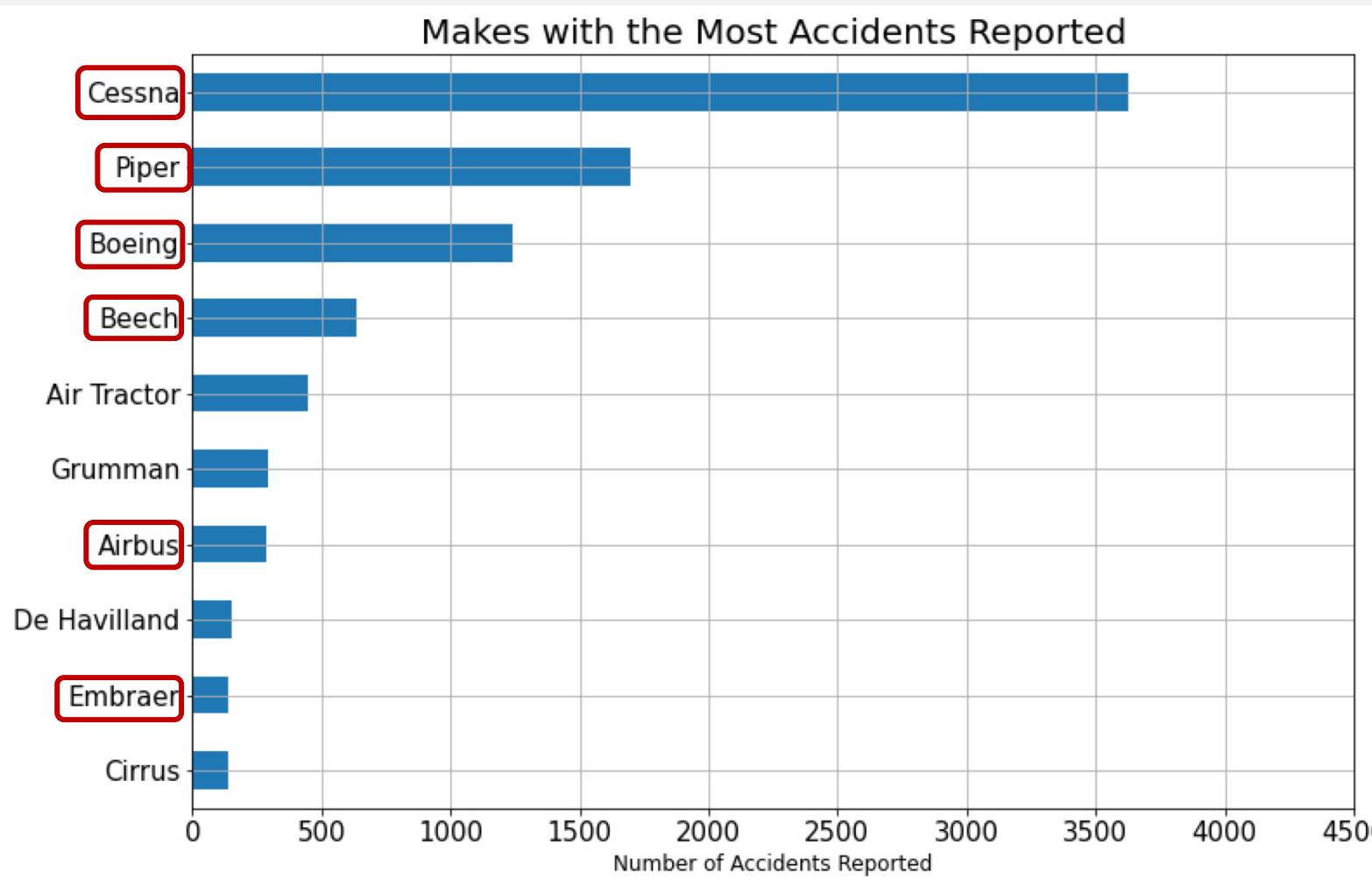
# WHICH AIRPLANE MANUFACTURERS CRASHED THE MOST?



