



AVIATION RISK ANALYSIS

Which are the safest planes on the market?

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DATA SCIENTISTS



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AGENDA

**BUSINESS
UNDERSTANDING**

01

04

DATA ANALYSIS

DATA SOURCE

02

05

RESULTS

**DATA
UNDERSTANDING**

03

06

FURTHER STEPS



BOEING

Boeing 757251



**0% FATALITY
RATING**



CESSNA

Cessna 152



Best in
Commercial





CESSNA

Cessna 172 - N



Best in
Private





01

BUSINESS UNDERSTANDING





IDEAL AEROPLANE FEATURES

SAFETY IS OUR PRIORITY

- Low fatalities
- Low injuries

MARKET MATTERS

- Examined Makes that appeared more frequently
- Allowed for a larger sample size



02

DATA SOURCE



WE ARE LOOKING AT ACCIDENTS

WE DO NOT HAVE DATA ON THE TOTAL POPULATION

- National Transportation Safety Board
- 2002 - 2021
- We do not know total planes flown during the time period.

This means we are examining **how bad accidents are when they occur**, not how likely an individual plane is to have an accident when flown.

Data Source: <https://www.kaggle.com/datasets/khsamaha/aviation-accident-database-synopses?resource=download>



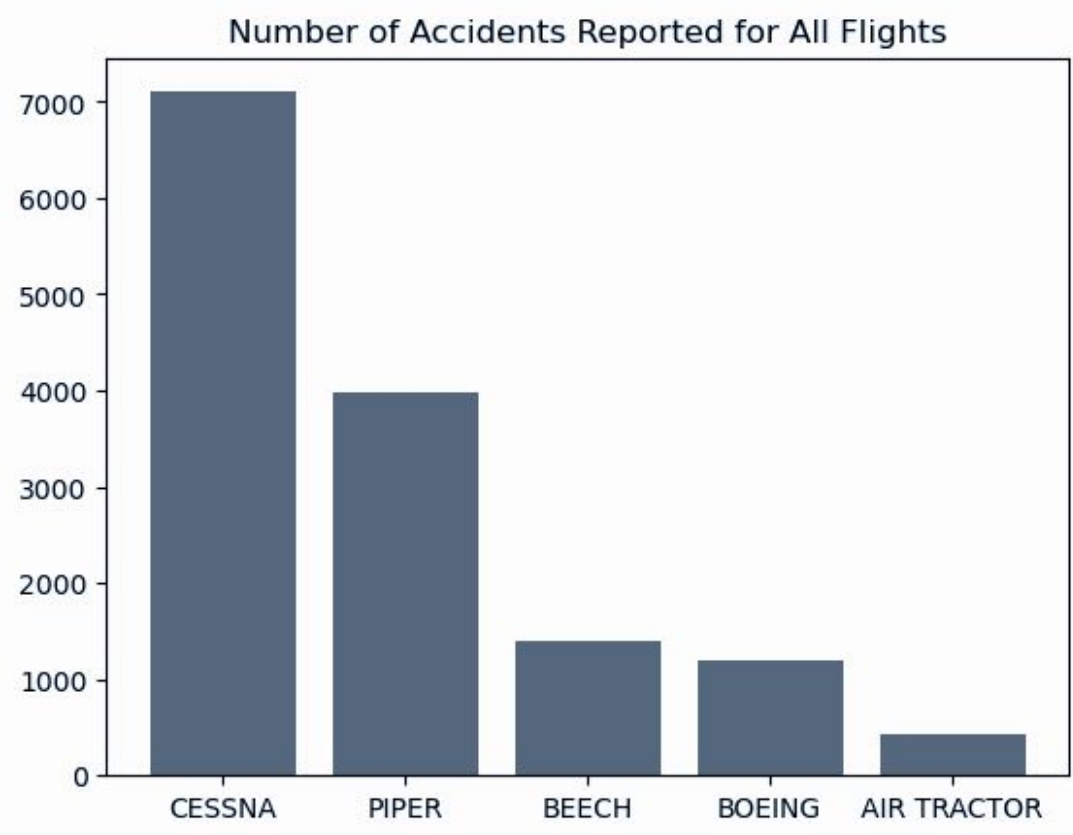
03

DATA UNDERSTANDING



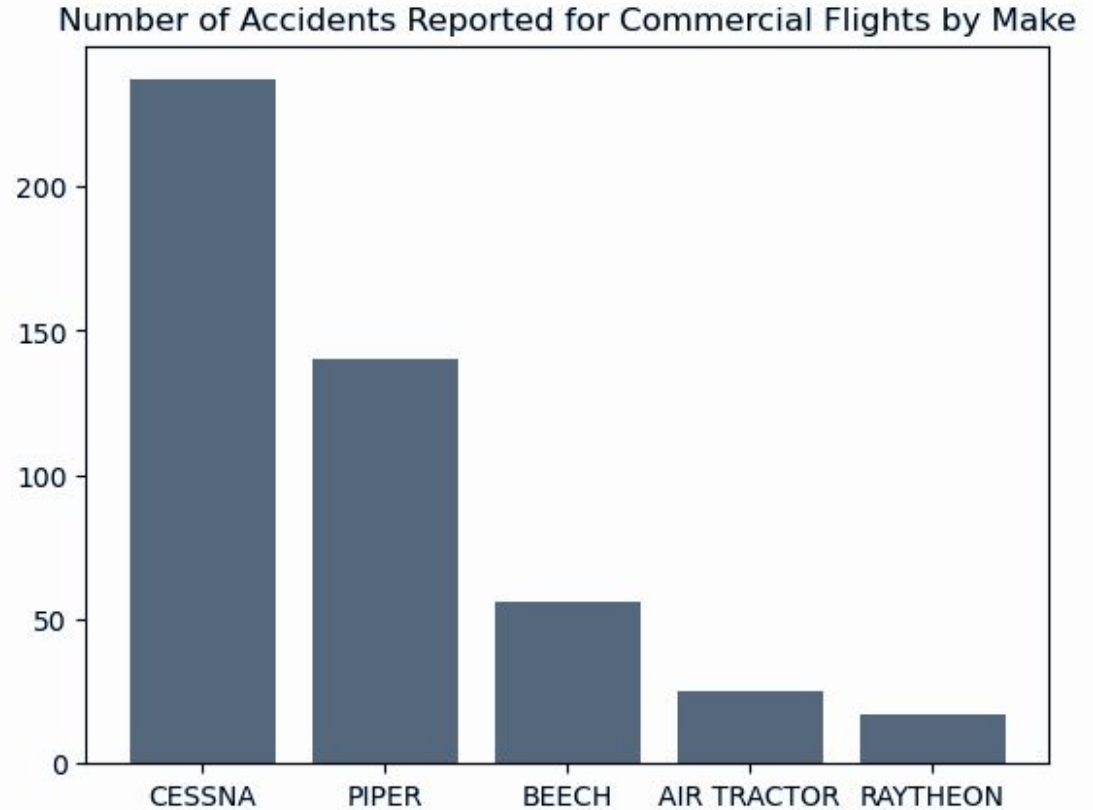
TOP MAKES

We examined the **overall number of planes** involved in accidents



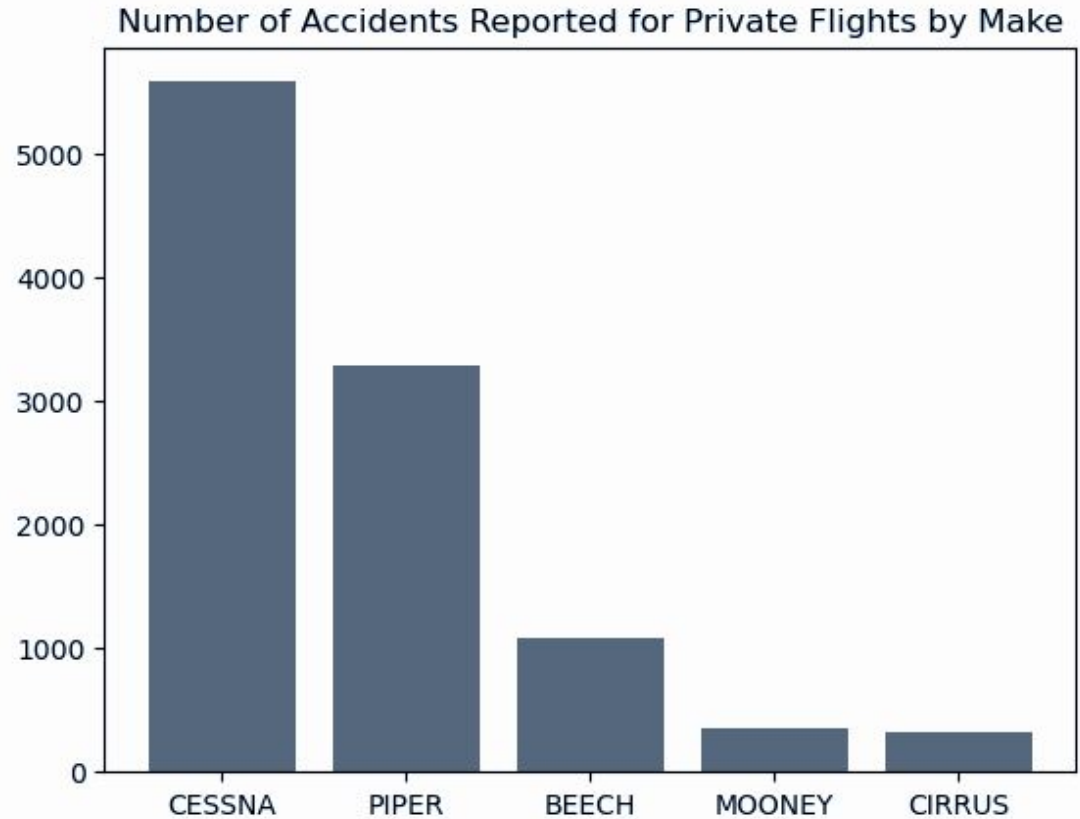
COMMERCIAL

...then examined the top
brands being used for
Commercial Purposes.



PRIVATE

...and those being used for
Private Enterprises.





04

DATA ANALYSIS



DETERMINING BRAND SAFETY

We used to following formulas to determine the ratio of injuries and casualties per accident:

$$\text{Probability of **Fatal** Crash} = \frac{\text{Total Reported **Fatal** Injuries}}{\text{Reported Occupancy}} \times 100$$

$$\text{Probability of Crash to cause **Injury**} = \frac{\text{Total Reported **Non-Fatal** Injuries}}{\text{Reported Occupancy}} \times 100$$

TOP MAKES – OVERALL

With our top makes established, we examined how they ranked in our safety metrics.

OVERALL

Makes	Total Accidents	Reported Occupancy	Fatality Ratio	Injury Ratio
AIR TRACTOR	431	1.03	19.74	23.71
BEECH	1,407	2.39	26.38	19.44
BOEING	1,200	72.69	4.14	7.18