Top 3 Makes:

1. Cessna
2. Piper
3. Boeing

# WHICH AIRPLANE MANUFACTURERS CRASHED THE MOST?



## Top 5 Commercial Makes:

1. **Boeing (USA)**
2. **Airbus (Netherlands)**
3. **Embraer (Brazil)**
4. **Bombardier (Canada)**
5. **Comac (China)**

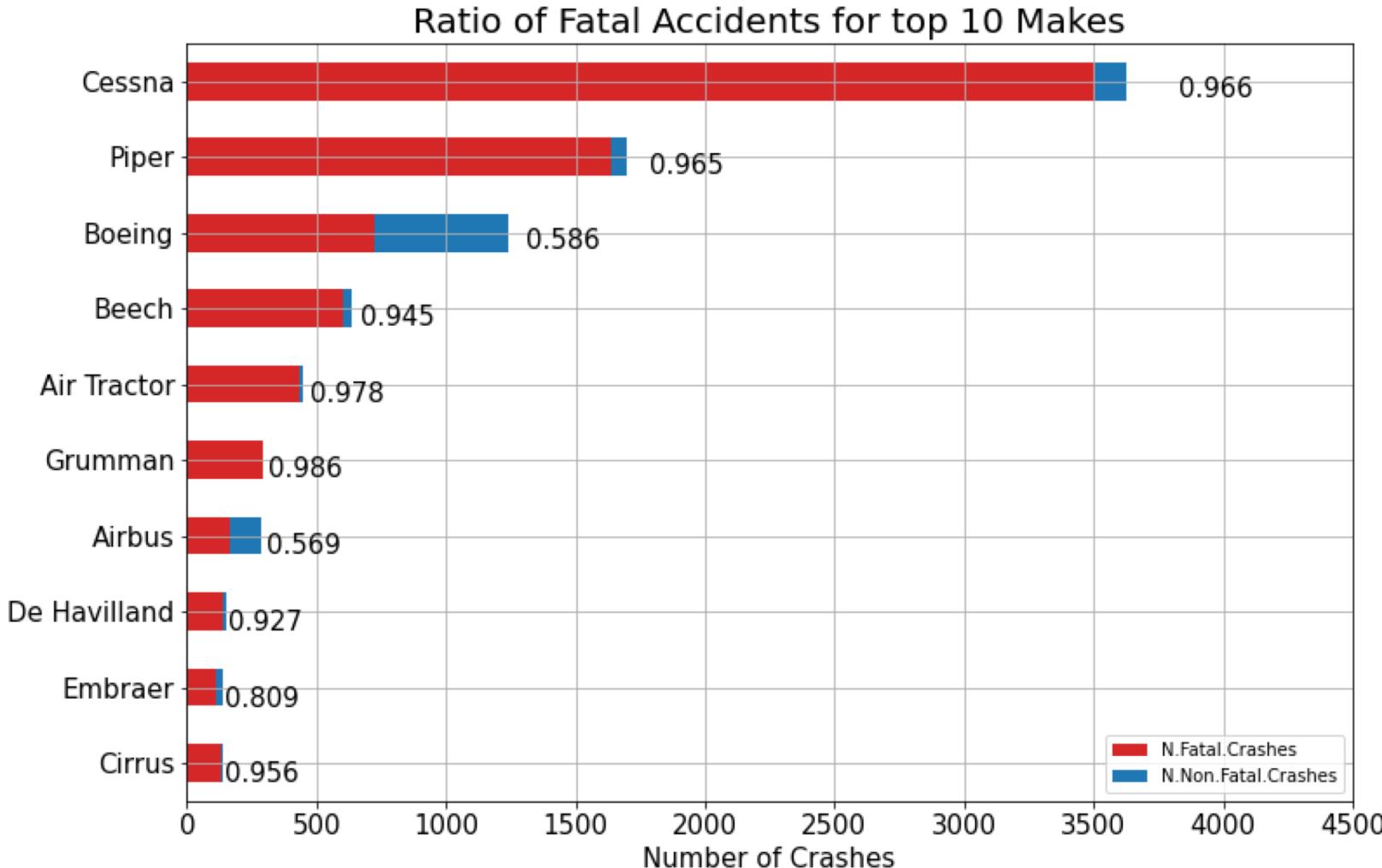
## Top 5 Private Makes:

1. **Airbus Corporate Jets (France)**
2. **Boeing Business Jets (USA)**
3. **Bombardier Business Aircraft (Canada)**
4. **Beechcraft (USA)**
5. **Cessna (USA)**

## General Aviation “Big 3”:

1. **Cessna**
2. **Beechcraft**
3. **Piper**

# HOW MANY OF THESE ACCIDENTS RESULTED IN FATALITIES?

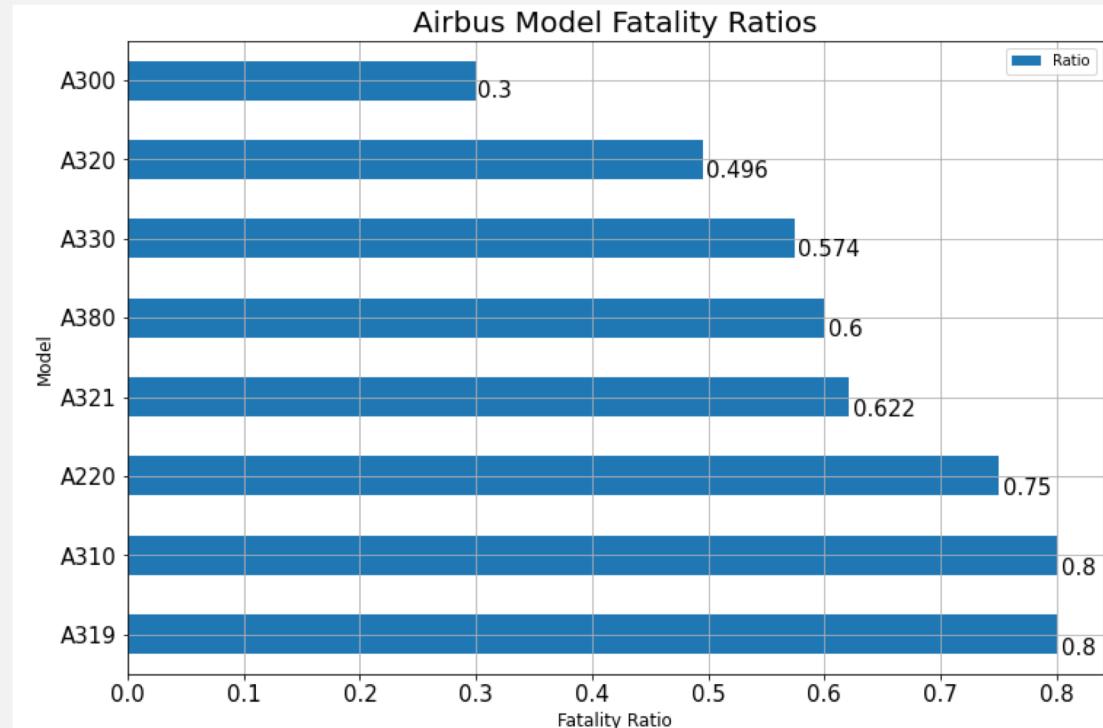
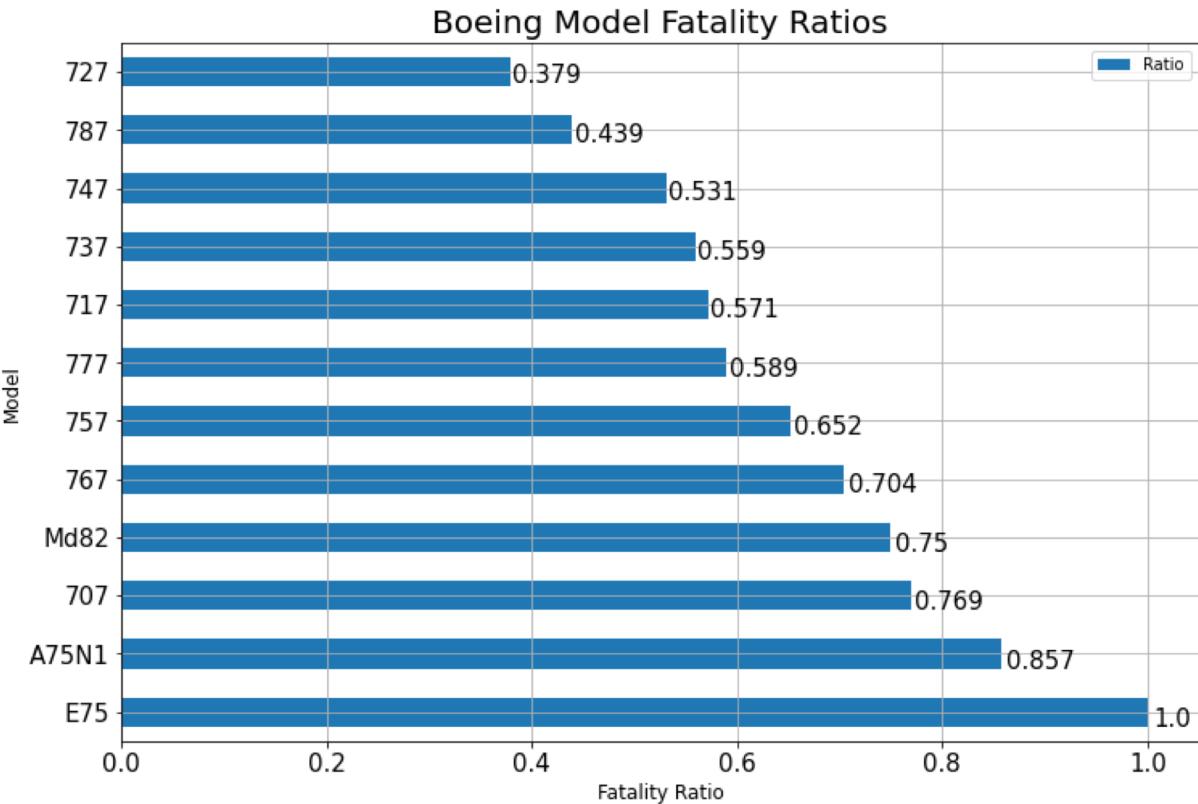