CESSNA	7,103	2.00	14.90	19.27
PIPER	3,985	1.91	18.03	19.90

TOP MAKES – COMMERCIAL

With our top makes established, we examined how they ranked in our safety metrics.

COMMERCIAL

Makes	Total Accidents	Reported Occupancy	Total Injured	Fatality Ratio	Injury Ratio
AIR TRACTOR	25	1.03	0.24	19.74	23.71
BEECH	56	2.39	0.42	26.38	19.44
CESSNA	237	2.00	0.39	14.90	19.27
PIPER	140	1.91	0.37	18.03	19.90
RAYTHEON	17	3.57	0.47	27.44	15.91

TOP MAKES – PRIVATE

With our top makes established, we examined how they ranked in our safety metrics.

PRIVATE

Makes	Total Accidents	Reported Occupancy	Total Injured	Fatality Ratio	Injury Ratio
BEECH	1,085	2.39	0.42	26.38	19.44
CESSNA	5,586	2.00	0.39	14.90	19.27
CIRRUS	317	2.04	0.42	29.01	20.31
MOONEY	355	1.76	0.45	24.15	25.32
PIPER	3,282	1.91	0.37	18.03	19.90

TOP MAKES – CONCLUSION

Boeing performed best overall

- Did not appear in the breakdowns
- It appeared in both categories frequently, so it did not show up in the niche market
- However, this makes it an **excellent pick** for a company looking to work in both

Cessna performed best in the breakdowns, and second best overall.