Fatality ratio =  $\frac{\text{# fatal crashes}}{\text{total crashes}}$

Most Makes:  
fatality ratios above 0.9  
(>90% fatal)

Boeing and Airbus:  
fatality ratios below 0.6  
(<60% fatal)

# WHICH BOEING AND AIRBUS MODELS HAVE THE LOWEST FATALITY RATIOS?

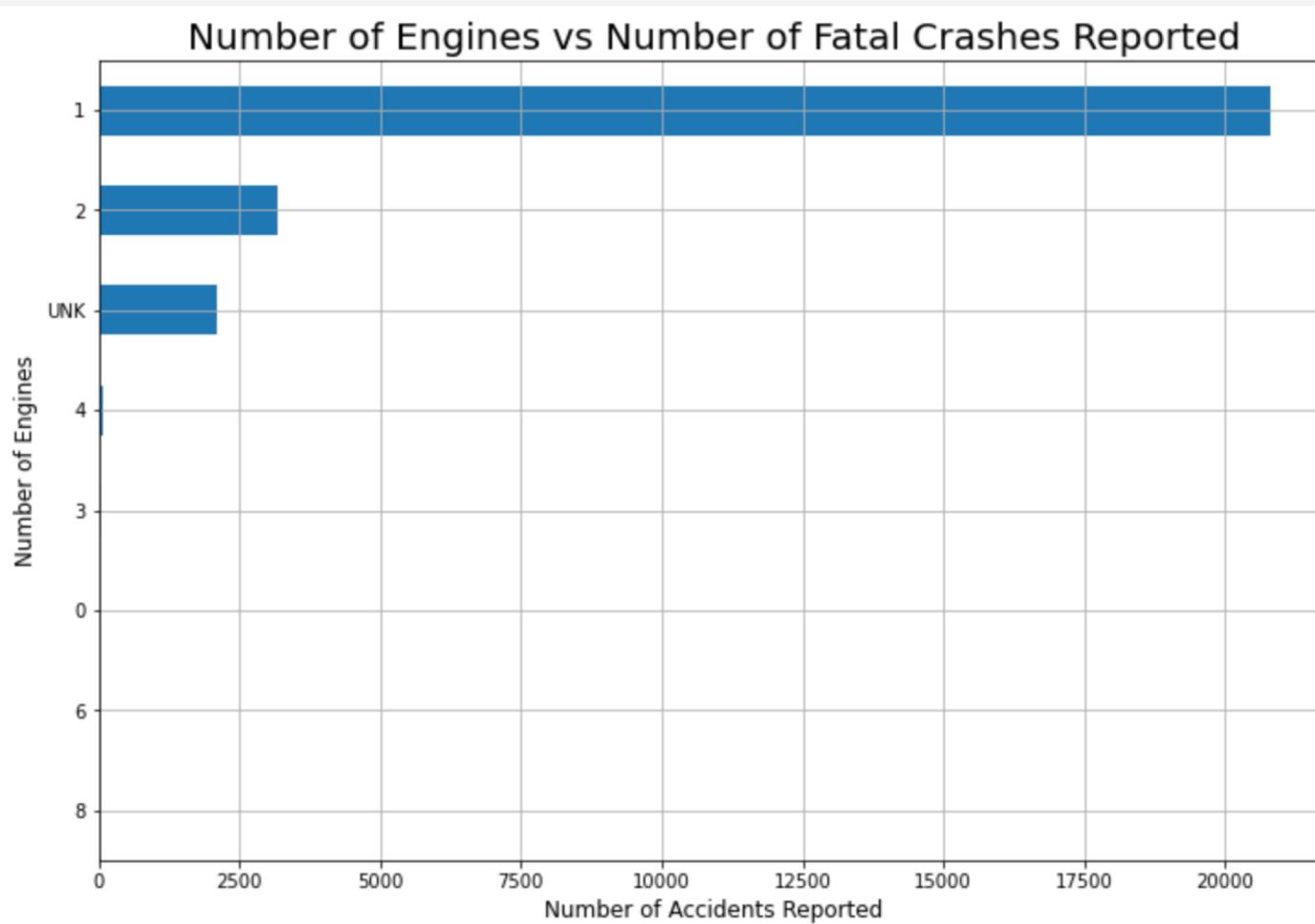


Each Make has 2 models with fatality ratios below 0.5:

- Boeing: 727, 787
- Airbus: A300, A320

# NUMBER OF ENGINES THAT PRODUCE THE MOST FATALITIES

Shorthand for Airplane size



Small, single engine planes  
crashes produce the most  
fatalities

## CONCLUSIONS

1. *Avoid Instructional and Aerial Applications*
2. *Boeing and Airbus have the best safety record*
  - *Best models: Boeing 727 & 787, Airbus A300 & A320*
3. *Avoid single engine planes*



# WHAT NOW?

## Determine Airplane Requirements

- What cargo will we be transporting?
- What size of plane is necessary?
- Are specialty planes required?

## Individual Manufacturer Due Diligence

- Which manufacturer has the most planes in the sky?
- Which manufacturer has the best crash / total flight ratio?

# CONTACT INFORMATION

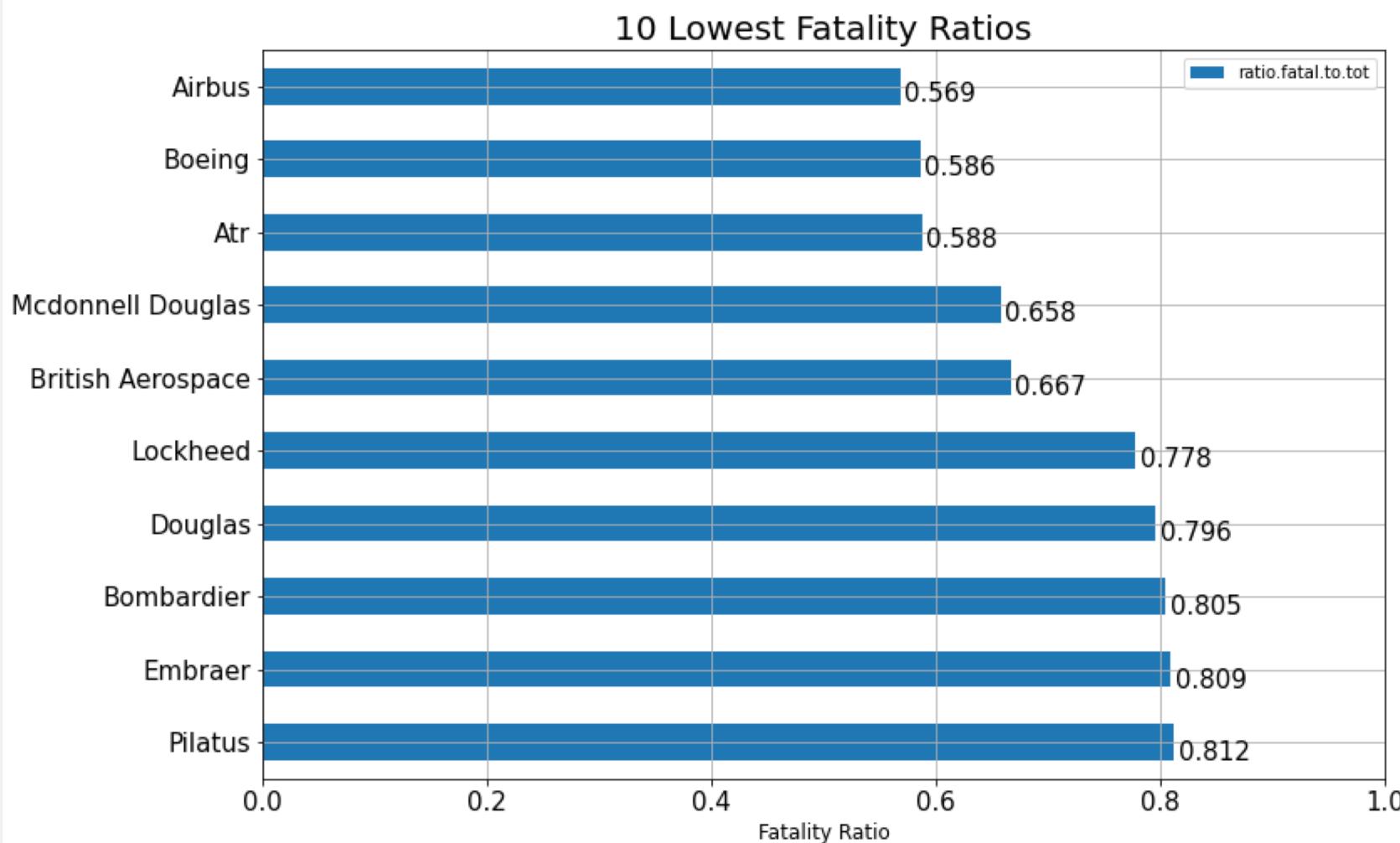
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# APPENDIX