05

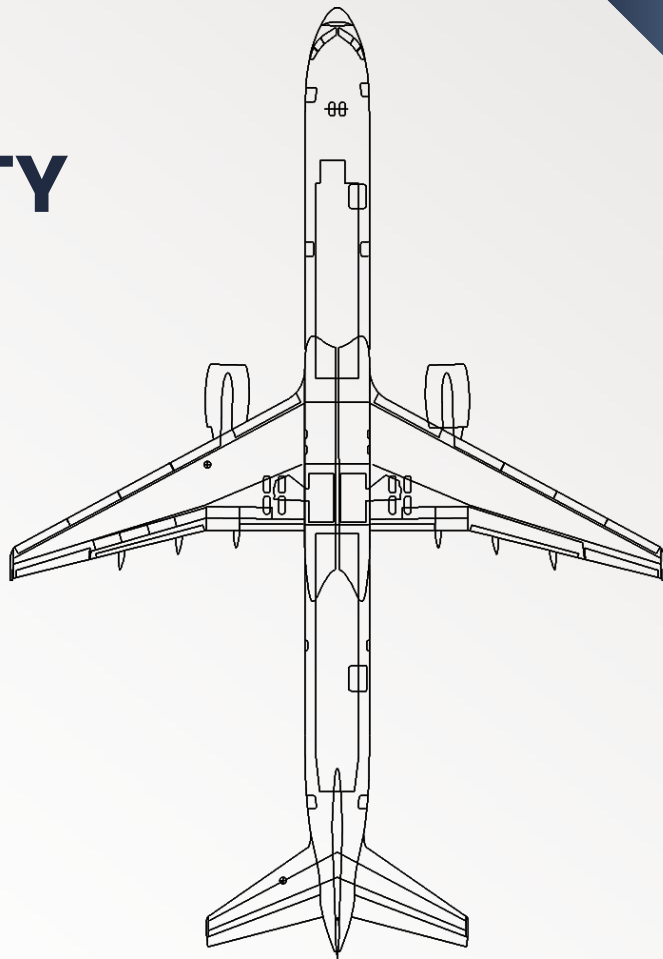
RECOMMENDATIONS



OVERALL BEST FOR SAFETY

BOEING 757251

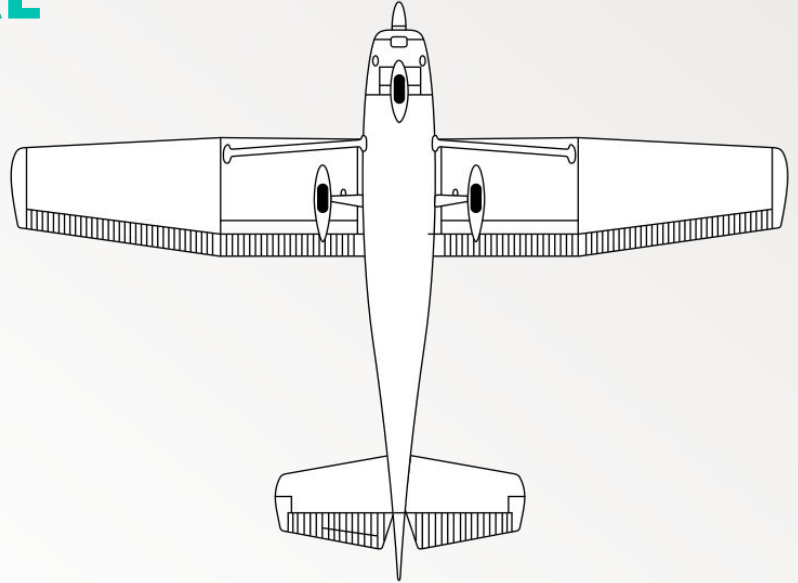
The 757251 had a **0% fatality** rate
and a **1.3% injury rate**



BEST FOR COMMERCIAL

CESSNA 152

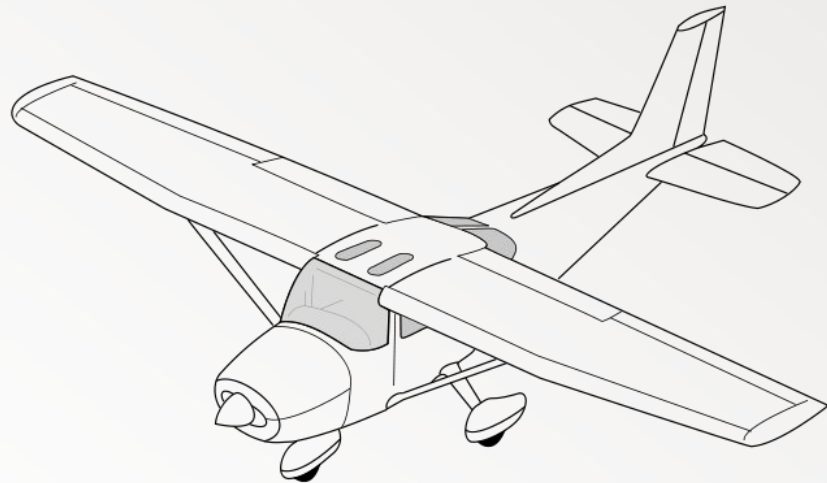
The 152 had a **9.6% fatality** rate
and a **15.4% injury rate**



BEST FOR PRIVATE

CESSNA 172-N

The 152 had a **11.3% fatality** rate
and a **19.7% injury rate**





06

FURTHER RESEARCH





FURTHER RESEARCH

Acquire more robust aircraft flight data.

Financial Analysis.

Any Questions?

Repo Available Here: <https://github.com/mcumiskey/Aviation-Risk-Analysis>

Interactive Dashboard:

https://public.tableau.com/views/Aviation_Project_17242489618110/Dashboard1?:language=en-US&publish=yes&:sid=&:redirect=auth&:display_count=n&:origin=viz_share_link

Presented by Miles Cumiskey and Joey Barilla