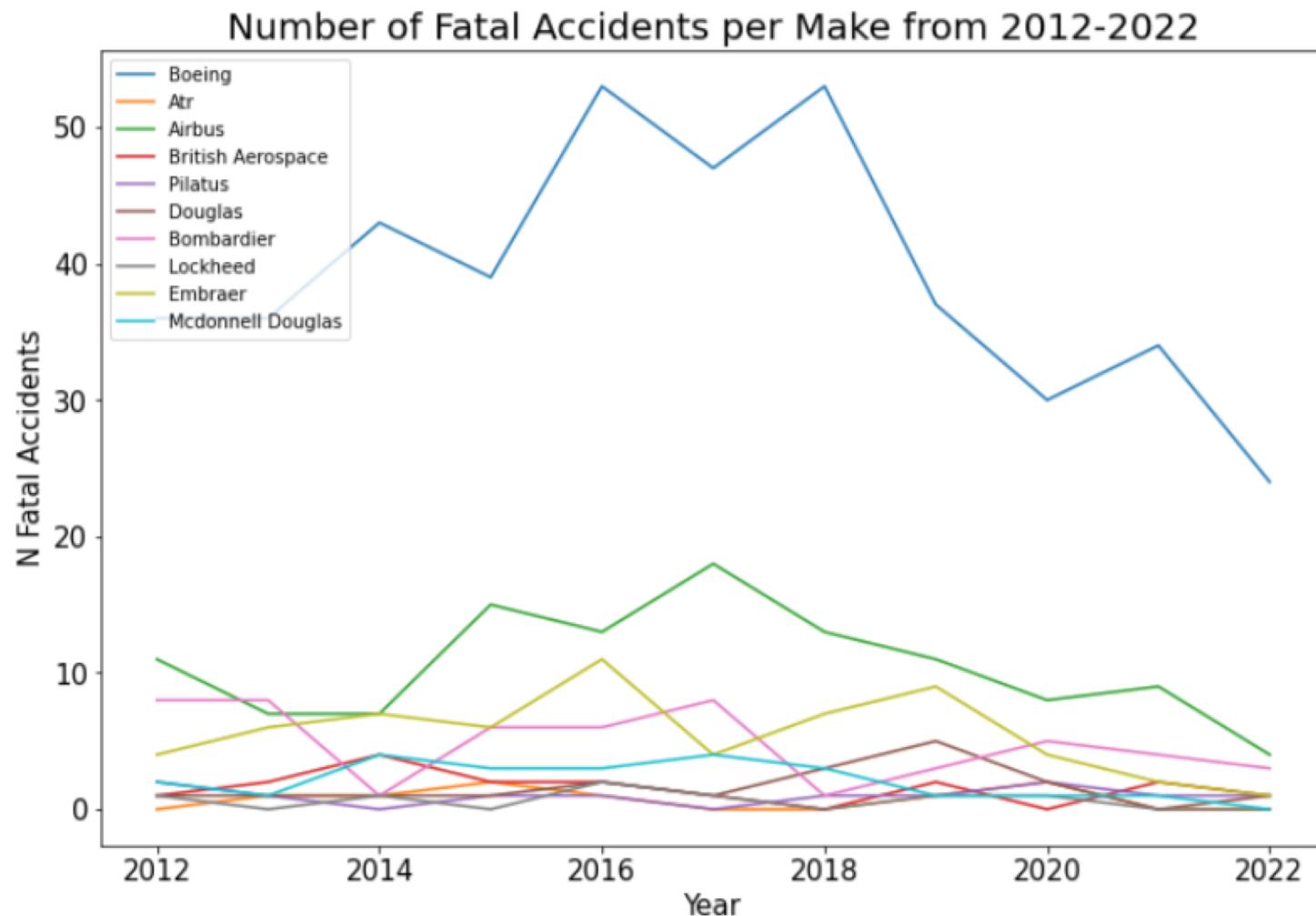
# WHICH AIRPLANE MANUFACTURES HAVE THE LOWEST FATALITY RATE?



## Boeing and Airbus:

- Large, reputable manufactures
- Lowest fatality ratios

# WHICH MAKES HAVE MADE THE MOST SAFETY IMPROVEMENTS?



Improvements over the last 10 years

Looking at the 10 makes with the lowest fatality ratio

**Overall Trend:** Not much improvement

**Boeing:** Significant reduction in fatalities since 2018

**Airbus:** Reduction in fatalities since 2017